

Insomnia and Its Comorbidities in Chronic Kidney Disease

Cristiano Violani, Fabio Lucidi, Alessandra Devoto, Caterina Lombardo, and Rosa Maria De Santo*

Sleep disorders are among the factors that can reduce the quality of life in patients with chronic kidney disease. Chronic kidney disease patients could benefit from an accurate evaluation and treatment of insomnia because this sleep disorder is associated with a high persistence-relapse rate, poor physical health, and mental disease (anxiety, depression) both in terms of comorbidity and antecedent. A multilayer evaluation of insomnia is possible because of valid and reliable instruments (both objective and subjective). Furthermore, a rational etiologic model of insomnia allows better understanding and treatment as a result of effective cognitive-behavioral techniques.

Semin Nephrol 26:61-63 © 2006 Elsevier Inc. All rights reserved.

KEYWORDS sleep disorders, CKD, comorbidities, etiology of insomnia, quality of life

Results of many studies indicate that sleep disorders can reduce the quality of life in patients with chronic kidney disease (CKD). The prevalence of sleep disorders among CKD patients has been estimated to be around 41% to 83% by questionnaire-based studies, the most frequent complaints being difficulty in falling asleep, difficulty in maintaining sleep, daytime sleepiness, and fatigue.¹⁻³ Laboratory studies, using nocturnal polygraphic recordings, show that uremic patients suffer from sleep fragmentation, sleep apnea, and restless leg syndrome.^{3,4} Furthermore, sleep disorders, especially sleep apnea, could predict mortality⁵ in uremic patients. Even if the high prevalence rate of sleep disorders is acknowledged consensually, most of the questionnaire-based and polygraphic-based studies fail to evaluate the severity of the sleep problems. Whether the clinical relevance of the disorder was evaluated or not may to some extent explain the broad estimate of the prevalence of sleep complaints obtained by the different study reports. For example, insomnia symptoms are reported by 36% of the general population; however, when the weekly frequency and duration of symptoms are evaluated, the prevalence decreases to 9%.⁶ The need for an accurate evaluation of the presence of all diagnostic criteria for insomnia is not a mere methodologic issue, but has direct clinical relevance, as indicated by Devoto

et al⁷ who, in a longitudinal study, found that the number of criteria satisfied in the first assessment (t_0) predicts the Diagnostic and Statistic Manual of Mental Disorders IV Edition (DSM IV) diagnosis 4 months later. Namely, 80% of the patients who satisfied at least 2 DSM IV criteria at t_0 showed a full insomnia syndrome at t_1 , whereas only 25% of the patients who satisfied 1 DSM IV criterion at t_0 showed a full insomnia syndrome at t_1 .

Insomnia and Its Comorbidities

International classification systems (ie, DSM and International Classification of Sleep Disorders [ICSD]) state that a clinically relevant sleep disorder such as insomnia can be diagnosed if its symptoms occur for at least 1 month, with a weekly frequency greater than 2 instances, and if the symptoms negatively affect diurnal well-being. A full insomnia syndrome disorder has a relevant impact on health because (1) insomnia has a high persistence-relapse rate; (2) it is associated with poor physical health, frequent accidents at work and on the road, and high social and medical costs; and (3) it is associated with mental disease—both in terms of comorbidity and as an antecedent.

Insomnia Has a High Persistence-Relapse Rate

Examining a sample of 7,954 individuals from the general population, Ford and Kamerow⁸ showed that after 1 year the persistence-relapse rate could be estimated at around 40%. A

Department of Psychology, University of Rome "La Sapienza", Rome, Italy.

*Fellow of the Istituto Italiano per gli Studi Filosofici.

