

Prevalence of Insomnia: A Survey of the Enrollees at Five Managed Care Organizations

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Abstract

The purpose of the study was to assess the prevalence of and factors associated with insomnia among enrollees of managed care organizations (MCOs). A survey was distributed either by mail or during a clinic visit to 7,500 enrollees of five MCOs in the United States. The survey included a sleep questionnaire, demographic questions, and questions about medical encounters and prescription drug use. Three levels of insomnia (none; level I—difficulty initiating or maintaining sleep; level II—insomnia with daytime dysfunction) were defined from the responses. Comorbidities were determined by proxy from prescription drug use reported by respondents. A total of 3,447 survey responses were received, yielding a response rate of 46%. Level I and level II insomnia was reported by 13.5% and 32.5% of the respondents, respectively. Level II insomnia increased with decreasing education, income, and age and was more prevalent in women and non-Caucasians. Insomnia was significantly correlated with all daytime sleepiness and most nighttime disturbances factors. Fifty-two percent of all respondents reported at least one comorbid condition. Respondents with multiple comorbidities reported level II insomnia more frequently than those with no comorbidities. Only 0.9% of clinic visitors were seeing a physician specifically for sleep problems. Of those with level I and level II insomnia, only 5.5% and 11.6%, respectively, were

taking prescription medications specifically for sleep problems; 11.2% and 21.4%, respectively, were taking over-the-counter medications for sleep. Insomnia occurs in MCO enrollees at rates comparable to those found in the general population. However, few patients with insomnia are actually being treated for their condition. Proper evaluation, diagnosis, and treatment of insomnia are warranted.

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Insomnia affects more than 60 million Americans each year, half of whom describe it as a serious health concern.¹ Insomnia occurs among general populations at the rate of 20%–30%.²⁻⁵ The differences in reported rates of insomnia may be due to varying definitions (including differing age distributions) and the different nationalities of the study populations. In general, insomnia has been reported to be more prevalent in females, the unemployed, and the unmarried.³ Several studies have shown that insomnia increases with increasing age⁵⁻⁷; another showed that it peaks in late middle age (45–64 years).³

Insomnia has been found to be linked to various health problems. According to the National Health Interview Survey, persons sleeping 7 or 8 hours per night made fewer physician visits and spent fewer days in the hospital than did those sleeping for a greater or lesser number of hours.⁸ The 1979 National Survey of Psychotherapeutic Drug Use showed that insomnia (defined as sleep onset or maintenance problems) was associated with multiple health problems.⁹ A study among 3,201 Swedish men age 30–69 years reported that sleep complaints were nearly twice as common among men who had regular medical check-ups for somatic diseases.⁷ A study in Germany found that moderate-to-severe insomnia constituted a significant burden for primary care physicians, with the average annual consultation rate among patients with mild, moderate, or severe insomnia significantly higher

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than that of persons with no sleep disorders.⁵ Chronic somatic and psychiatric disorders were linked to sleep problems in a 1993 study among 2,512 general-practice patients age 18–65 years who completed a questionnaire.¹⁰ Severe insomnia was found in 18.7% of this cohort, and there was a high comorbidity of severe insomnia with chronic somatic and psychiatric disorders, especially depression. Measurement of sleep problems in the Medical Outcomes Study revealed generally high associations between many of the sleep measures and other health measures, suggesting that sleep measures are indicators of health.¹¹ Persons reporting sleep problems are known to have a greater likelihood of comorbid physical conditions; further, an association has been found between sleep problems and other health problems that may require medical attention by primary caregivers.²

Despite the demonstrated link between health problems and insomnia, the incidence of insomnia remains largely underestimated. One report stated that only 5% of the estimated 65 million persons with insomnia in the United States visited their physician specifically for insomnia, and 69% never mentioned it when visiting their physicians for other reasons.¹² Another study revealed that in more than half the cases of insomnia, the general practitioner was unaware that the patient had a sleep problem.¹⁰

This report presents the results of a survey among managed care organization (MCO) enrollees in the United States. The study was performed to determine whether insomnia rates among MCO enrollees reflect those found in other populations; that is, whether (1) insomnia occurs in about 20%–30% of a healthy population and at a higher rate in a population seeking health care (ie, a health-compromised population); (2) insomnia rates are higher among the elderly, females, and persons of lower socioeconomic status; and (3) insomnia is underreported by patients and underdiagnosed and undertreated by physicians. We also wished to determine what types of medical problems are most closely linked to insomnia and hypothesized that persons with multiple medical problems would have higher insomnia rates than persons with fewer problems. Finally, we expected that daytime sleepiness factors and nighttime disturbance factors would be highly correlated with insomnia levels.

