

Insomnia in the Elderly

Introduction

Insomnia is the most common sleep complaint among adults of all ages in the U.S. According to annual surveys by the National Sleep Foundation, more than half of adults between the ages of 18 and 84 experience at least one symptom of insomnia a few nights a week or more. Among the elderly, insomnia is often caused by mental or physical illness, sleep cycle changes, other sleep disorders, lifestyle factors, long-term use of hypnotic medications, or a stressful event such as the death of a spouse.

What Is Insomnia?

Insomnia is a subjective report of insufficient or non-restorative sleep despite adequate opportunity to sleep. Specifically, an insomnia patient may present with complaints of difficulty falling asleep, difficulty maintaining sleep or non-restorative sleep. An insomnia diagnosis also requires daytime complaints, which may include daytime sleepiness or fatigue, loss of memory, concentration problems, irritability, anxiety, or moodiness.

Insomnia may be primary, occurring in the absence of other conditions, or comorbid with medical illnesses such as rheumatoid arthritis, Parkinson's disease, congestive heart failure, stroke, asthma, and chronic obstructive pulmonary disease, cancer, Alzheimer's disease and other forms of dementia.¹ Medications used to treat such conditions may also cause nighttime insomnia and/or daytime symptoms such as fatigue and drowsiness.

Insomnia is Linked with Illness, not Aging Per Se

Sleep patterns change in later life, with older adults spending significantly less time in slow wave sleep and more time in the lighter stages of sleep. Circadian rhythms may also become less sensitive to the effects of melatonin and to external cues such as periods of light and dark, thereby making the daily rhythms of sleeping and waking less robust in older adults.² Additionally, older adults often experience an advance of the sleep phase, sleeping and waking on an earlier schedule than younger adults.³

However, these changes in sleep pattern need not result in insomnia or reduced sleep time in the elderly. According to a 2003 survey by the National Sleep Foundation, older age per se is not associated with sleep difficulty. Rather, the survey data suggest that among adults between the ages of 55 and 84, those who suffer from mental or physical illnesses such as depression, anxiety, hypertension, heart disease, stroke, respiratory disease, diabetes, and arthritis are more likely to suffer from insomnia. The data also suggest that the more medical conditions a person has, the more likely they are to suffer from frequent sleep problems.

Insomnia and Bereavement

The death of a spouse is traumatic and can leave the surviving spouse vulnerable to mental and physical health problems. Evidence suggests that sleep disturbance is an essential feature of both complicated grief and grief-related depression.^{4 5} Grief and conjugal bereavement may also cause transient insomnia that may become chronic if left untreated, especially in cases where spouses undergo long-term illness before dying. A 2003 study of women who had lost a spouse to cancer found that such widows showed impairments in quality of life and psychological well-being and had a higher instance of sleep disturbance.⁶

Additional Risk Factors for Insomnia in the Elderly

In addition to circadian changes and medical problems, one of the most common causes of disturbed sleep in the elderly is nocturnal micturition. Approximately two-thirds of elderly adults report disturbed sleep due to a frequent need to go to the bathroom during the night.⁷ Use or abuse of hypnotic medications is also associated with an increased risk of insomnia in the elderly, as is body pain and excess body weight.^{8 9} Female gender is another strong risk factor for insomnia; women are more likely than men to suffer from insomnia throughout their lives, and older age increases this risk.¹⁰ Low education levels, living in a geriatric care facility and being separated, divorced or widowed may also increase the risk of insomnia in older adults.^{11 12 13 14} Lifestyle also has a strong impact on the sleep of older adults; inactivity, spending too much time in bed and frequent napping increase the risk of insomnia among older adults.¹⁵

Insomnia Comorbid with Other Sleep Disorders

Insomnia in older adults may also be comorbid with other sleep disorders, including restless legs syndrome (RLS) and obstructive sleep apnea (OSA). OSA may cause extreme daytime sleepiness, irritability, and repeated nocturnal awakenings that are sometimes mistaken for insomnia. OSA is more common in post-menopausal women than in women who have not gone through menopause.¹⁶ Patients who complain of insomnia as well as snoring and daytime sleepiness should be screened for OSA.