Address reprint requests to Professor Cristiano Violani, Department of Psychology, University of Rome "La Sapienza", Via dei Marsi 78, 00185 Rome, Italy. E-mail: cristiano.violani@uniroma1.it

study conducted in Zurich consisted of a sample of young adults interviewed 3 times (at ages 21, 23, and 28), and showed that 19% of the sample complained about insomnia twice and 4.8% complained about insomnia in all 3 interviews.⁹

Insomnia Is Associated With Poor Health and Well-Being

Severe insomnia is associated with chronic illness, such as congestive heart failure, obstructive airway disease, prostate problems, systemic hypertension, diabetes, and rheumatic diseases.¹⁰ After controlling for other risk factors, reduced or excessive total sleep time is associated with a higher mortality rate.¹¹ Insomnia also is associated with increased accidents and work problems,^{12,13} is a strong predictor of absenteeism,¹⁴ and is associated with poor job satisfaction and work efficiency.^{13,15} Furthermore, different studies report that insomnia is associated with increased use of medical services.¹⁵⁻¹⁷ Compared with good sleepers, insomniacs visit their general practitioners and other health professionals significantly more often, use more medications, and are hospitalized more often.¹³ In CKD patients, a recent study¹ using a questionnaire that considers the DSM IV and ICSD combined criteria for insomnia,¹⁸ showed that in a sample of 140 patients in hemodialysis, the prevalence of the full insomnia syndrome is greater than that of the general population (40%), whereas only 15% of the sample declared they had no sleep complaint.

Insomnia Is Associated With Mental Disease Both in Terms of Comorbidity and as an Antecedent

Cross-sectional studies indicate that insomnia is associated highly with affective disorders (14%-31%), anxiety (26%-36%), and psychosomatic diseases.^{8,19,20} Prospective epidemiologic studies indicate that disturbed sleep is a risk factor for depression and anxiety disorders.^{8,20,21}

The Evaluation and Treatment of Insomnia

“Getting a good night’s sleep is as important for our patients as we think it is important for our children.”²² However, insomnia often is overlooked by both patients and health professionals. In the Italian general population, most patients reporting insomnia symptoms consider them personal characteristics rather than a disease.²³ In the United States, few general practitioners inquire about their patients’ sleep and most of them do not inquire about potential causes, perhaps because of a lack in basic knowledge, training, and updates on sleep disorders.^{24,25}

Notwithstanding this, the diagnosis and treatment of insomnia is not very difficult because brief and valid questionnaires and computer aided interviews are available for the screening, and ICSD-based clinical interviews, sleep diaries, and actigraphic or polysomnographic ambulatory

recordings are available for an accurate multilayer evaluation and diagnosis.^{18,26} Furthermore, the understanding and treatment of insomnia now is improved by a better knowledge of the physiologic mechanisms regulating sleep. A rational etiologic model for primary insomnia^{27,28} indicates that insomnia stems from the interaction of 3 main factors: predisposing factors (eg, an insomniac parent, hyperarousability), precipitating factors (eg, work and family stress), and perpetuating factors (eg, irregular sleep-wake schedules).

With regard to the role of perpetuating factors of insomnia on CKD patients, Lucidi et al²⁹ studied 70 CKD patients in hemodialytic treatment with regular schedules (18 had dialysis in the morning, 19 in the afternoon) and asked them to report their sleep parameters (time in bed, light off, final awakening, and so forth) in a sleep log for 14 consecutive days. Results showed that patients enrolled in the dialytic treatment in the morning reported greater wakefulness after sleep onset, shorter total sleep time, and a lower sleep efficiency index compared with those who received dialysis in the afternoon. Comparing the sleep parameters of the nights before, after, and free from dialysis, the results indicated that the dialytic schedule, similar to shift work, negatively affects the sleep/wake cycle and thus increases the risk for developing a chronic sleep disorder. For the treatment of chronic insomnia, beside effective pharmacologic treatments, a wide range of behavioral-cognitive treatments (BCTs) have been developed such as stimulus control,³⁰ sleep restriction,³¹ sleep hygiene,³² and behavioral-cognitive techniques.²⁷ There is a consensus agreement that these techniques are the most suitable treatment for chronic primary insomnia³³ and their effectiveness is documented by both randomized clinical trials and meta-analyses.³⁴⁻³⁶ The results of a recent meta-analysis³⁷ comparing BCTs and pharmacologic treatments showed that BCT is more effective than pharmacologic treatments in reducing sleep-onset latency. Furthermore, long-term results obtained through BCTs are better than pharmacologic treatment as indicated by experimental studies.^{38,39}