... METHODS ...

Study Design

This study was carried out at five American Medical Group Association® members: Lovelace Health System (Albuquerque, NM); Lewis-Gale Clinic (Salem, VA); Cleveland Clinic (Cleveland, OH);

Sutter/CHS (Sacramento, CA); and Geisinger Clinic (Danville, PA). Two data collection methods were used. First, each clinic mailed questionnaires to 1,100 randomly selected persons enrolled in its healthcare system who were not actively seeking care. This group was considered a healthy, or well, population. Second, each clinic distributed questionnaires to 400 persons who were visiting the clinic. These clinic visitors were considered a less-than-healthy population.

Survey Questionnaire

The questionnaire was a two-page, double-sided scan form of the Health Status Questionnaire with all the SF-36 Health Survey¹³ items and a three-question depression screen, a sleep questionnaire, demographic questions, and questions about medical encounters and prescription and over-the-counter drug use. It was distributed by mail and in the clinics between May 1995 and January 1996. Of the 5,500 mailed surveys, 1,740 (31.6%) responses were received. Of the 2,000 clinic surveys, 1,707 (85.3%) responses were received.

Data Compilation and Statistics

Data from the mail surveys and the clinic surveys were compiled both separately and in combination to describe the well population, the less-than-healthy population, and the total (combined) population of MCO enrollees. Data were compiled and analyzed by the American Medical Group Association's Quality Management and Research Department (Alexandria, VA).

Responses to questions about prescription drug use at the time the survey was completed were used as an index (proxy) for comorbid conditions. This index was broadly divided into nine disease categories: endocrine, nutritional, metabolic, and immunity; circulatory system; respiratory system; musculoskeletal and connective tissue; genitourinary; digestive system; brain, nervous system, and sense organs; infection and parasitic; and other.

The sleep section of the questionnaire contained three categories of questions dealing with sleep loss, daytime sleepiness, and nighttime disturbances. Each category consisted of five questions. Appendix A shows the categories, question numbers, questions, and abbreviations for the questions that are used throughout this report. Using the responses to the five questions in the sleep loss category, three levels of insomnia were defined as shown in Appendix B.

Correlations between daytime sleepiness and nighttime disturbances were calculated by using the Spearman correlation coefficient. The chi-square test was performed to determine whether there were sta-

tistically significant differences in insomnia distribution between different groups. The significance level was set at $P < 0.05$ unless otherwise specified.

... RESULTS ...

Demographics

In general, survey respondents were middle class and fairly well educated (Table 1). There were more female than male respondents, and the population was predominantly Caucasian (80.9%) and married (68.6%). Most (32.2%) of the respondents were between 41 and 55 years of age, 8.2% were less than 25 years of age, and 9.1% were over 70 years of age.

When the mail and clinic surveys were compared, the respondents to the mail survey (well population) were significantly ($P < 0.05$) more affluent, better educated, more likely to be non-Caucasian, and younger than the clinic survey respondents. There were more married persons in the mail survey group, but the difference was not statistically significant. The gender breakdown was comparable in the two survey groups.

Comorbid Conditions

Figure 1 shows the percentage of mail, clinic, and total (combined) respondents reporting each of the nine comorbid index categories. Persons with insomnia were more likely to report comorbid index categories. Circulatory system disorders were the most frequently reported disorders by patients with both insomnia levels. Persons with level II insomnia were more likely to report nervous system comorbidities (17.74%) than were patients with level I (8.41%) or no (8.30%) insomnia.

