Volume 1, Issue 1,

2012

Insomnia *ROUNDS*

Offered by the Canadian Sleep Society for the continuing education of physician colleagues

Insomnia: Prevalence, Burden, and Consequences

By CHARLES M. MORIN, PhD

Insomnia is a significant and costly public health problem. It is among the most frequent complaints in primary-care medicine. Persistent insomnia represents an important health burden for the individual and for society at large, as evidenced by its adverse impact on quality of life, occupational functioning, and psychological and mental health. Despite its negative consequences, insomnia often remains unrecognized and untreated due to important barriers to assessment and management. This issue of *Insomnia Rounds* summarizes the most current evidence on the nature of insomnia, its prevalence, burden and consequences to the Canadian population, and addresses key issues related to assessment and diagnosis of insomnia.

Manifestations of Insomnia - How to Recognize and Diagnose

Insomnia is characterized by dissatisfaction about sleep quality or duration. Subjective complaints include difficulty falling asleep at bedtime, waking up at night and having difficulty going back to sleep, waking up too early in the morning with an inability to return to sleep, or a complaint of non-restorative sleep. These nocturnal symptoms routinely lead to daytime fatigue, decreased energy, problems with cognitive functions (attention, memory), and mood disturbances (dysphoria, irritability), which can produce significant distress and functional impairments at home, work or in social endeavors.^{1,2} Daytime impairment is often the main reason individuals with insomnia seek treatment.

Presentation

Insomnia symptoms are not mutually exclusive; for example, a person may present with sleep onset as well as maintenance difficulties. In a recent Canadian survey,³ the combination of at least 2 symptoms (usually trouble falling and staying asleep) was the most common presentation (47%), followed by 28% who reported initial insomnia, 15% middle-of-the-night insomnia, and 10% early morning awakenings. Nonrestorative sleep or poor sleep quality was reported by more than two-thirds (37%) of respondents, and the majority (71%) reported another concomitant insomnia symptom. The type of problems may also change over time. Difficulties falling asleep are more common early on in the course of insomnia, while problems maintaining sleep or mixed onset and maintenance insomnia become more prevalent with persistent insomnia.

Comorbidity with other medical or psychiatric disorders

Insomnia may present as a disorder on its own, but more frequently it presents in association with another medical or psychiatric disorder. Psychiatric comorbidity is particularly high with anxiety, mood, and substance abuse disorders.^{4,5} In the 2002 United States National Health Interview Survey, individuals with insomnia were more than 5 times as likely to

Available online at (www.insomniarounds.ca



President

Shelly K. Weiss, MD Hospital for Sick Children Toronto, ON Past President and Editor Insomnia Rounds Helen S. Driver, PhD, RPSGT, DABSM Queen's University Departments of Medicine and Psychology Sleep Disorders Laboratory, Kingston General Hospital Kingston, ON Vice-President, Research Célyne H. Bastien, PhD École de psychologie/School of Psychology Université Laval Quebec, OC Vice-President, Clinical Charles Samuels, MD, CCFP, DABSM Centre for Sleep and Human Performance Calgary, AB Secretary / Treasurer Reut Gruber, PhD McGill University, Douglas Institute Montreal, QC Member-at-Large (Technologist) Jeremy Gibbons, BSc, RPSGT Hospital for Sick Children Toronto, ON Member-at-Large (Technologist) Natalie Morin, RPSGT Ottawa, ON Member-at-Large (Student) Christian Burgess Department of Cell and Systems Biology University of Toronto Toronto, ON Member-at-Large (Student) Samar Khoury Hôpital du Sacré-Coeur de Montréal Centre d'études avancées en medecine du sommeil Montreal, QC Member-at-Large (Membership) Glendon Sullivan, MD Atlantic Health Sciences Centre Saint John, NB Member-at-Large (Physician speciality) Judith A. Leech, MD, FRCPC The Ottawa Hospital Sleep Centre Ottawa, ON Member-at-Large (Dental) Fernanda Almeida, DDS, MSc, PhD University of British Columbia Vancouver, BC Member-at-Large (Newsletter & Website) Stuart Fogel, PhD Centre de Recherche, Institut Universitaire de Gériatrie de Montréal (CRIUGM) Montreal, QC

present with anxiety or depression than individuals without insomnia.⁵ There is also evidence of high rates of comorbidity between insomnia and medical conditions such as pain, hypertension and congestive heart failure, diabetes, and obesity.^{5,6}

