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Sleep in the Context of Healthy Aging and Psychiatric Syndromes

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Introduction

Humans spend approximately 1/3 of their lives asleep. Whether due to evolutionary or ontogenetic factors, sleep and psychiatric disorders change with age. While much of sleep remains an enigma, the field of sleep research is experiencing an exponential increase in its understanding of the causes, correlates, and consequences of sleep disturbances. Although the relationship between age-related sleep and psychiatric conditions is a common clinical observation, empirical investigations into these associations remain scarce. Thus, treating patients with symptoms of sleep disorders in the context of psychiatric conditions remains a major challenge. This chapter reviews the state-of-the-science of sleep disorders in the context of psychiatric conditions in late-life.

Sleep in Aging

Both self-report and polysomnographic (PSG) studies of sleep document age-related changes in sleep architecture. Subjective sleep quality decreases with age. Shortened and less restorative sleep, more frequent nighttime awakenings, increased time awake in the night, and early morning awakenings (Morgan, 2000) are well documented with aging. Sleep is “structurally lighter” in the elderly. Cross-sectional studies using PSGs have shown that older adults spend less time in deep, slow-wave-sleep (SWS), more time in the light, non-restorative stages 1 and 2 sleep, and experience more frequent shifts from one sleep stage to another. These studies show more frequent arousals, shorter rapid eye movement (REM) sleep latencies, more and longer periods of alpha (wake) activity during sleep, and a lower awakening threshold in the elderly. (Boselli, Parrino, Smerieri, & Terzano, 1998; Morgan, 2000; Zepelin, McDonald, & Zammit, 1984). Sleep efficiency is the only parameter that declines significantly after the age of 60 (Ohayon, Carskadon, Guilleminault, & Vitiello, 2004). A meta-analysis of age-related sleep changes shows that PSG or self-report demonstrate that increased age is associated with extended sleep onset latency (SOL), increased wake after sleep onset (WASO), more nighttime awakenings (NTA), and decreased total sleep time (TST) (Floyd, Medler, Ager, & Janisse, 2000). Interestingly, objectively measured WASO, NTA, and TST correlate more with age than self-report.

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Night-to-night inconsistency, or intraindividual variability, increases in older adults with and without sleep complaints, both objectively and subjectively (Buysse et al., 2010; Dzierzewski et al., 2008). Importantly, although on average subjective and objective measures of sleep decline with age, self-report and PSG measures correlate poorly on a night-to-night basis (Kay, Dzierzewski, Rowe, & McCrae, in press).

Poor Sleep in Late-Life

Epidemiological estimates suggests that as many as 65% of older adults complain about at least one of several sleep disturbances (Newman, Enright, Manolio, Haponik, & Wahl, 1997). Poor sleep in elderly relates to higher mental and physical morbidity, hospitalizations, mortality rates, and suicidality (reviewed in Morgan, 2000). The most common complaints include frequent awakenings during the night, waking up too early, and difficulty falling asleep (Newman et al., 1997). Of these, late-life insomnia is among the most costly and preventable health problem in the United States. The diagnosis of late-life insomnia is based on a complaint of chronic (>1 month) difficulty initiating or maintaining sleep, or unrefreshing sleep occurring at least 3 nights per week. Although insomnia is not part of normal aging, the incidence, prevalence, severity, and chronicity of it increase with age.

Due to considerable interindividual variability in late-life sleep, insomnia and normal age-related changes overlap as do their consequences on daytime functioning. Older adults experience similar sleep very differently. For example, in late-life, women are more likely than men to complain of insomnia although objective sleep architecture is generally more disturbed in men (Vitiello, Larsen, & Moe, 2004). Notably, although aging is more correlated with objective measures of sleep architecture, subjective measures are more predictive of insomnia and its associated social costs and personal mental/physical sequelae.

Sleep and Other Conditions: Primary vs. Secondary

Roughly, 7 of 8 older adults who report sleep disturbances report at least one other major mental/psychological disorder, particularly depression, heart disease, pain, and memory problems (Foley, Ancoli-Israel, Britz, & Walsh, 2004). Such co-occurrences have traditionally led to two unsupported conclusions: 1) sleep disturbances are merely symptoms of mental/psychological disorders that cannot be improved without successful treatment of the primary condition and 2) sleep problems will subside with the successful treatment of the primary condition. While in some instances this may be true, clinical research suggests that sleep disturbances are treatable even in the context of a severe medical problem (reviewed in Morgan, 2000). Sleep complaints persist in the majority of patients following treatment of their primary medical or psychological condition (Nierenberg et al., 1999). Nevertheless, the vast majority of clinicians and patients believe that poor sleep is inextricably tied to another underlying pathology.

