

## MINI-REVIEW

# Sleep Disorders and Aging: Understanding the Causes

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AS many as 40% of the elderly population complain about sleep problems. Studies sampling from a wide variety of populations have consistently demonstrated that older people are disproportionately dissatisfied with their sleep; these studies have also noted disproportionate use of sedative medications among the aged (e.g., 1,2,3). Significant sleep disturbance can lead to daytime sleepiness and fatigue and impaired daytime function; it can seriously compromise the quality of life of many elderly individuals and cause them to seek professional health care.

The sleep disturbances of elderly people arise from a multitude of causes and create a complex problem. There are three major considerations regarding sleep disorders and aging: (a) the recognition of the multifactorial nature of sleep disorders in the elderly; (b) the need to, wherever possible, treat the primary problem rather than the symptom of sleep disturbance; and (c) the importance of taking a very conservative approach to prescription of hypnotics for sleep complaints.

### *The Multifactorial Nature of Sleep Disturbance in Aging*

Sleep disturbance in elderly people is the result of: (a) changes in sleep that accompany the aging process, per se; (b) medical and psychiatric conditions and their treatments and psychosocial factors that result in secondary sleep disturbance; (c) primary sleep disorders, some of which can themselves be age-related; and (d) poor sleep hygiene. A given sleep complaint can be and often is based on any combination of these factors. It is also important to recognize that whether an older individual complains is also dependent on their subjective appraisal of their own sleep quality.

### *Age-Related Sleep Change*

The subjective complaints of the elderly have clear objective bases when their sleep is examined in the laboratory. Polysomnographic studies consistently show that older individuals spend more time in bed, spend less time asleep, take more time to fall asleep, awaken more often and for longer periods of time, and have less efficient sleep. Also, they spend less time in slow wave (SWS) and rapid

eye movement (REM) sleep and are more prone to napping compared to younger individuals (2,4).

It is important to remember that considerable portions of these changes are age-related and are not the result of any medical or psychiatric pathologies, primary sleep disorders, or poor sleep hygiene. That is, even extremely healthy, carefully screened, noncomplaining aged adults manifest the changes in sleep quality mentioned above.

### *Sleep Disturbance Secondary to Physical and Mental Illness*

The role of physical and mental health in the reported sleep disturbances of elderly persons has begun to be better appreciated (5). While it is clear that sleep is severely disturbed by numerous diseases that increase in prevalence with advancing age, e.g., dementia (6,7), a number of studies have recently demonstrated that when medical and psychological health factors, such as the presence of significant systemic diseases, pain syndromes or major life event stresses, are controlled for then the prevalence and incidence of sleep complaint in aged samples are considerably less than most previous studies have reported (8).

A recent epidemiologic study has elegantly demonstrated that the bulk of incident insomnias that developed in a large elderly sample over three years were associated with incident medical or psychosocial burden (1,9). Further, initial report of insomnia coupled with improved health over the three-year period was associated with resolution of insomnia (10). This ongoing study clearly demonstrates the logical causal relationship between health and sleep quality and argues against insomnia being the result of aging, per se. Another consideration that needs to be appreciated in this context is that medical treatment of an illness ranging from bedrest to medications can also impact sleep quality adversely (2,4,5,11).

### *Primary Sleep Disorders*

The sleep of the elderly can also be impaired as a direct result of primary sleep disorders, some of which themselves may be age-related. Sleep-related breathing disturbance (SRBD or sleep apnea) and periodic leg movement

during sleep (PLMS or nocturnal myoclonus) are two such primary sleep disorders for which there is clear evidence of increasing prevalence with age (8,12).

However, the clinical implications of these observations are unclear. The presence of mild or even moderate amounts of SRBD in the absence of symptoms such as excessive daytime sleepiness and impaired daytime function is not necessarily clinically significant (8,12,13). Similarly, older individuals can experience significant nocturnal myoclonic activity and be apparently free of morbidity. The true impact of these disorders in the aged population has yet to be clearly delineated. Finally, it needs to be remembered that an older individual can also have a primary sleep disorder that is not age-related (e.g., psychophysiological insomnia or narcolepsy).

#### *The Roles of Sleep Hygiene and Subjective Appraisal*

Even given all of the factors discussed above, the sleep quality of older individuals can be further compromised by a multitude of other factors. These factors may be collectively described as poor sleep hygiene, which includes, but is not limited to: an individual's chosen sleep schedule; daytime napping; their bedroom environment, including bed, acoustics, lighting, and bed partner; dietary habits (e.g., "tea and toast" syndrome); lack of regular exercise and exposure to daylight; inappropriate use of caffeine, alcohol, or medications; and inappropriate use of the bedroom environment (e.g., using bedtime as "worry time"). These factors all have the potential to affect sleep adversely. Improving an individual's sleep hygiene can aid in optimizing their sleep quality (5,14). Quite often, education about normal age-related sleep changes coupled with specific advice regarding sleep hygiene can effectively treat a sleep complaint not based on a specific pathology.