Conclusions

The results of the literature reviewed earlier indicate that BCTs for primary insomnia are effective, and sometimes even more effective than pharmacologic treatments. However, the question of whether BCT also is effective for insomnias secondary to medical or psychiatric disorders still must be studied. Outcome studies and case reports showed positive results in reducing insomnia symptoms secondary to chronic pain.⁴⁰⁻⁴² Lichstein et al⁴³ reported that elderly patients with insomnia secondary to medical and psychiatric disorders showed significant improvements both in objective sleep-onset latency and sleep efficiency index and in the subjective quality of sleep. Thus, even if to our knowledge no data are available on the effectiveness of BCT for sleep disorders in CKD patients, the results of the studies reviewed earlier are encouraging.

References

1. De Santo RM, Lucidi F, Violani C, et al: Insomnia is associated with systolic hypertension in uremic patients on hemodialysis. *Int J Artif Organs* 24:853-862, 2001
2. Holley JL, Nespor S, Rault R: A comparison of reported sleep disorders in patients on chronic hemodialysis and continuous peritoneal dialysis. *Am J Kidney Dis* 19:156-161, 1992
3. Walker S, Fine A, Kryger MH: Sleep complaints are common in dialysis unit. *Am J Kidney Dis* 26:751-756, 1995
4. Kimmel PL, Miller G, Mendelson WB: Sleep apnea syndrome in chronic renal disease. *Am J Med* 86:308-314, 1989
5. Benz RL, Pressman MR, Hovick ET, et al: Potential novel predictors of mortality in end-stage renal disease patients with sleep disorders. *Am J Kidney Dis* 35:1052-1060, 2000
6. Ancoli-Israel S, Roth T: Characteristics of insomnia in the United States: Results of the 1991 National Sleep Foundation Survey. I. *Sleep* 22: S347-S353, 1999
7. Devoto A, Violani C, Lucidi F, et al: Individual characteristics of insomniacs. Paper presented at the 16th Congress of the European Sleep Research Society. Reykjavik, June 3-7, 2002. Abstract 102 in *J Sleep Research*, 11, s1, 53
8. Ford DE, Kamerow DB: Epidemiologic study of sleep disturbances and psychiatric disorders: An opportunity for prevention? *JAMA* 262:1479-1484, 1989
9. Vollrath M, Wicki W, Angst J: The Zurich study. VIII. Insomnia: Association with depression, anxiety, somatic syndromes. *Eur Arch Psychiatry Neurol Sci* 239:113-124, 1989
10. Katz DA, McHorney C: Clinical correlates of insomnia in patients with chronic illnesses. *Arch Intern Med* 158:1099-1107, 1998
11. Kripke DF, Simons RN, Garfinkel L, et al: Short and long sleep and sleeping pills: Is increased mortality associated? *Arch Gen Psychiatry* 36:103-116, 1979
12. Gallup Organization: *Sleep in America*. Princeton, NJ, The Gallup Organization, 1991
13. Léger D, Guilleminault C, Biol DS, et al: Medical and socio-professional impact of insomnia. *Sleep* 25:625-629, 2002
14. Leigh P: Employee and job attributes and predictors of absenteeism in a national sample of workers: The importance of health and dangerous working conditions. *Soc Sci Med* 33:127-133, 1991
15. Lavie P: Sleep habits and sleep disturbances in industrial workers in Israel: Main findings and some characteristics of workers complaining of excessive daytime sleepiness. *Sleep* 4:147-158, 1981
16. Weyerer S, Dilling H: Prevalence and treatment of insomnia in the community: Results from the upper Bavarian field study. *Sleep* 14:392-398, 1991
17. Benca R, Quintas J: Sleep and host defenses: A review. *Sleep* 20:1027-1037, 1997
18. Violani C, Devoto A, Lucidi F, et al: Validity of a short insomnia questionnaire: The SDQ. *Brain Res Bull* 63:415-421, 2004