To counteract this bias, the National Institute of Health (NIH) issued a statement in 2005 recommending that disturbed sleep no longer be routinely conceptualized as secondary to another disorder (“NIH State-of- the-Science Conference statement on Manifestations and Management of Chronic Insomnia in Adults,” 2005). The prevalence rate of sleep

complaints among older adults drops to as low as ~2% after eliminating all who complain of a co-morbid mental/physical conditions. (Vitiello, Moe, & Prinz, 2002). But calculating prevalence rates after controlling for potential comorbid conditions should be viewed with caution – as co-occurrence does not negate independence.

Sleep and Psychiatric Conditions

Across the lifespan, poor sleep is often co-morbid with psychiatric disorders. More than 30% of older individuals with insomnia have an accompanying psychiatric disorder (reviewed in Morgan, 2000). The relationship between sleep and mental health has long been recognized. In 1867 Wilhelm Griesinger outlined four major psychological conditions highly correlated with sleep disturbance: depression, hypochondriasis, mania, and psychosis (Griesinger, 1867). The basic relationship between depression, anxiety, mania, psychosis and sleep disturbances remains a robust finding. This chapter reviews the relationship between age-related changes in sleep and the aforementioned mental health problems, with the addition of a brief discussion on dementia. Although the specificity of a sleep disturbance as psychiatrically diagnostic is low, (Morgan, 2000), understanding this relationship enriches our understanding of both.

Depression

Roughly 14% of older adults in the US experience significant symptoms of depression (Zivin et al., 2010). About a quarter of these meet criteria for major depressive disorder, among the highest incidence of any major psychiatric disorder. Clinical and epidemiological evidence indicate that depression shares a robust relationship with sleep disturbances and that this relationship is likely bi-directional. In a general population, sleep disturbance is present in about 60% of depressed individuals. It is one of the most common symptoms of mild depression (Carragher, Mewton, Slade, & Teesson, 2011). Several of the changes that occur with sleep in depression resemble sleep changes that also occur with aging, specifically reduced sleep length, reduced sleep continuity, decreased REM sleep latency, and a decline in sleep depth (Kupfer, Reynolds, Ulrich, Shaw, & Coble, 1982). These age-related changes in sleep are more severe in older adults with depression compared to healthy older adults (Knowles, & MacLean, 1990).

In older adults depressive symptoms frequently appear with severe insomnia, both the sleep onset and sleep maintenance varieties (Maggi et al., 1998). Early morning awakenings are the most frequent sleep disturbance in conjunction with late-life depression (Mallon, Broman, & Hetta, 2000b; Rodin, McAvay, & Timko, 1988). Insomnia in conjunction with depression has a poorer prognosis than depression alone and predicts future major depressive episodes (Roberts, Shema, Kaplan, & Strawbridge, 2000; Mallon, Broman, & Hetta, 2000). Targeted assessment and treatment for co-morbid insomnia in late-life depression is indicated.

Mania

The three year incidence of bipolar disorders in adults over the age of 55 is among the lowest of all DSM-IV disorders (bipolar I = 0.54%, bipolar II = 0.34%; Chou, Mackenzie,

Liang, & Sareen, 2011). Bipolar disorder deserves consideration due to its substantial personal and social burden. There is an absolute dearth of research on the relationship between age-related changes in sleep and mania. In younger samples, decreases in self-reported sleep duration commonly precede a manic episode (Jackson, Cavanagh, & Scott, 2003). Objective sleep changes in bipolar disorder include: abnormalities in REM latency, duration, and density (reviewed in Eidelman, Talbot, Gruber, Hairston, & Harvey, 2010). Increased SWS is predictive of manic symptoms and impairment at 3 months, while greater time spent in Stage 2 sleep is predictive of lower levels of manic symptoms and impairment. Clozapine (commonly prescribed to treat resistant mania), increases time spent in Stage 2 sleep (Hinze-Selch, Mullington, Orth, Lauer, & Pollmächer, 1997), suggesting that Stage 2 sleep contributes to countering mania. Research in this area is warranted.

Anxiety

Anxiety is a common problem in late-life. The three year incidence of anxiety disorders in adults over the age of 60 ranges from 0.58% (social phobia) to 1.63% (generalized anxiety disorder; GAD; Chou et al, 2011). Although the prevalence of anxiety disorders decreases with age, there is evidence that this may be a research artifact due to: (1) cohort effects (i.e., older adults may be less likely to report anxiety symptoms), (2) differences in how anxiety is experienced with by the aged and how it is measured by researchers (i.e., more subclinical anxiety in late-life and decreased physiological reactivity), and/or (3) sampling bias. Anxiety disorders in late-life, especially GAD, are highly associated with sleep disturbances even when controlling for co-morbid depression. About half of older adults with an anxiety disorder also have sleep disturbance, most commonly sleep onset difficulties (Mallon et al., 2000b). Among anxiety patients, the degree of sleep disturbance correlates with anxiety severity (Ohayon, 2004). Sleep disturbances in late-life GAD are more severe than in younger GAD patients (Bernes, et al., 2009). The high co-morbidity of sleep and anxiety may be related to the fact that anxiety in most everyone, syndromic or not, typically disrupts sleep, briefly or over an extended time frame (reviewed in Magee, & Carmin, 2010).