The next edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) is likely to move away from the distinction between primary and secondary insomnia, partly because it is often difficult to determine which condition is the cause and which is the consequence, and this relationship may also change over time. For instance, although insomnia can be a symptom of another medical (pain) or psychiatric (depression) disorder, its persistent form can also lead to major depression and even exacerbate pain-related conditions. Proposed new DSM-5 criteria for insomnia can be viewed at the American Psychiatric Association website.¹

Sleep history

The diagnosis of insomnia is based on clinical symptoms, and a detailed sleep history is necessary to reach an accurate diagnosis. Because of the heterogeneity of insomnia complaints and its multiple origins, the assessment should cover the following:⁷

- the nature of the sleep complaint, its onset and circumstances, duration, severity, and course
- the patient's sleep-wake schedule, pre-bedtime routines, daytime functions
- · medical and psychiatric contributing factors
- · other sleep-related symptoms
- alleviating and exacerbating factors, medication and substance use, and current and past treatments

Sleep diary

The sleep diary is a useful tool to complement baseline clinical evaluation and to monitor treatment progress. A typical diary (Table 1) includes entries for bedtime, awakening time, and estimates of time to fall asleep, number and duration of awakenings, sleep time, and sleep quality.⁸ The patient should complete this diary on a daily basis, typically upon arising in the morning, before and during the course of treatment.

Insomnia Severity Index

The Insomnia Severity Index⁹ is another useful tool that patients can fill out as part of their initial evaluation and to document treatment outcome (Table 2). In-laboratory polysomnography is not indicated for the routine evaluation of insomnia; its main indication is for patients with excessive daytime sleepiness or with symptoms of other disorders such as sleep apnea or periodic limb movements.

Prevalence - Who Gets Insomnia?

Insomnia is among the most prevalent complaints brought to the attention of primary-care physicians. Approximately 20% of patients seen by primary-care physicians report significant sleep disturbances.¹⁰ Insomnia affects all segments of the population, including children and the elderly. While precise estimates vary as a function of definitions and methodology, approximately 40% of adults (\geq 18 years of age) report at least 1 symptom of insomnia 3 times per week, 20% are dissatisfied with their sleep, and about 10%-13% meet criteria for an insomnia disorder (Figure 1).^{3,11,12}

Insomnia is more prevalent among women, middleaged and older adults, and individuals with poor self-rated physical or psychological mental health.³ Difficulties initiating sleep are more common among young adults, and problems maintaining sleep become more frequent among middle-aged and older adults.⁴ The incidence of insomnia is also higher among first-degree family members than in the general population, with mothers and daughters being the most frequently affected.¹³ It is unclear whether this familial link is inherited through a genetic predisposition, learned by observations of parental models, or simply a byproduct of another psychopathology.

Insomnia can be a situational, recurrent, or persistent problem. Even with chronic insomnia there is variability across nights, with a good night's sleep interspersed between several poor ones. Acute insomnia is usually triggered by stressful life events or changes in sleep schedules, and usually resolves once the precipitating event has subsided. It can also follow an intermittent course, with recurrent episodes of sleep difficulties closely associated with stressful events. However, for some individuals, perhaps those more vulnerable to insomnia, sleep difficulties persist after the initial cause has disappeared.



Table 1. Consensus Sleep Diary – sample page

	Sample			ID/Name:				
Today's date	4/5/11							
1. What time did you get into bed?	10:15 p.m.							
2. What time did you try to go to sleep?	11:30 p.m.							
3. How long did it take you to fall asleep?	55 min.							
4. How many times did you wake up, not counting your final awakening?	3 times							
5. In total, how long did these awakenings last?	1 hour 10 min.							
6. What time was your final awak- ening?	6:35 a.m.							
7. What time did you get out of bed for the day?	7:20 a.m.							
8. How would you rate the quality of your sleep?	 Very poor Poor Fair Good Very good 	 Very poor Poor Fair Good Very good 	 Very poor Poor Fair Good Very good 	 Very poor Poor Fair Good Very good 	 Very poor Poor Fair Good Very good 	 Very poor Poor Fair Good Very good 	 Very poor Poor Fair Good Very good 	 Very poor Poor Fair Good Very good
9. Comments (if applicable)	I have a cold							

Reproduced with permission from Carney CE et al. Sleep. 2012;35(2):287-302. Copyright © 2012, Associated Professional Sleep Societies, LLC.