Implications for Health and Quality of Life

Insomnia is associated with a diminished quality of life; a recent study of more than 3,400 primary care physicians found that insomnia patients report a quality of life comparable to patients with congestive heart failure or depression.¹⁷ For older adults, insomnia is also associated with cognitive decline, higher rates of physical and mental illness, greater use of the healthcare system, and an increased risk of falls and hip fractures.^{18 19 20} Spouses and other bed partners may also be affected by an insomnia patient's sleep problems; one large, population-based sample of older adults found that people whose spouses suffered from sleep problems were more likely to have poor health, depressed mood, and marital unhappiness.²¹

Behavioral and Psychological Therapy

Behavioral and psychological therapies are increasingly prescribed for elderly patients with insomnia. Often the first step in any behavioral approach to insomnia treatment is the adoption of good sleep hygiene, which refers to habits that promote sleep such as keeping a regular sleep/wake schedule, having a relaxing bedtime routine, avoiding caffeine and alcohol, and creating a sleep environment that is cool, dark, quiet, and comfortable. Additional behavioral approaches may include relaxation techniques, regular exercise, and ensuring exposure to bright light soon after waking.

Psychological therapies for the treatment of insomnia usually target the attitudes and beliefs that perpetuate insomnia. For example, an insomnia patient may have a strong belief about when sleep should occur that conflicts with his or her circadian clock. An insomnia patient may also have considerable anxiety about his or her ability to sleep. Such anxiety ultimately worsens the insomnia. Psychological therapies aim to re-teach the patient about sleep in order to allow them to form lasting positive sleep associations that will reinforce their efforts to overcome insomnia.

Cognitive Behavioral Therapy for Insomnia

Cognitive behavioral therapy (CBT) for insomnia has been shown to produce significant and lasting improvements in all measures of insomnia with no side effects or risk of dependency.²² CBT for insomnia typically requires multiple sessions with a practitioner over a period of 6-8 weeks, though research suggests that even brief behavioral interventions can significantly improve insomnia as well as daytime symptoms of sleepiness and anxiety.²³ Research also suggests that as many as one-third of insomnia patients become good sleepers as a result of CBT for insomnia.²⁴

Cognitive behavioral therapy (CBT) for insomnia typically consists of the following components, and physicians may use one or a combination of them:

- Cognitive restructuring - targets the patient's maladaptive beliefs about sleep, such as excessive worry about the effects of not sleeping
- Sleep restriction – limits the patient's time in bed to the amount of time he or she typically sleeps, and then gradually increases time in bed as sleep time increases
- Stimulus control – allows the patient to re-associate the bedroom with sleep. It involves going to bed only when sleepy, limiting the bedroom activities to sleep and sex, getting out of bed if sleep is not achieved within 15 minutes and avoiding naps
- Relaxation therapy – reduces stress and anxiety, relaxes the body, and prepares the patient for sleep

Pharmacological Therapies

Pharmacological treatments are recommended for patients in whom behavioral strategies alone are not effective. There are currently ten drugs with approval by the U.S. Food and Drug Administration (FDA) for the treatment of insomnia (see Table 1), and all are recommended for short-term use. Those that have received FDA approval since 2005 (ramelteon, eszopiclone and zolpidem CR) may be prescribed without limitation on the duration of their use.

Pharmacological Therapies

Table 1 – FDA-Approved Medications for the Treatment of Insomnia

Drug	Chemical Class	Recommended Dose in Adults, in Older Adults	Half Life (hours)
Estazolam	Benzodiazepine	2 mg, 1 mg	8 - 24
Eszopiclone	Non-benzodiazepine	2 mg, 3 mg, 1 mg	5 - 7
Flurazepam	Benzodiazepine	30 mg, 15 mg	48 - 120
Quazepam	Benzodiazepine	15 mg, 7.5 mg	48 - 120
Temazepam	Benzodiazepine	30 mg, 15 mg	8 - 20
Triazolam	Benzodiazepine	0.25 mg, 0.125 mg	2 - 4
Zaleplon	Non-benzodiazepine	10 mg, 5 mg	~1.0
Zolpidem	Non-benzodiazepine	10 mg, 5 mg	1.5 – 2.4
Zolpidem CR	Non-benzodiazepine	12.5 mg, 6.25 mg	6.26 – 12.5
Ramelteon	Melatonin agonist	8 mg, 8 mg	1.5 - 5