Treating older adults with co-morbid insomnia and anxiety can be challenging. Cognitive behavioral therapy (CBT) of co-morbid anxiety or insomnia may be effective in treating the anxiety (CBTA or insomnia CBTI). But treating one may not result in improvement in the other (Rybarczyk, Lopez, Alsten, Benson & Stepanki, 2002). Combining components of CBT for anxiety and insomnia may effectively address both, but is not yet supported by research (Magee, & Carmin, 2010).

Psychosis

Sleep complaints are common with schizophrenia in late-life and are more severe than in normal aging (Martin, Jester, & Ancoli-Israel, 2005). Sleep abnormalities occur in both medicated and unmediated patients. In younger patients, schizophrenia is related to reduced sleep length, longer sleep latencies, and poorer sleep efficiency (Benca, Obermeyer, Thisted, & Gillin, 1992). In late-life, schizophrenia is related to increased time in bed, total sleep time, more night time awakenings, greater wake after sleep onset, more and longer naps (Martin, Jester, & Ancoli-Israel, 2005). These sleep disturbances may be due to the disorder.

Conversely, changes in sleep can exacerbate symptoms and are predictive of psychotic episodes. This includes psychotic symptoms, impairments in cognitive functioning, negative symptoms, and poor quality-of-life (Martin, Jester, Caliguiri, Patterson, Heaton, & Ancoli-Israel, 2001). Little research exists.

Dementia

The term dementia loosely describes symptoms dominated by negative cognitive changes, such as declines in memory, attention, executive functions, and language in the presence of significant functional impairment in activities of daily living, such as self-care and bowel/bladder management. Dementia is not a disorder, but rather a symptom of several dementing conditions (Alzheimer's disease, Parkinson's disease, Lewy Body disease, etc.). Because dementia results from different neurological pathologies, sleep presentation differs considerably from condition-to-condition.

Alzheimer's disease (AD), the single most prevalent dementing disorder, is the focus of this section. Many untoward changes in sleep occur in AD. Both wake and sleep EEG show a general slowing of waveforms. The sleep of AD patients is less efficient, shows more time in lighter sleep, less time in deep sleep, a decrease in time in REM sleep, and shows more arousals than controls (Bliwise, 1993). A rather disruptive problem is "sundowning" which refers to AD patients' propensity to become more agitated, active, and confused during the evening hours. Sundowning is a predictor of institutionalization. Treatments of sleep disturbances in AD patients are underdeveloped and lack consensus. Because sleep problems associated AD patients are generally viewed as multifactorial, potential treatments should be individually tailored and consider both the causes of the disturbance and the context in which the disturbance occurs (for a review see McCurry, Reynolds, Ancoli-Israel, Teri, and Vitiello, 2000). This area lacks research.

Summary

Sleep disturbances in the context of psychiatric conditions in late-life creates an ambiguous and challenging scenario for researchers and clinicians. Important research agenda and treatment implications abound. We lack investigations of the potential shared biological substrates between sleep disorders and psychiatric conditions in late-life and we lack randomized, controlled trials aimed at improving the sleep of older adults with concurrent psychiatric conditions. An important caveat regarding treatment is that it may be difficult on occasion to determine the best treatment plan for sleep disorders in the context of psychiatric conditions in late-life. When co-morbid with another condition, sleep complaints deserve focused assessment and treatment. The modal treatment for sleep disorders in the context of psychiatric conditions in late-life is medication. Due to concerns over polypharmacy, drug interactions, and differing metabolisms in late-life, pharmaceutical interventions should be used sparingly (Dzierzewski, O'Brien, Kay, & McCrae, 2010). Cognitive-behavioral therapy is an evidence-based treatment for sleep disorders and should be the treatment of choice, even in the context of conditions thought to be biological and/or psychiatric.

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- An important caveat regarding treatment is that it may be difficult on occasion to determine the best treatment plan for sleep disorders in the context of psychiatric conditions in late-life.
- The modal treatment for sleep disorders in the context of psychiatric conditions in late-life is medication.
- Cognitive-behavioral therapy is an evidence-based treatment for sleep disorders and should be the treatment of choice, even in the context of conditions thought to be biological and/or psychiatric.