

Reviews**Sleep disorders in elderly**Chamil Marasinghe¹*Journal of the Ceylon College of Physicians, 2012, 43, 37-40***Introduction**

Sleep disorders are common but an under recognized problem in elderly. A large epidemiological study on sleep revealed that 50% of older adults had insomnia¹. Due to poor self reporting by the patient assuming it is as part of aging process and lack of interest by the clinicians, most sleep disorders remain untreated. There are three main sleeping problems associated with aging: inability to initiate the sleep, problems in maintaining sleep and day time sleepiness.

Physiological changes of sleep with aging

Although it was thought that the amount of sleep needed for a night decreases with age, American National Sleep Survey found that the total sleep time of an elder was 7 hours a night, as same as a young adult². In contrast Van Cauter and others have found that among men sleep time decreased by an average of 27 minutes per decade from midlife until the eighth decade³. Normal sleep is divided in to REM (Rapid Eye Movement) and non REM sleep. Non REM sleep has four stages, stage I, II, III and IV. Stages I and II are categorized as light sleep and stages III and IV are deep sleep. REM sleep encompasses 15 to 25% of the total sleep time and is associated with dreaming. Episodes of REM sleep occur at approximately 90 minute cycles. A meta-analysis has shown that the percentage time of REM sleep decreases while percentage of light sleep increases with aging⁴. It was also observed that with ageing significant reduction of stage III and stage IV deep sleep time and frequent awakening in the night occur. Circadian sleep rhythms become weaker as we age⁵. Weakening of the hypothalamic suprachiasmatic nuclear function and reduction in nocturnal melatonin secretion contribute for this⁵. However none of these physiological changes will significantly impair the quality of sleep. Therefore a sleep complaint in elderly should be considered as a disorder and an aetiology has to be sought out.

Recognition of sleep disorders in elderly

Sleep disorders are identified by a careful sleep history that includes timing and regularity of bed time, onset of sleep, night time awakenings, time of waking up in the morning, day time naps and day time sleepiness. History regarding the bed partner is also useful for better understanding of the problem. If the history is not clear and insufficient a sleep diary maintained by the patient over two weeks period will give further insight in to the problem.

Sleep disorders in elderly can be categorized in to two broader groups: **Primary sleep disorders** and **secondary sleep disorders**.

Primary sleep disorders include:

- sleep disordered breathing (SDB)
- REM sleep behavior disorder (RBD)
- restless leg syndrome (RLS)
- periodic limb movement in sleep (PLMS).

Secondary sleep disorders are due to diseases with chronic pain and discomfort (painful diabetic neuropathy, peripheral vascular disease, malignancies associated with pain, gastroesophageal reflux disease), frequent micturition during night (uncontrolled diabetes, prostate enlargement), dyspnoea that will interfere with sleep (cardiac failure, chronic obstructive pulmonary disease, asthma), medications interfering with sleep (selective serotonin reuptake inhibitors, beta blockers, alpha blockers, theophyllin, salbutamol, corticosteroids, thyroxin)⁶.

Psychiatric disorders also have a close link with insomnia. In a large cross sectional survey conducted by Ohayon and Roth found that 65%, 61% and 44% of the subjects with major depression, panic disorder and generalized anxiety disorder suffered from insomnia⁷. It is also known that elderly subjects with persistent insomnia were at a greater risk for the development of depression⁸.

In addition, changes in life such as retirement, bereavement, reduced social interactions and environmental changes such as moving in to a new house or elder's home placement can result in change in sleep patterns⁹.

¹ Senior Lecturer in Medicine and Consultant Physician, Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka.