19. Balan S, Spivak B, Mester R, et al: Psychiatric and polysomnographic evaluation of sleep disturbances. *J Affect Dis* 49:27-30, 1998
20. Breslau N, Roth T, Rosenthal L, et al: Sleep disturbance and psychiatric disorders: A longitudinal epidemiological study of young adults. *Biol Psychiatry* 39:411-418, 1996
21. Chang PP, Ford DE, Mead LA, et al: Insomnia in young men and subsequent depression. The Johns Hopkins Precursors Study. *Am J Epidemiol* 146:105-114, 1997
22. Kimmel PL: Go to bed and get a good night's sleep: You need your rest! *Am J Kidney Dis* 35:1221-1223, 2000
23. Bosio A, Violani C, Vecchio L, et al: *Insomnia nel quotidiano: Indagine su esperienza e gestione dell'insomnia presso gli italiani. Il sonno in Italia—1997*. Milano, Poletto Editore, 1997, pp 128-131
24. Simon GE, VonKorff M: Prevalence, burden, and treatment of insomnia in primary care. *Am J Psychiatry* 154:1417-1423, 1997
25. Kryger M, Lavie P, Rosen R: Recognition and diagnosis of insomnia. *Sleep* 22:S421-S426, 1999
26. Ohayon MM, Caulet M, Priest RG, et al: DSM-IV and ICSD-90 insomnia symptoms and sleep dissatisfaction. *Br J Psychiatry* 171:382-388, 1997
27. Morin C: *Insomnia: Psychological assessment and management*. New York, Guilford Press, 1993
28. Spielman AJ, Nunes J, Glovinsky PB: *Insomnia*. *Neurol Clin* 14:513-543, 1996
29. Lucidi F, Bertini M, De Santo RM: Effetti dell'emodialisi sulla qualità del sonno. *Psicologia della Salute* 2:65-75, 1999
30. Bootzin R, Epstein D, Wood J: Stimulus control instructions, in Hauri P (ed): *Case Studies in Insomnia*. New York, Plenum Press, 1991, pp19-28
31. Spielman A, Saskin P, Thropy M: Treatment of chronic insomnia by restriction of time in bed. *Sleep* 10:45-56, 1987
32. Hauri P: Sleep hygiene, relaxation therapy, and cognitive interventions, in Hauri P (ed): *Case Studies in Insomnia*. New York, Plenum Press, 1991, pp 65-84
33. Morin C, Hauri P, Espie C, et al: Nonpharmacologic treatment of chronic insomnia. *Sleep* 22:1134-1156, 1999
34. Morin CM, Culbert JP, Schwartz SM: Nonpharmacological intervention for insomnia: A meta-analysis of treatment efficacy. *Am J Psychiatry* 151:1172-1180, 1994
35. Murtagh DRR, Greenwood KM: Identifying effective psychological treatments for insomnia: A meta-analysis. *J Consult Clin Psychol* 63: 79-89, 1995
36. Lombardo C, Violani C, Devoto A, et al: L'efficacia dei trattamenti non farmacologici dell'insomnia valutata tramite meta-analisi, in Bonsignore (ed): *G. (A cura di) Il Sonno in Italia*, Milan, Italy, Edizioni Poletto, 1997
37. Smith M, Perlis M, Park A, et al: Comparative meta-analysis of pharmacotherapy and behaviour therapy for persistent insomnia. *Am J Psychiatry* 159:5-11, 2002
38. McClusky HY, Milby JB, Switzer PK, et al: Efficacy of behavioural versus triazolam treatment in persistent sleep-onset insomnia. *Am J Psychiatry* 148:121-126, 1991
39. Morin M, Colecchi C, Stone J, et al: Behavioral and pharmacological therapies for late-life insomnia: A randomized controlled trial. *JAMA* 281:991-999, 1999
40. Cannicci J, Malcolm R, Peek LA: Treatment of insomnia in cancer patients using muscle relaxation training. *J Behav Ther Exp Psychiatry* 14:251-256, 1983
41. Stam H, Bultz BD: The treatment of severe insomnia in a cancer patient. *J Behav Ther Exp Psychiatry* 17:33-37, 1986
42. Varni JW: Behavioral treatment of disease-related chronic insomnia in a hemophiliac. *J Behav Ther Exp Psychiatry* 11:143-145, 1980
43. Lichstein K, Wilson N, Jhonson C: Psychological treatment of secondary insomnia. *Psychol Aging* 15:232-240, 2000