Pharmacological Therapy, cont'd

Sleep hygiene and behavioral remedies are usually employed before the use of medications, but pharmacological therapies may also be a first-line treatment in patients with more severe insomnia, which generally refers to sleep difficulty that occurs every night and causes significant daytime impairment.²⁵ When used alone, behavioral strategies have been shown to be an effective long-term treatment for insomnia.²⁶ However, evidence suggests that pharmacological therapies used in combination with behavioral strategies are more effective at treating short-term sleep difficulties than behavioral strategies alone.²⁷

Adverse Effects with Pharmacological Therapies

Each of the medications approved for the treatment of insomnia have the potential for adverse effects, which may include daytime drowsiness, cognitive impairment, ataxia, dependence, and rebound insomnia. Research suggests that the occurrence of these effects may be lower for the newer sleep medications (e.g., ramelteon, eszopiclone and zolpidem CR), most likely because these agents have shorter half-lives.²⁸ Additionally, the FDA recently requested that manufacturers of insomnia medications revise their product labels to include stronger language concerning potential risks. These risks include severe allergic reactions and complex sleep-related behaviors, which may include sleep driving. Sleep driving is defined as driving while not fully awake after ingestion of a sedative-hypnotic product, with no memory of the event.

Special Considerations for Pharmacological Treatments

There are a number of factors to consider before treating an older patient with insomnia medications, including the patient's current medication regimen and the physiological characteristics of older adults. For example, older adults may metabolize some drugs more slowly, which can magnify the effect of the drug.²⁹ Older adults may also take medications to treat other conditions, increasing the likelihood of adverse drug interactions. Older adults may also be more susceptible to the potential side effects of insomnia medications such as residual sedation, ataxia, cognitive impairments, and an increased risk of falls.³⁰ Insomnia medications may also worsen respiratory problems and sleep-related breathing disorders.³¹

Patients who take insomnia medications may become dependent on them. In order to minimize this risk, patients should be informed about the potential side effects of

such drugs and offered alternatives to drug treatment such as behavioral remedies. Physicians may also redefine the patient's use (e.g., as needed vs. nightly) or allow the patient a gradual withdrawal schedule spanning several weeks. For most patients, the ideal pharmacological agent has rapid onset and lasts through the night with minimal or no adverse effects. The newer, shorter-acting agents typically have few or no adverse effects and are more likely to achieve this result.

Off-Label Medications and Complimentary and Alternative Medicine

There are a number of prescription drugs without FDA approval for insomnia that are widely prescribed to treat insomnia, including sedating antidepressants, antipsychotics, and antihistamines.³² However, the effectiveness of these products for the long-term treatment of insomnia has not been supported by randomized clinical trials and many have potentially serious side effects. Thus, they are not recommended for the treatment of insomnia.

Melatonin and other complimentary and alternative therapies (e.g., valerian) have been shown to modestly improve sleep complaints and are widely used for the treatment of insomnia, especially among older adults. However, such products are not regulated by the FDA and there is little evidence regarding their safety.³³ Thus, they are not recommended for the treatment of insomnia.

Additional alternative therapies for the treatment of insomnia include light therapy and exercise therapies such as yoga and acupuncture. As of this writing, these treatments have not undergone adequate evaluation and their use in the treatment of insomnia is therefore not recommended.³⁴

Differential Diagnosis

Evaluating a patient for insomnia begins by asking patients whether they have difficulty falling asleep, difficulty staying asleep or waking up unrefreshed. Patients should also be asked about their daytime symptoms such as sleepiness and irritability as well as any nighttime symptoms such as snoring, breathing pauses during sleep, limb movement or discomfort during or preceding sleep, or unusual sleep behaviors such as sleep walking. Inquiring about the patient's sleep environment, caffeine and alcohol consumption, sleep schedule and bedtime routine may also reveal precipitating factors for insomnia. Insomnia patients should use a sleep diary for a period of two weeks in order to provide practitioners with a detailed view of his or her sleep habits. A diagnosis of insomnia does not require polysomnography except in cases where other sleep problems such as obstructive sleep apnea are suspected. Rather, insomnia is diagnosed based on patient history and subjective complaints.