Among primary sleep disorders sleep disordered breathing is considered as an important condition. The spectrum of SDB ranges from simple snoring to partial or complete cessation of the air flow of breathing (hypopnoea and apnoea). Apnoea-hypopnoea index (AHI) is determined by the number of hypopnoea or apnoea per hour of sleep. SDB is diagnosed when AHI is >5 . The Sleep Heart Health Study reported that 32% of elders between 60-90 years had an AHI of 5-14 and 19% had AHI of >15 ¹⁰. REM sleep behavior disorder is a condition in which the skeletal muscle atonia which is normally found during REM sleep is absent. Patients tend to kick, punch, walk or run during REM sleep (they act out their dreams). A clear aetiology of this condition is not known but there is an association between RBD and neurodegenerative disorders such as Parkinson's disease and multi system atrophy¹¹. Restless leg syndrome is the uncomfortable sensation of legs when the patient is in a rest state that is accompanied by an urge to move the legs in order to provide temporary relief. This usually develops towards the end of the day. This condition was found to be significantly impairing the quality of sleep. RLS is associated with iron deficiency state, uraemia and peripheral neuropathy. Periodic limb movement in sleep is characterized by repeated leg jerks or kicks during sleep. Each jerk will result in an arousal or a brief awakening which will lead to sleep fragmentation. Patient has no ability to recall these events. The bed partner will inform this as they will be kicked by the patient regularly during sleep making it difficult to share the bed. PLMS is diagnosed by overnight polysomnogram calculating periodic limb movement index.

Consequences of sleep disorders

Elders tend to be awake till late in the night or some till dawn as a result of insomnia. The other problem they face is inability to maintain the sleep. They wake many times in the night or wake up early hours in the morning and are unable to fall asleep thereafter. With that experience elders become more and more anxious about sleeping. The day time sleepiness is one of the main consequences of lack of quality sleep in the night. The inability to concentrate at work or day to day activities will lead to various other problems including road traffic accidents. Day time sleepiness makes elders to have frequent day time naps, which will make further disturbances in the night time sleep. Elderly subject with insomnia and SDB have been found to have lower day time functioning and longer psychomotor reaction times¹². The Sleep Heart Health Study found that the risk of developing cardiovascular disease including ischaemic heart disease and cardiac failure is higher in elders with insomnia and SDB¹³.

Insomnia may also precipitate falls. In a survey of 1526 older adults aged 64 to 99 years sleep disorders were significantly associated with the number of reported falls¹⁴. Insomnia contributes to cognitive decline¹⁵ and on the other hand elders with dementia and their care givers complain more about disturbed sleep¹⁶.

Management of sleep disorder

Identification of the aetiology is the key to success of sleep disorder management. If a secondary cause can be identified it needs to be treated first. If pain is the cause for insomnia then it has to be dealt with, likewise paroxysmal nocturnal dyspnoea, nocturia, depression and other secondary aetiologies need to be identified and managed. It is important to substitute medications that have significant impact on sleep.

Life style changes and proper sleep habits improve sleep. Regularity of sleep and wake times, avoiding excessive time in the bed (maximum of 20 minutes before falling sleep), relaxing bed time routines, daily activities and exercise, avoiding caffeine, alcohol and nicotine in the afternoon and evening, eliminating loud noises, excessive light and uncomfortable room temperature are essential to improve insomnia.

Primary sleep disorders have specific treatments. The treatment for SDB is continuous positive airway pressure (CPAP). Weaver and Chasens found that in elders with SDB, CPAP would reduce apnoea and hypopnoea, improve the quality of sleep, reduce day time sleepiness, improve gait, and have a positive effect on cardiac function¹⁷. RLS and PLMS improve with dopamine agonists such as Ropinirole. Carbidopa-Levodopa is also found to be effective¹⁸.