Longitudinal studies reveal that nearly 70% of individuals with insomnia at baseline present with persistent insomnia a year later, and 50% continue reporting insomnia up to 3 years later.^{14,15} Thus, clinicians should attend to insomnia complaints and not presume that a situational problem will necessarily subside with time.

Burden and Consequences – What is the Cost of Insomnia?

The impact of persistent insomnia should not be underestimated. Significant adverse effects on the individual as well as on society have been documented in several domains:^{4,10,16-19}

- Psychosocial: reduced quality of life and increased risks of depression
- Occupational: reduced productivity and increased disability
- · Economic: higher healthcare utilisation
- Public safety: increased risks of accidents due to impaired vigilance

Reduced quality of life and psychosocial functioning

Persons with insomnia experience more subjective impairments of waking behaviours and psychosocial func-

tioning, relative to those without insomnia. These include problems with attention and memory, mood disturbances, lower ratings of enjoyment of interpersonal relationships, and more days where they are unable to work or carry out normal role-related activities.^{4,10,20}

Insomnia is associated with impaired cognitive skills, including attention, memory, and vigilance, all of which may contribute to significant functional impairments at work, at home, or while driving a motor vehicle. In a Canadian study by Daley et al,¹⁷ individuals with an insomnia disorder reported more frequent absences from work (4.4 days annually specifically due to insomnia) and greater reduction of productivity relative to good sleepers. Higher rates of accidents among individuals with insomnia have also been linked to impaired vigilance caused by a cumulative sleep loss. Although absenteeism and accidents cannot always be linked exclusively to sleep difficulties (comorbid disorders can also contribute to these problems), they represent 2 of the main reasons individuals seek help.¹¹

Increased risk of psychiatric disorders

Evidence from longitudinal studies indicates that insomnia is an important risk factor for new-onset psychiatric disorders, most notably major depression, anxiety,

Table 1	2.	Insomnia	Severity	y Index	(ISI)
---------	----	----------	----------	---------	-------

Subject ID:	ct ID: Date:				
For each question below	, please circle the numb	er corresponding most accur	ately to your sleep patte	erns in the LAST MONTH.	
For the first three questio 1. Difficulty falling aslee	ns, please rate the SEVE p:	RITY of your sleep difficulties	5.		
None	Mild	Moderate	Severe	Very Severe	
0	1	2	3	4	
2. Difficulty staying aslee	ep:				
None	Mild	Moderate	Severe	Very Severe	
0	1	2	3	4	
3. Problem waking up to	o early in the morning:				
None	Mild	Moderate	Severe	Very Severe	
0	1	2	3	4	
4. How SATISFIED/disso	itisfied are you with your	current sleep pattern?			
Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	
0	1	2	3	4	
5. To what extent do you function at work/daily	consider your sleep pro	bblem to INTERFERE with you memory, mood).	ur daily functioning (e.g	., daytime fatigue, ability to	
Not at all Interfering	A Little Interfering	Somewhat Interfering	Much Interfering	Very Much Interfering	
0	1	2	3	4	
6. How NOTICEABLE to	others do you think you	r sleeping problem is in term	is of impairing the quali	ty of your life?	
Not at all Noticeable	A little Noticeable	Somewhat Noticeable	Much Noticeable	Very Much Noticeable	
0	1	2	3	4	
7. How WORRIED/distre	essed are you about you	r current sleep problem?			
	A Little	Somewhat	Much	Very Much	
Not at all	/ CEIIIO				

_____ (Total score ranges from 0-28) Add scores for all seven items = ____ 0-7 = No clinically significant insomnia; 8-14 = Subthreshold insomnia; 15-21= Clinical insomnia (moderate severity); 22-28 = Clinical insomnia (severe)

Copyright © Morin, C.M. (1993, 1996, 2000, 2006).