The last layer of complexity concerning sleep disturbance in the elderly is that of subjective appraisal of sleep quality. One individual may judge normal age-related sleep change in the absence of other disturbing factors to be a possibly annoying but minimal problem, while another might view it as severe and report a sleep complaint. Conversely, another patient with age-related change, primary and secondary disorders, and poor sleep hygiene — all contributing to severely disturbed sleep that could be improved — might view the sleep disturbance as simply "part of growing old" and not volunteer a complaint. Sensitivity to an individual's appraisal of their problem is crucial as it can strongly influence whether or not a patient is likely to report a significant sleep disturbance and it may affect their adherence to treatment.

#### *Use of Sedative-Hypnotics*

There is often the temptation to prescribe a sedative when faced with an older person complaining of poor sleep quality (3). In 1985 over 20 million benzodiazepine prescriptions were written, representing a 38% increase from 1980 levels (15). A disproportionate number of these prescriptions were written for elderly patients, with persons above 60 receiving 66% more sedative prescriptions than persons 40 to 59. Further, older women were 1.7 times more likely to receive a sedative prescription compared to older men.

While sedatives can be useful for relief of transient insomnia, several recent studies have demonstrated the limited efficacy of chronic sedative use in older populations (e.g., 3,16). Tolerance frequently develops, and symptomatic treatment with hypnotics may even exacerbate existing sleep disturbances by inducing a drug dependency in insomnia with rebound insomnia and nightmares when the drug is discontinued. Occult sleep apnea can also be exacerbated. Adverse daytime effects can include impaired cognition, slowed psychomotor functioning, and increased likelihood of injuries due to falls. A recent epidemiological study further calls into question the chronic use of sedatives demonstrating that patients with insomnia who make use of psychotropic medication reported comparable satisfaction about their sleep quality compared with patients with insomnia not taking psychotropics (3).

Two recent NIH Consensus Conferences advocate great restraint in the use of sedative-hypnotics for other than temporary, situational, or intermittent conditions, and even then for extremely limited periods, at the smallest effective dose, with frequent "drug holidays" (17,18).

#### *Circadian Rhythms and Melatonin*

There is considerable evidence that at least some of the sleep disturbance seen with advancing age may be the result of ontogenetic changes in the physiological systems that generate and regulate circadian rhythms (19). That is, disturbed sleep in the elderly is at least partially the result of breakdowns in the body's circadian rhythms. Based on the premise that sleep quality will improve, considerable research has focused on assessing interventions which may reverse these circadian changes. The circadian melatonin rhythm has been demonstrated to interact with the timing and quality of sleep, and exhibits diminished amplitude and advanced phase (occurring earlier in reference to clock time) with advancing age (19). Melatonin is available over the counter and its exaggerated potential to treat sleep disturbance has received considerable attention in the media.

Melatonin's potential efficacy in this context has been preliminarily demonstrated in a recent series of studies (20-22). Melatonin may ultimately prove to be efficacious but is likely to be limited in usefulness to those elderly who are "melatonin-deficient." Indeed, in older individuals with relatively robust melatonin rhythms it may prove counterproductive, interfering with endogenous melatonin secretion. Further, the potential side effects from regular melatonin supplementation are unexplored, and its currently available preparations are far from optimal in dosage, quality control, and speed of release. It is likely that appropriate melatonin preparations will ultimately prove useful in improving sleep quality in a subset of older insomniacs. At the present time such preparations are not available.

#### *Summary and Conclusion*

The sleep disturbances disproportionately reported by the elderly are multifactorial in their origins and must be taken seriously. Even optimally healthy, noncomplaining elderly people have sleep patterns that are significantly disturbed relative to healthy younger subjects. In this regard, the unrealistic but understandable expectation of many elderly —

that they should sleep for as long and as soundly as they did when they were young — needs to be recognized and addressed. It is important to distinguish these age-related sleep disturbances from those originating in pathological processes such as sleep disorders secondary to medical and psychosocial burden, primary sleep disorders, and poor sleep hygiene. Finally, whether or not an individual chooses to view their sleep disturbance, regardless of its cause, as a problem deserving of complaint and makes an effort to seek treatment is moderated by that individual's appraisal of their sleep disturbance and its implications.

In conclusion, sleep disorders in older patients can arise from multiple and diverse causes. Because many sleep disorders are secondary, comprehensive and accurate diagnosis and specific cause-based treatments are essential. A careful review of sleep history, sleep hygiene, and education regarding age-related sleep change should be integral parts of any evaluation of a sleep disturbance. When appropriate, referral to the growing number of specialized sleep disorders centers and clinics should be considered (23). Hypnotics should be used with extreme caution and only for transient or situational sleep disturbances, as their chronic use is at best questionable and potentially harmful.

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