Selected patients may benefit from temporary use of the sleep promoting medications¹⁹. Sedative antihistamines, sedating antidepressants, benzodiazepines and non-benzodiazepine hypnotic medications have been used for chronic insomnia^{19,20}. Tri-cyclic antidepressants have long been used for insomnia, but the use has been limited by unwanted anticholinergic side effects. Alprazolam is a short-acting anxiolytic benzodiazepine which is used by patients and clinicians for sleep disturbances. However FDA (Food and Drug Authority) has not approved Alprazolam for chronic sleep disorders. Elderly individuals should be cautious in the use of Alprazolam due to the possibility of increased susceptibility to side-effects such as loss of co-ordination and drowsiness²¹. Oral Midazolam is indicated for the short-term treatment of moderately severe insomnia in patients who have not responded adequately to other hypnotics and who have persistent trouble in falling asleep. As Midazolam has

extremely short duration of action, it is not used for patients who have trouble staying asleep through the night.

Moderate to long acting benzodiazepines, such as Temazepam is used for those with sleep maintenance difficulties. Temazepam is an FDA approved medication for the short-term treatment of insomnia. In sleep laboratory studies, Temazepam significantly decreased the number of nightly awakenings²² but has the drawback of distorting the normal sleep pattern²³.

A significant advance in the treatment of insomnia came with the development of the non-benzodiazepine hypnotic medications, Zolpidem, Zopiclone, Zaleplon and Eszopiclone. These medications have shorter durations of action than many traditional benzodiazepines and may be associated with less risk of tolerance and abuse. They have also been demonstrated to be helpful in cases in which insomnia is comorbid with depression or anxiety, leading to beneficial effects not only with sleep but also with mood and anxiety symptoms²⁴. Zolpidem is effective in initiating the sleep but has not adequately demonstrated effectiveness in maintaining sleep, unless delivered in a controlled-release form²⁵. Zopiclone is indicated for the short term treatment of insomnia where sleep initiation or sleep maintenance are prominent symptoms. However long term use is not recommended as tolerance, dependence and addiction can occur with prolonged use. Benzodiazepines and non-benzodiazepine hypnotic drugs also cause impairment in body balance and standing steadiness on the following day morning and falls and hip fractures are frequently reported²⁶. Therefore all these agents should be used with caution as side effects are common in elderly.

Cognitive behavioral therapy is another useful treatment option for sleep disorders. Some elders with circadian sleep rhythm disturbances benefit by bright light therapy. Exposure to bright light in the early evening and avoiding bright light in the morning will improve the sleep of this minor category of sleep disorder.