and substance abuse disorders.^{21,22} Individuals with insomnia were nearly 4 times more likely to develop new-onset major depression over the next 3.5 years relative to individuals without insomnia at baseline; risks to develop anxiety and substance abuse disorders were 2 and 7 times higher, respectively.²¹ A systematic review of 21 longitudinal studies found that nondepressed people with insomnia had a 2-fold risk to develop depression compared to people with no sleep difficulties.²²

Insomnia and fatigue are the 2 most common residual symptoms in patients treated for depression,²³ and such residual symptoms may increase the risk of relapse for future depressive episodes. Recent clinical trials of comorbid insomnia and major depression have shown that augmentation therapy targeting insomnia symptoms specifically enhanced outcomes compared to treatment focusing on depression only.^{24,25} While the evidence is not as strong for medical as for psychiatric morbidity, at least 2 longitudinal studies have shown that chronic insomnia increases the long-term risk of cardiovascular morbidity.6,26

Economic burden

Chronic insomnia carries significant economic burden for the healthcare system and for society at large. A longitudinal study conducted with 6599 working persons (40-45 years old) in Norway¹⁹ found that insomnia was a strong predictor of permanent



work disability (odds ratio = 4.56), even after controlling for baseline exposure to disability and sick leave, sleep duration, as well as other possible confounders.

A recent study by Daley et al¹⁶ estimated the total annual cost of insomnia in the province of Quebec alone to be \$6.6 billion. This total included direct costs associated with healthcare consultations and products used to promote sleep (prescribed and overthe-counter medications, and alcohol), as well as indirect costs resulting from loss of resources (absenteeism and reduced productivity) associated with insomnia. The average annual per-person costs (direct and indirect costs combined) were \$5010 for individuals with an insomnia disorder and \$1431 for those with subsyndromal insomnia, compared to \$424 for good sleepers. The burden of illness in terms of adverse impacts on resources lost (indirect costs) was 10-fold higher than the direct costs spent for treating insomnia (ie, healthcare consultations, medications, etc; Figure 2). Thus, huge sums of money are spent annually to promote sleep, but much more is lost for untreated insomnia.

Table 3 outlines the characteristics and healthrelated burdens of individuals with insomnia.

Conclusion

Insomnia is a significant and prevalent public health problem. It may present as an independent disorder, but more often it is comorbid with another medical or psychiatric disorder. It is often a persistent condition that can lead to negative long-term outcomes both for mental and physical health. It is therefore important to recognize and treat



Indirect costs of insomnia (absenteeism/productivity) are 10 times higher than the direct costs of insomnia therapies.

Reproduced with permission from Daley et al. *Sleep*. 2009;32(1):55-64. Copyright © 2009, Associated Professional Sleep Societies, LLC.

Table 3. Individuals with Insomnia:

- Are twice as likely to be female
- Likely have a first-degree relative with insomnia
- Have a 2-fold risk to develop depression
- Are twice as likely to develop anxiety
- Are 7 times as likely to develop substance abuse disorder
- Are at increased risk of cardiovascular morbidity
- Have an odds ratio of 4.6 for permanent work disability
- Cost in excess of \$5000 per year in absenteeism and reduced productivity compared to \$424 for good sleepers

sleep/insomnia complaints early on so as to reduce psychosocial and health morbidity.

Dr. Morin is Professor of Psychology and Director, Centre d'étude des troubles du sommeil, Université Laval, Québec. He also holds the Canada Research Chair on Sleep Disorders.