A differential diagnosis of insomnia should involve:

- A determination of the nature of the sleep disturbance (sleep onset vs. sleep maintenance insomnia)
- A determination of the duration of the sleep disturbance
- A discussion of daytime symptoms (e.g., irritability, fatigue)
- An evaluation for medical or psychiatric conditions
- A screening for other sleep disorders such as OSA and RLS
- A list of current medications (prescription and over-the-counter)
- An evaluation of patient's sleep and sleepiness diary
- A review of the patient's sleep environment
- Information on the patient's caffeine use

- Information on the patient's use of alcohol
- A discussion of lifestyle factors including exercise habits, work schedules and recent life events that may be causing stress or anxiety

The Case of the Elderly Widow

Presentation

"MD" is a 73 year-old widow who presents with complaints of long-term sleep maintenance insomnia that has worsened over the past one to two years. She has no trouble initiating sleep but reports prolonged nighttime awakenings and early morning awakenings. She goes to bed at 9:30 PM and gets up anywhere between 5:30 AM and 7:00 AM. She falls asleep within ten minutes but wakes up three to four times for an estimated two hours of wakefulness after sleep onset. She sometimes wakes up at 4:00 AM and can't get back to sleep for the rest of the night. Overall, she reports sleeping no more than four to five hours per night. She feels groggy in the morning and remains tired through the day. Occasionally, she naps for 30-45 minutes while watching television, although not always intentionally. She used to be fairly active but has stopped several of her social activities, due to lack of energy. She worries about her inability to sleep as long as she used to and about the impact her sleep problem has had on her ability to enjoy retirement life.

The patient's current episode of insomnia started about two years ago while her husband was hospitalized for lung cancer. While intermittent initially, her insomnia became more persistent and troublesome after her husband passed away one year ago. She states that she has never been a great sleeper since menopause, but she managed to get through with an occasional hypnotic medication. Currently, she has trouble sleeping at least four to five nights per week and may get an occasional good night's sleep from pure exhaustion, just to start another cycle of several nights of disturbed sleep. She has been using lorazepam (2 mg HS) alternately with trazodone (50 mg HS) for the last few months. Although these medications provided some relief initially, she now has trouble sleeping whether or not she uses any medication.

Clinical Assessment

MD reports some intermittent arthritic pain that may exacerbate her sleep problems at night. However, her sleep problem predated the onset of her pain. She denies snoring or other symptoms of sleep apnea or periodic limb movements. She denies restless legs, gastroesophageal reflux, or any other symptom of sleep disorder.

MD presents mixed symptoms of anxiety (e.g., worrying, restlessness) and depression (e.g., low energy, difficulty concentrating, and sadness) of mild to moderate severity. She is still going through a normal grieving process, with periods of sadness and loneliness, but she does not appear in major depression and has no prior history of depression or other psychiatric disorder.

Medical History:

Hypertension X 10 years - BP 140/85, well controlled

Mild arthritis X 2 years, well controlled

Current Medications:

Atenolol 50 mg po qd
Naproxen sodium tabs, 220 mg (prn)
Acetaminophen PM (prn)
Lorazepam 2 mg po hs X 10 years (prn)
Trazodone 50 mg po hs (prn)

Lifestyle Factors:

MD drinks two coffees and one tea per day (none in the evening), one glass of wine with dinner on weekends; non smoking, no drugs.

Family and Social History

MD's mother died of a stroke at age 82. She also had a history of chronic insomnia and anxiety and used sedative-hypnotics for many years. Her father died at age 75 of lung cancer. She has one living sister, aged 70, with chronic insomnia, and three children aged 45, 47, 50, including one daughter with insomnia and one with anxiety disorder.