References

- Foley DJ, Monjan AA, Brown SL, Simonsick EM, Wallace RB, Blazer DJ. Sleep complaints about elderly persons: an epidemiologic study of three communities. *Sleep* 1995; **18**: 425-32.
- Foley D, Ancoli-Israel, Brutz P, Walsh J. Sleep disturbances and chronic disease in older adults: results of the 2003 National Sleep Foundation Sleep in American survey. *J Psychosom Res* 2004; **56**: 497-502.
- Van Cauter EV, Leproult R, Plat L. Age related changes in slow wave sleep and REM sleep and relationship with growth hormone and cortisol levels in healthy men. *JAMA* 2000; **284**: 861-8.
- Ohayon MM, Carskadon MA, Guilleminault C, Vitiello MV. Meta-analysis of quantitative sleep parameters from childhood to old age in healthy individuals: Developing normal sleep values across the human lifespan. *Sleep* 2004; **27**: 1255-73.
- Neikrug AB, Ancoli Israel S. Sleep disorders in the older adult – A mini-review. *Gerontology* 2010; **56**: 181-9.
- David N, Neubauer MD. Sleep problems in the elderly. *Am Fam Physician* 1999; **59**(9): 2551-8.
- Ohayon MM, Roth T. What are the contributing factors for insomnia in the general population? *J Psychosomatic Res* 2001; **51**: 745-55.
- Perlis ML, Smith LJ, Lyness JM, Matteson SR, Pigeon WR, Jungquist CR, Tu X. Insomnia as a risk factor for onset of depression in the elderly. *Behav Sleep Med*. 2006; **4**: 104-13.
- Susan K Roepke, Ancoli Israel S. Sleep disorders in elderly. *Indian J med Res* 2010; **131**: 302-10.
- Young T, Shahar E, Nieto FJ, Redlines S, Newman AB, Gottlieb DJ, Walsleben JA, Finn L, Enright P, Samet JM, Predictors of sleep-disordered breathing in community-dwelling adults: the sleep heart health study. *Arch Intern Med* 2002; **162**: 893-900.
- Boeve BF, Silber MH, Ferman TJ, Lucas JA, Parisi JE. Association of REM sleep behavior disorder and neurodegenerative disease may reflect an underlying synucleinopathy. *Mov Disorders* 2001; **16**: 622-30.
- Gooneratne N, Gehrman PR, Nkwuo JE, Bellemy SL, Schutte-rodin S, Dinges DF, Pack AI: Consequences of co-morbid insomnia symptoms and sleep related breathing disorder in elderly subjects. *Arch Intern Med* 2006; **166**: 1732-8.
- Shahar E, Whitney CW, Redline S, Lee ET, Newman AB, Javier NF, o'connor GT, Boland LL, Schwartz JE, Samet JM. Sleep-disordered breathing and cardiovascular disease: cross sectional results of the sleep heart health study. *Am J Respir Crit Care Med* 2001; **163**: 19-25.
- Ancoli Israel S. Insomnia in the elderly: a review for the primary Care practitioners. *Sleep* 2000; **23** (suppl 1): S23-S30.
- Cricco M, Simonsick EM, Foley DJ. The impact on insomnia on cognitive function in older adults. *J Am Geriatr Soc* 2001; **49**: 1185-9.
- McCurry SM, Reynold CF, Ancoli Israel S, Teri L, Vitiello MV. Treatment of sleep disturbances in Alzheimer's disease. *Sleep Med Rev* 2000; **4**: 603-28.
- Weaver TE, Chasens ER. Continuous positive airway pressure treatment for sleep apnoea in older adults. *Sleep Med Rev* 2007; **11**: 99-111.
- Hening W, Allen RP, Picchietti DL, Silber MH. Restless leg syndrome task force of the Standard and the Practice

- Committee of the Academy of Sleep Medicine: An update on the dopaminergic treatment of the restless leg syndrome and periodic limb movement disorder. *Sleep* 2004; **27**: 560-83.
19. Hartmann PM. Drug treatment of insomnia: Indications and new agents. *Am Fam Physician* 1995; **51**: 191-4.
 20. Nowell PD, Mazumdar S, Buysse DJ, Dew MA, Reynolds CF, Kupfer DJ. Benzodiazepines and solpidem for chronic insomnia. *JAMA* 1997; **278**: 2170-7.
 21. "Alprazolam - Oral (Xanax) Side Effects, Medical Uses, and Drug Interactions". Medicine Net.com. July 2005.
 22. Bixler EO, Kales A, Soldatos CR, Scharf MB, Kales JD. "Effectiveness of temazepam with short-intermediate-, and long-term use: sleep laboratory evaluation". *J Clin Pharmacol* 1978; **18** (2-3): 110-8.
 23. Ferrillo F, Balestra V, Carta F, Nuvoli G, Pintus C, Rosadini G. "Comparison between the central effects of camazepam and temazepam. Computerized analysis of sleep recordings". *Neuropsychobiology* 1984; **11** (1): 72-6.
 24. Richey SM, Krystal AD. Pharmacological advances in the treatment of insomnia. *Curr Pharm Des* 2011; **17**(15): 1471-5.
 25. Rosenberg RP. (Jan-Mar 2006). "Sleep maintenance insomnia: strengths and weaknesses of current pharmacologic therapies". *Ann Clin Psychiatry* **18**(1): 49-56.
 26. Mets MA, Volkerts ER, Olivier B, Verster JC. (Feb 2010). "Effect of hypnotic drugs on body balance and standing steadiness". *Sleep Med Rev* **14** (4): 259-67.