Respondents with level II insomnia reported multiple comorbidities more frequently than did those with no insomnia. Among all respondents (mail and clinic), those with level II insomnia reported three or more comorbid index categories at a rate of 9.59%, compared with only 5.93% of persons with no

insomnia. Overall, at the time of this study, 48% of respondents were not taking any prescription drugs; 30% were taking drugs indicated for one comorbid index category; 14.8%, for two categories; 4.8%, for three categories; 1.9%, for four categories; and 0.2%, for five categories.

Insomnia

The prevalence of insomnia among the survey respondents is shown in Table 2. Level I insomnia was found in 13.5% and level II insomnia in 32.5% of the total survey population. The rates of level I and level II insomnia among mail survey respondents were 14.5% and 30.6%, respectively; among clinic survey respondents, the rates were 12.4% and 34.2%, respectively. The difference in insomnia rates between the mail and clinic responses was statistically significant ($P = 0.036$).

Levels of insomnia in the various demographic categories were examined (Table 3). Level II insomnia was found to be inversely related to education, age, and income. It was also more prevalent in women than

Table 1. Demographics of Survey Respondents

Demographic Group (n = 3,447)	Respondents (%)		
	Mail Survey	Clinic Survey	Total Survey
Annual Income (\$)			
<30,000	24.3	37.2	30.4
30,000-60,000	44.1	41.3	42.8
>60,000	31.6	21.4	26.9
Gender			
Male	38.1	38.1	38.1
Female	61.9	61.9	61.9
Education			
High school or less	30.1	33.7	31.9
More than high school	69.6	66.3	68.1
Marital Status			
Married	69.6	67.6	68.6
Other	30.4	32.4	31.4
Race			
Caucasian	78.0	83.9	80.9
Other	22.0	16.1	19.1
Age (yr)			
≤25	7.5	8.8	8.2
26-40	24.7	27.7	26.2
41-55	36.3	28.5	32.3
56-70	24.1	24.3	24.2
>70	7.5	10.6	9.1

men and in non-Caucasians than Caucasians. These relationships held true for all three groups of respondents (mail, clinic, and total). Further, level II insomnia was found to be more prevalent among clinic than mail respondents in all demographic groups except males and those over 70 years of age.

Daytime Sleepiness and Nighttime Disturbance Factors

Table 4 shows the number and percentage of respondents who answered "yes" or "no" to each of the sleep loss, daytime sleepiness, and nighttime disturbances questions. Most of the daytime sleepiness and nighttime disturbances factors were significantly ($P < 0.01$) correlated with level II insomnia. A weak correlation was found between insomnia and sleeping

more than 9 out of 24 hours, sleepwalking, bed wetting, and falling out of bed.