Patient lives alone in her house since her husband died last year. She worked for 30 years as a manager in a retail store and retired at 65 years old. She describes herself as a fairly independent person, requiring no assistance in her instrumental activities of daily living. She used to be active in her church and other local organizations but has stopped since her husband was diagnosed with cancer two years ago.

Summary of Findings from Sleep-Related Evaluations for Patient "MD"

There are a number of insomnia evaluation tools and resources available to clinicians, including sleep diaries, bed partner interviews, the Pittsburgh Sleep Quality Index, the Insomnia Severity Index (ISI), and the Epworth Sleepiness Scale. Overnight polysomnography is not recommended for the evaluation of insomnia unless other sleep problems (e.g., sleep-disordered breathing) are suspected.

The sleep-related evaluations for MD include a sleep diary and the ISI:

Sleep diary findings – Data from MD's one-week sleep diary are generally consistent with her history. There is evidence of difficulty maintaining sleep on six of seven nights, with two to three awakenings per night totaling between one and 2.5 hours of wakefulness after sleep onset. The patient used lorazepam on three nights and trazodone on two nights. She reported sleeping five to six hours per night out of approximately eight to nine hours spent in bed. She reported napping on three occasions during the day/evening. Her sleep schedule was quite variable and she spent a great deal of time awake in bed.

Insomnia Severity Index – MD's total score of 18 on the Insomnia Severity Index suggests moderately severe insomnia, with evidence of difficulty maintaining sleep, dissatisfaction with sleep, moderate degree of interference with daytime functioning and significant concern about the sleep problem.

Differential Diagnosis

Differential diagnosis for this patient is chronic primary insomnia exacerbated by residual depressive symptoms associated with grief related to the death of her husband. MD presents a diagnosis of persistent insomnia, involving sleep maintenance difficulties occurring almost nightly. She uses lorazepam (2 mg HS) or

trazodone (50 mg HS) as a sleep aid but these medications do not seem to provide much relief. Yet, her sleep is worse on nights that she does not take one of these medications, possibly due to some rebound insomnia and the apprehension associated with not taking the medication. Although there is no clinical evidence of major depression, there are residual depressive symptoms that may exacerbate her sleep disturbances. There is no clinical evidence of other sleep disorders such as sleep apnea and periodic limb movements as potential contributing factors. Pain may exacerbate her sleep difficulties but it is not the main contributing factor as the onset of insomnia predated the onset of pain and the course of these two conditions are fairly independent.

Treatment Recommendations

After reviewing her sleep diary and discussing the probable diagnosis, the patient was advised to decrease the amount of time spent in bed at night in order to consolidate her sleep requirement. Specifically, she was instructed to postpone her bedtime until 10:30 PM and to compress her sleep window to a maximum of 6.5 hours. Additionally, the patient was asked to gradually discontinue lorazepam and she was advised about the potential for withdrawal symptoms (e.g., anxiety, worsening of sleep difficulties) during the tapering off period. She was advised to call the clinic for further guidance if these symptoms become too severe before her next scheduled consultation in two weeks. She was instructed to avoid napping during the day or evening, to continue keeping her daily sleep diary, and to resume social activities as she used to do. She was also advised that following gradual discontinuation of lorazepam and trazodone, continued insomnia symptoms could be treated (as needed) with one of the newer hypnotic medications (zolpidem CR, eszopiclone, or ramelteon).

Clinical Course

At her two week follow up visit, MD reports that she has compressed her sleep window as recommended. Based on her sleep diary, she is going to bed later, around 10:15 PM and arising at 5:15 AM, for a total sleep window of about seven hours. Although she has discontinued her lorazepam medication, she reports that her sleep is less interrupted than before. She estimates sleeping about five to 5.5 hours out of 6.5 hours spent in bed and feels she has more energy during the day. She was advised to continue postponing her bedtime until at least 10:30 PM and to compress her sleep window to a maximum of 6.5 to seven hours per night. She was asked to discontinue trazodone over the next two weeks, with the understanding that another medication will be considered for sleep and/or depression if these symptoms persist after a trial with the current behavioral intervention.