References

- American Psychiatric Association. DSM-5 Development: M 00 Insomnia Disorder. Available at: http://www.dsm5.org/ProposedRevision/Pages/proposedrevision.aspx?rid=65. Accessed February 16, 2012.
- American Academy of Sleep Medicine. International Classification of Sleep Disorders: Diagnostic and Coding Manual, 2nd ed. Westchester (IL): American Academy of Sleep Medicine; 2005.
- Morin CM, LeBlanc M, Belanger L, Ivers H, Merette C, Savard J. Prevalence of insomnia and its treatment in Canada. *Can J Psychiatry.* 2011;56(9):540-548.
- Roth T, Jaeger S, Jin R, Kalsekar A, Stang PE, Kessler RC. Sleep problems, comorbid mental disorders, and role functioning in the national comorbidity survey replication. *Biol Psychiatry*. 2006;60(12):1364-1371.
- Pearson NJ, Johnson LL, Nahin RL. Insomnia, trouble sleeping, and complementary and alternative medicine: Analysis of the 2002 national health interview survey data. *Arch Intern Med.* 2006;166(16):1775-1782.
- Suka M, Yoshida K, Sugimori H. Persistent insomnia is a predictor of hypertension in Japanese male workers. J Occup Health. 2003;45(6):244-250.
- Morin CM, Benca R. Chronic insomnia. *Lancet.* 2012 Jan 19. [Epub ahead of print]
- Carney CE, Buysse DJ, Ancoli-Israel S, et al. The consensus sleep diary: standardizing prospective sleep self-monitoring. *Sleep.* 2012;35(2):287-302.
- Bastien CH, Vallières A, Morin CM. Validation of the Insomnia Severity Index as an outcome measure for insomnia research. *Sleep Med.* 2001;2(4):297-307.
- Simon GE, VonKorff M. Prevalence, burden, and treatment of insomnia in primary care. *Am J Psychiatry*. 1997;154(10):1417-1423.
- Morin CM, LeBlanc M, Daley M, Grégoire JP, Mérette C. Epidemiology of insomnia: Prevalence, self-help treatments, consultations, and determinants of help-seeking behaviors. *Sleep Med.* 2006;7(2):123-130.



- 12. Ohayon MM. Epidemiology of insomnia: What we know and what we still need to learn. *Sleep Med Rev.* 2002;6(2):97-111.
- Dauvilliers Y, Morin CM, Cervena K, et al. Family studies in insomnia. J Psychosom Res. 2005; 58(3):271-278.
- Morphy H, Dunn KM, Lewis M, Boardman HF, Croft PR. Epidemiology of insomnia: A longitudinal study in a UK population. *Sleep.* 2007;30(3):274-280.
- Morin CM, Bélanger L, LeBlanc M, et al. The natural history of insomnia: a population-based 3-year longitudinal study. *Arch Intern Med.* 2009;169(5):447-453.
- Daley M, Morin CM, LeBlanc M, Grégoire JP, Savard J. The economic burden of insomnia: Direct and indirect costs for individuals with insomnia syndrome, insomnia symptoms, and good sleepers. *Sleep.* 2009;32(1):55-64.
- Daley M, Morin CM, LeBlanc M, Gregoire JP, Savard J, Baillargeon L. Insomnia and its relationship to health-care utilization, work absenteeism, productivity and accidents. *Sleep Med.* 2009;10(4):427-438.
- National Institutes of Health. National Institutes of Health State of the Science Conference statement on Manifestations and Management of Chronic Insomnia in Adults, June 13-15, 2005. *Sleep.* 2005;28(9):1049-1057.
- 19. Sivertsen B, Overland S, Pallesen S, et al. Insomnia and long sleep duration are risk factors for later work disability. The Hordaland Health Study. *J Sleep Res.* 2009;18(1):122-128.
- Fortier-Brochu E, Beaulieu-Bonneau S, Ivers H, Morin CM. Insomnia and daytime cognitive performance: a meta-analysis. *Sleep Med Rev.* 2012;16(1):83-94.
- Breslau N, Roth T, Rosenthal L, Andreski P. Sleep disturbance and psychiatric disorders: A longitudinal epidemiological study of young adults. *Biol Psychiatry*. 1996;39(6):411-418.
- Baglioni C, Battagliese G, Feige B, et al. Insomnia as a predictor of depression: a meta-analytic evaluation of longitudinal epidemiological studies. J Affect Disord. 2011;135(1-3):10-19.
- 23. Nierenberg AA, Keefe BR, Leslie VC, et al. Residual symptoms in depressed patients who respond acutely to fluoxetine. *J Clin Psychiatry*. 1999;60(4):221-225.
- Fava M, McCall WV, Krystal A, et al. Eszopicione co-administered with fluoxetine in patients with insomnia coexisting with major depressive disorder. *Biol Psychiatry*. 2006;59(11):1052-1060.
- Manber R, Edinger JD, Gress JL, San Pedro-Salcedo MG, Kuo TF, Kalista T. Cognitive behavioral therapy for insomnia enhances depression outcome in patients with comorbid major depressive disorder and insomnia. *Sleep.* 2008;31(4):489-495.
- Mallon L, Broman JE, Hetta J. Sleep complaints predict coronary artery disease mortality in males: a 12-year follow-up study of a middle-aged Swedish population. *J Intern Med.* 2002;251(3):207-216.