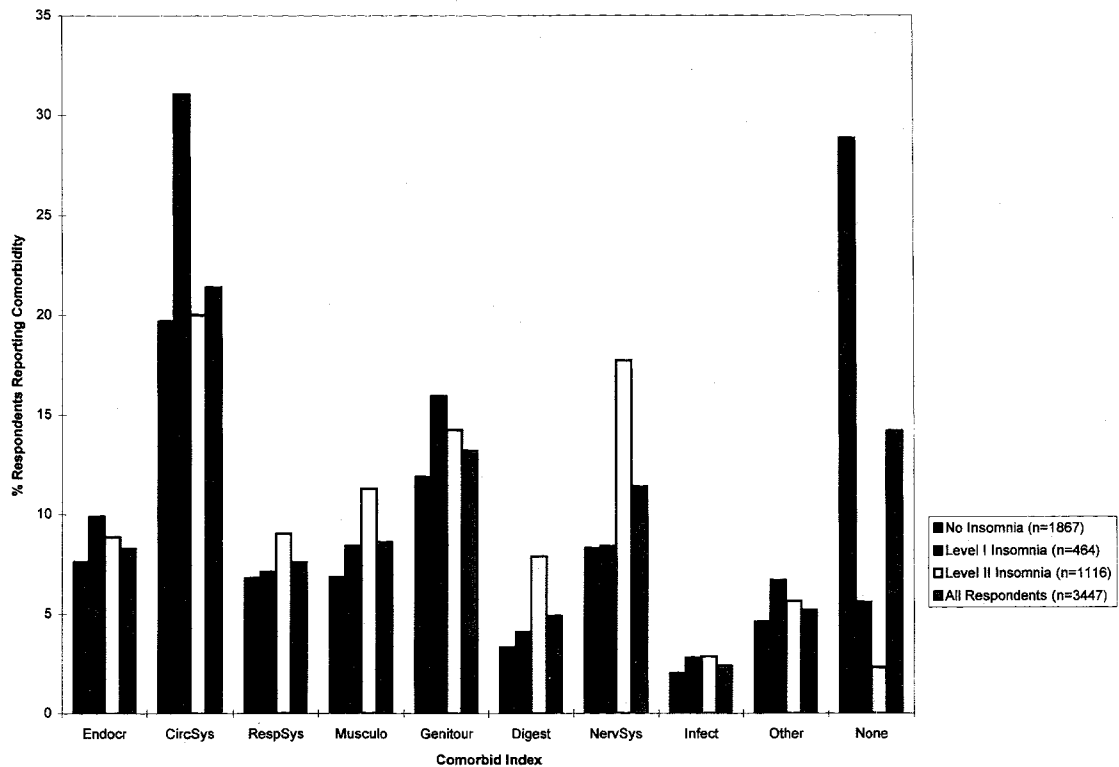
Physician Awareness

Only 0.9% of the clinic visitors reported that they were there to see a physician specifically for sleep problems. Of those with level I and level II insomnia, only 5.5% and 11.6%, respectively, were taking prescription medications specifically for sleep problems; 11.2% and 21.4% were taking over-the-counter medications for sleep.

... DISCUSSION ...

Data presented in this study confirmed that insomnia occurs among MCO enrollees at rates that are at

Figure 1. Percentage of Survey Respondents With Each Level of Insomnia Reporting Each Category of the Comorbidity Index



Respondents may be represented in more than one index category.

Category key: Endocr = endocrine, nutritional, metabolic, and immunity; CircSys = circulatory system; RespSys = respiratory system; Musculo = musculoskeletal and connective tissue; Genitour = genitourinary; Digest = digestive system; NervSys = brain, nervous system, and sense organs; Infect = infectious and parasitic; Other = other; None = no comorbidity reported.

least equal to, and perhaps slightly higher than, rates found in the general population. As expected, the level II insomnia rate among the less-than-healthy population of MCO enrollees was found to be higher than that of the well population (34.2% vs. 30.6%, respectively). Of interest, the return rate differed considerably between mail and clinic surveys (31.6% vs. 85.3%). The low return rate of the mail surveys may limit the generalizability of the mail survey results. It appears that those who returned the questionnaires were predominantly middle class and well educated.

For the most part, insomnia rates among the various demographic groups of MCO enrollees reflect those that have been reported in other general populations. That is, insomnia was found to be more prevalent among females than males, to be inversely related to income and education, and to be more prevalent among non-Caucasians than Caucasians.

Interestingly, among the MCO enrollees, those under 25 years of age reported level II insomnia at the highest rate. The rate decreased with age, and those over 70 years of age reported level II insomnia at the lowest rate. However, level I insomnia showed the opposite pattern: it was least frequent among those under 25 years of age and increased with age so that those over 70 had the highest level I insomnia rate. A recent report stated that the nature of insomnia differs among age groups; among older persons the chief sleep complaint is difficulty

staying asleep, whereas in younger persons the chief complaint is difficulty falling asleep.¹⁴ In our study, the presence of daytime dysfunction was considered the

Table 2. Prevalence of Insomnia Among Survey Respondents*

Insomnia Level	Mail Survey		Clinic Survey		Total Survey	
	No.	(%)	No.	(%)	No.	(%)
No Insomnia	956	(54.9)	911	(53.4)	1,867	(54.2)
Level I Insomnia	252	(14.5)	212	(12.4)	464	(13.5)
Level II Insomnia	532	(30.6)	584	(34.2)	1,116	(32.5)
Total No.	1,740		1,707		3,447	