Three additional follow up visits were held over the next two-month period. The goal of these visits was to provide support and guidance for implementing behavioral changes and evaluate the need to add a medication for sleep. There was also education about more realistic and age-appropriate sleep expectations. MD was prescribed zolpidem CR (6.25 mg) to be used as a rescue medication. She continued keeping a sleep diary to monitor compliance with treatment and progress.

Follow-Up

At a follow up appointment approximately three months after her initial visit for insomnia, MD reports sleeping better and feeling more rested during the day. She is maintaining a more regular sleep schedule, going to bed around 10:30 PM and arising at 6:00 AM. She uses zolpidem CR about once a week. She still has some occasional difficulties maintaining sleep but, overall, she feels she is sleeping

between six and 6.5 hours per night and has a better sleep quality than before treatment. Although MD thought initially that she absolutely needed eight hours of uninterrupted sleep in order to feel rested and to function well during the day, she now realizes that she feels better with 6.5 hours of uninterrupted sleep rather than with about the same amount of broken sleep spread over eight to nine hours spent in bed.

Summary

Insomnia is a condition involving both sleep disturbances and daytime functional impairments (e.g., fatigue, attention/concentration problems, and mood disturbances). It often develops in the context of stressful life events or changes in sleep schedule and environment. Even when the initial precipitating factors are removed, insomnia may persist over time due to other contributing/perpetuating factors, including poor sleep habits, irregular sleep schedules, unrealistic sleep expectations and chronic hypnotic use. Effective treatment should target these perpetuating factors.

There are several treatment options available for insomnia but only cognitive behavioral therapy and the benzodiazepine-receptor agonists have adequate evidence to be recommended as first line therapy. Both treatment approaches are effective on a short-term basis and cognitive behavioral therapy has the advantage of producing more sustained sleep improvements. Behavioral and pharmacological approaches can be combined to optimize short-term and long-term therapeutic benefits.

The case presented here is typical of many older adults with persistent insomnia associated with changes in life circumstances (e.g., loss of a spouse) or health status. MD started using benzodiazepines for insomnia due to stress related to the cancer of her husband and grief related to his death. While effective when used on an intermittent basis, with nightly use lorazepam eventually lost its sleep-promoting effects. A guided withdrawal program was effective in assisting her with the discontinuation of benzodiazepine medication. The addition of behavioral strategies, such as postponing bedtime and reducing the amount of time spent awake in bed, served to consolidate sleep and improve sleep quality while minimizing rebound insomnia. Following treatment, there were still some occasional nights of insomnia, but the patient felt more in control of her sleep and less distressed about the occasional poor night's sleep. In addition, she felt that having a hypnotic medication available as a rescue reduced her fear and apprehension of not sleeping.



Go to www.BriefCaseCME.com for another valuable CME opportunity.