ABSTRACT OF INTEREST

The consensus sleep diary: standardizing prospective sleep self-monitoring.

CARNEY CE, BUYSSE DJ, ANCOLI-ISRAEL S, EDINGER JD, KRYSTAL AD, LICHSTEIN KL, MORIN CM.

STUDY OBJECTIVES: To present an expert consensus, standardized, patient-informed sleep diary.

METHODS AND RESULTS: Sleep diaries from the original expert panel of 25 attendees of the Pittsburgh Assessment Conference(1) were collected and reviewed. A smaller subset of experts formed a committee and reviewed the compiled diaries. Items deemed essential were included in a Core sleep diary, and those deemed optional were retained for an expanded diary. Sec-

ondly, optional items would be available in other versions. A draft of the Core and optional versions along with a feedback questionnaire were sent to members of the Pittsburgh Assessment Conference. The feedback from the group was integrated and the diary drafts were subjected to 6 focus groups composed of good sleepers, people with insomnia, and people with sleep apnea. The data were summarized into themes and changes to the drafts were made in response to the focus groups. The resultant draft was evaluated by another focus group and subjected to lexile analyses. The lexile analyses suggested that the Core diary instructions are at a sixth-grade reading level and the Core diary was written at a third-grade reading level.

CONCLUSIONS: The Consensus Sleep Diary was the result of collaborations with insomnia experts and potential users. The adoption of a standard sleep diary for insomnia will facilitate comparisons across studies and advance the field. The proposed diary is intended as a living document which still needs to be tested, refined, and validated. *Sleep.* 2012;35(2):287-302.

UPCOMING CONFERENCES

June 9 – 13, 2012

SLEEP 2012: 26th Annual Meeting of the

Associated Professional Sleep Societies, LLC

Boston, Massachusetts

CONTACT: Website: http://www.sleepmeeting.org Telephone: (630) 737-9700 Fax: (630) 737-9789

June 11, 2012 – 5:00–8:30 PM

Canadian Sleep Society: Annual General Meeting Boston Public Library, 700 Boylston St., Boston, MA 02116

September 4 – 8, 2012 21st Congress of the European Sleep Research Society Paris, France CONTACT: Website: http://www.congrex.ch/esrs2012 Telephone: +41 61 686 77 77 Fax: +41 61 686 77 88

October 20, 2012 Sleep CME day: "Doc, I Can't Sleep!" -

Insomnia and Disturbed Sleep

Presented by the Canadian Sleep Society (CSS) and Continuing Professional Development (CPD) Office, Queens University Kingston, Ontario

October 4 - 7, 2013

6th Conference of the Canadian Sleep Society

Halifax, Nova Scotia

CONTACT: Website: www.canadiansleepsociety.com

Dr. Morin has received research support from Merck and sanofiaventis, and has served a consulting/advisory role for Novartis and Valeant.

Change of address notices and requests for subscriptions to *Insomnia Rounds* are to be sent by mail to P.O. Box 310, Station H, Montreal, Quebec H3G 2K8 or by fax to (514) 932-5114 or by e-mail to info@snellmedical.com. Please reference *Insomnia Rounds* in your correspondence. Undeliverable copies are to be sent to the address above. Publications Post #40032303

This activity is supported by an educational donation provided by $Valeant\ Canada$

© 2012 The Canadian Sleep Society, which is solely responsible for the contents. The opinions expressed in this publication do not necessarily reflect those of the publisher or sponsor, but rather are those of the author(s) based on the available scientific literature. Publisher: **SNELL Medical Communication Inc.** in cooperation with the The Canadian Sleep Society. The administration of any therapies discussed or referred to in *Insomnia Rounds*[™] should always be consistent with the recognized prescribing information in Canada. **SNELL Medical Communication Inc.** is committed to the development of superior Continuing Medical Education.