*Chi square with 2 degrees of freedom = 6.641; P = 0.036

Table 3. Level II Insomnia Rates Among Different Groups

Group (n = 3,447)	Level II Insomnia Rate*			
	No.	Mail Survey	Clinic Survey	Total Survey
Annual Income (\$)†				
<30,000	886	30.08	35.50	33.18
30,000-60,000	1,779	31.76	34.47	33.15
>60,000	782	28.86	31.16	29.72
Gender‡				
Male	1,313	26.70	24.42	25.57
Female	2,134	32.94	40.45	36.64
Education‡				
High school or less	1,024	31.71	36.21	34.05
More than high school	2,423	30.13	33.30	31.67
Marital Status‡				
Married	2,365	28.80	32.43	30.55
Other	1,082	34.69	36.98	35.85
Race§				
Caucasian	2,789	29.85	33.50	31.72
Other	658	32.98	38.95	35.47
Age (yr)§				
≤ 25	283	43.48	47.89	45.91
26-40	903	33.86	39.46	36.89
41-55	1,113	33.27	38.56	35.67
56-70	834	22.22	26.09	24.21
> 70	314	19.13	16.47	17.54

*Rate=percentage of respondents with level II insomnia in each demographic group

†Significant difference, P <0.05.

‡Significant difference, P <0.001

§Not significant.

differentiating factor between level I and level II insomnia. Perhaps the insomnia of older persons does not tend to result in daytime dysfunction, or perhaps daytime dysfunction is not noticed by these individuals because it is already a regular part of their lives.

This study corroborated the published reports on the high degree of correlation between insomnia levels and most daytime sleepiness and nighttime disturbances. However, nighttime disturbances such as

sleepwalking, bed wetting, and falling out of bed were not correlated with insomnia.

The link between health problems and insomnia reported by others was supported by this research. Approximately 98% of those with level II insomnia and 94% of those with level I insomnia reported having comorbid conditions, compared with 71.2% of those with no insomnia. The less-than-healthy population (clinic respondents) in this study had higher

Table 4. Prevalence of Sleep Loss, Daytime Sleepiness, and Nighttime Disturbances

Question	Response	Mail Survey		Clinic Survey		Total Survey	
		No.	%	No.	%	No.	%
A1. Difficulty falling asleep	Yes	389	22.3	471	27.6	860	24.9
	No	1,351	77.7	1,236	72.4	2,587	75.1
A2. Awaken too early	Yes	452	25.9	453	26.5	905	26.3
	No	1,288	74.1	1,254	73.5	2,542	73.7
A3. Trouble going back to sleep	Yes	451	25.9	484	28.4	935	27.1
	No	1,289	74.1	1,223	71.6	3,512	72.8
A4. Tired in the morning	Yes	774	44.5	767	44.9	1,541	44.7
	No	966	55.5	940	55.1	1,906	55.3
A5. Sleep loss affects mood	Yes	578	33.2	591	34.6	1,169	33.9
	No	1,162	66.8	1,116	65.4	2,278	66.1
B1. Falling asleep	Yes	488	28.0	431	25.2	919	26.7
	No	1,252	72.0	1,275	74.8	2,527	73.3
B2. Excessive sleepiness	Yes	131	7.5	169	9.9	300	8.7
	No	1,609	92.5	1,538	90.1	3,147	91.3
B3. Sleep > 9 hours	Yes	116	6.7	164	9.6	280	8.1
	No	1,624	93.3	1,543	90.4	3,167	91.9
B4. Snore heavily	Yes	285	16.4	278	16.3	563	16.3
	No	1,455	83.6	1,429	83.7	2,884	83.7
B5. Breathing pauses	Yes	111	6.4	109	6.4	220	6.4
	No	1,629	93.6	1,598	93.6	3,227	93.6
C1. Legs jerk	Yes	348	20.0	332	19.5	680	19.7
	No	1,392	80.6	1,375	80.5	2,767	80.3
C2. Sleepwalking	Yes	14	0.8	9	0.5	23	0.7
	No	1,726	99.2	1,698	99.5	3,424	99.3
C3. Nightmares	Yes	168	9.7	198	11.6	366	10.6
	No	1,572	90.3	1,509	88.4	3,081	89.4
C4. Bed wetting	Yes	7	0.4	18	1.1	25	0.7
	No	1,733	99.6	1,689	98.9	3,422	99.3
C5. Fallen out of bed	Yes	8	0.5	5	0.3	13	0.4
	No	1,732	99.5	1,702	99.7	3,434	99.6