References

-
- ¹ 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 Vol. 28
 - ² Kripke, DF et al. Circadian phase in adults of contrasting ages *Chronobiology International* 2005 Vol. 22, No. 4
 - ³ Reid KJ, Zee PC. Circadian rhythm disorders, *Seminars in Neurology* 2004 Vol. 24, No. 3
 - ⁴ Beem EE, et al., Psychological functioning of recently bereaved middle-aged women: the first 13 months, *Psychological Reports*, 2000, Vol. 87, No.1
 - ⁵ Byrne GJ and Raphael B, The psychological symptoms of conjugal bereavement in elderly men over the first 13 months, *International Journal of Geriatric Psychiatry*, 1997 Vol. 12, No. 2
 - ⁶ Vladimarsdottir U, et al., Long-term effects of widowhood after terminal cancer: a Swedish nationwide follow-up, *Scandinavian Journal of Public Health* 2003, Vol. 31, No. 1
 - ⁷ National Sleep Foundation 2003 *Sleep in America* Poll
 - ⁸ Tung-Ping S, et al., Prevalence and risk factors of insomnia in community-dwelling Chinese elderly: a Taiwanese urban area survey, *Australian and New Zealand Journal of Psychiatry*, 2004 Vol. 38, No. 9
 - ⁹ National Sleep Foundation 2003 *Sleep in America* Poll
 - ¹⁰ Newman AB et al. Sleep disturbance, psychosocial correlates, and cardiovascular disease in 5201 older adults: the Cardiovascular Health Study *Journal of the American Geriatric Society* 1997 Vol. 45, No. 1
 - ¹¹ Foley DJ et al. Incidence and remission of insomnia among elderly adults: an epidemiologic study of 6,800 persons over three years *Sleep* 1999 Vol. 22 Suppl 2
 - ¹² Tjepkema M. Insomnia *Health Report* 2005 Vol. 17, No. 1
 - ¹³ Makhoul MM. Insomnia symptoms and their correlates among the elderly in geriatric homes in Alexandria, Egypt *Sleep and Breathing* 2007 Vol. 11, No. 3
 - ¹⁴ Doi Y et al. Prevalence of sleep disturbance and hypnotic medication use in relation to sociodemographic factors in the general Japanese adult population *Epidemiology* 2000 Vol. 10, No. 2
 - ¹⁵ Ancoli-Israel S. Insomnia and daytime napping in older adults *Clinical Sleep Medicine* 2006 Vol. 2, No. 3
 - ¹⁶ National Sleep Foundation Scientific Workshop on Women and Sleep March 5-11, 2007
 - ¹⁷ Katz DA, McHorney CA. The relationship between insomnia and health-related quality of life in patients with chronic illness *Family Practice* Vol. 51, No. 3
 - ¹⁸ Kapur VK et al. The relationship between chronically disrupted sleep and healthcare use *Sleep* 2002 Vol. 25, No. 3
 - ¹⁹ Brassington GS et al. Sleep problems as a risk factor for falls in a sample of community-dwelling adults aged 64-99 years *Journal of the American Geriatric Society* 2000 Vol. 48, No. 10
 - ²⁰ Cricco M et al. The Impact of Insomnia on Cognitive Functioning in Older Adults *Journal of the American Geriatric Society* 1002 Vol. 49, No. 9
 - ²¹ Strawbridge WJ et al. Impact of spouses' sleep problems on partners *Sleep* 2004 Vol. 27, No. 3

-
- ²² Edinger JD et al., Cognitive behavioral therapy for treatment of chronic primary insomnia: a randomized controlled trial *Journal of the American Medical Association* 2001 Vol. 285, No. 14
- ²³ Germain A, et al., Effects of a brief behavioral treatment for late-life insomnia: preliminary findings *Clinical Sleep Medicine* 2006 Vol. 15, No. 2
- ²⁴ Morin CM, et al. Nonpharmacologic treatment of chronic insomnia: an American Academy of Sleep Medicine Review *Sleep* 1999 Vol. 22
- ²⁵ Holbrook AM et al., The diagnosis and management of insomnia in clinical practice: a practical evidence-based approach *Canadian Medical Association Journal* 2000 Vol. 162, No. 2
- ²⁶ Lee KA, Sleep dysfunction in women and its management *Current Treatment Options in Neurology* 2006 Vol. 8, No. 5
- ²⁷ Morin CM, et al., Behavioral and pharmacological therapies for late-life insomnia: a randomized controlled trial *Journal of the American Medical Association* 1999 Vol. 281, No. 11
- ²⁸ 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 Vol. 28
- ²⁹ Greenblatt DJ et al. Clinical pharmacokinetics of anxiolytics and hypnotics in the elderly Therapeutic considerations (Part I) 1991 *Clinical Pharmacokinetics* Vol. 21, No. 3
- ³⁰ Brassington GS et al. Sleep problems as a risk factor for falls in a sample of community-dwelling adults aged 64-99 years *Journal of the American Geriatric Society* 2000 Vol. 48, No. 10
- ³¹ Guilleminault C, Silvestri R. Aging, drugs and sleep *Neurobiology of Aging* 1982 Vol. 3, No. 4
- ³² 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 Vol. 28
- ³³ 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 Vol. 28
- ³⁴ 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 Vol. 28