insomnia rates than the well population (mail respondents) in all but two of the demographic groups. Further, respondents with level II insomnia were more likely to report three or more comorbidities than were those with no insomnia.

Prescriptions related to circulatory-system comorbid conditions were most frequently reported by all survey respondents. However, among persons with level II insomnia, prescriptions for brain and nervous system drugs were reported at a rate nearly equal to that of circulatory-system drugs.

This study supported our hypothesis that insomnia is underreported, underdiagnosed, and undertreated. Although 34.2% of the less-than-healthy population were suffering from insomnia, only 0.9% were seeing their physician specifically for that problem, and only 6.1% were taking a prescription medication for insomnia. However, the survey did not measure how many persons with insomnia mentioned the problem to their physicians.

Several significant implications for primary care physicians and MCOs arise from the results of this study. One of every three persons seeking health care is likely to have level II insomnia but is unlikely to be seeking care for that specific reason. Therefore, these individuals are unlikely to receive treatment for insomnia. Because insomnia is quite prevalent among those with somatic and psychiatric disorders, but may not be mentioned by these patients, it is important for physicians to ask their patients about their sleep. Adequate diagnosis and treatment of insomnia may have an impact on healthcare dollars spent, patient quality of life, and patient satisfaction with healthcare.

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Appendix A. Questions Regarding Sleep Loss, Daytime Sleepiness, and Nighttime Disturbances*

Category	Question	Abbreviation
Sleep Loss	A1. Do you often have difficulty falling asleep?	Difficulty falling asleep
	A2. Do you awaken too early in the morning?	Awaken too early
	A3. If you frequently awaken during the night, do you have difficulty going back to sleep?	Trouble going back to sleep
	A4. Do you often feel tired when you awaken in the morning?	Tired in the morning
	A5. Does sleep loss affect your mood during the day, making you feel tense, irritable, or depressed?	Sleep loss affects mood
Daytime Sleepiness	B1. Do you often find yourself falling asleep when you don't intend to, such as while driving, viewing television, or watching movies?	Falling asleep
	B2. Does excessive sleepiness often interfere with your work or social life?	Excessive sleepiness
	B3. During a 24-hour period, do you usually sleep more than 9 hours?	Sleep > 9 hours
	B4. Do you snore heavily most nights?	Snore heavily
	B5. Have you been told you have long pauses in your breathing during sleep?	Breathing pauses
Nighttime Disturbances	C1. Do your legs jerk frequently or feel uncomfortable or restless before or during sleep?	Legs jerk
	C2. Have you recently walked in your sleep?	Sleepwalking
	C3. Do you often have disturbing nightmares?	Nightmares
	C4. Do you sometimes wet the bed at night?	Bed wetting
	C5. Have you recently fallen out of bed?	Fallen out of bed

*Questions from the Health Status Questionnaire (HSQ) HSQ 2 0, Type Specification 4/1/93, ©Health Outcomes Institute, 1993.

Appendix B. Sleep Loss Questions and Definitions of Insomnia Levels

Question	
A1. Do you often have difficulty falling asleep?	
A2. Do you awaken too early in the morning?	
A3. If you frequently awaken during the night, do you have difficulty going back to sleep?	
A4. Do you often feel tired when you awaken in the morning?	
A5. Does sleep loss affect your mood during the day, making you feel tense, irritable, or depressed?	
Response	Insomnia Level
No to all of A1-A5	No Insomnia
Yes to any of A1-A3 and No to A4 and A5	Level I Insomnia
Yes to any of A1-A3 and Yes to A4 or A5	Level II Insomnia