

# Psychiatric Illness and Sleep in Older Adults

## Comorbidity and Opportunities for Intervention



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### KEYWORDS

• Sleep disorders • Psychiatric illness • Suicide • Older adults

### KEY POINTS

- Sleep disorders are prevalent among older adults.
- Psychiatric disorders are highly comorbid with sleep disorders, though much less work has been conducted specifically examining older adults.
- Sleep disorders have been shown to be associated with suicide risk among older adults even beyond the effects of psychopathology.
- Research is needed to examine the potential for sleep interventions to improve both sleep and psychopathology symptoms among older adults.

Psychopathology is common among older adults, with community prevalence rates as high as 15% for anxiety<sup>1</sup> and 13% for depression.<sup>2</sup> Further, although in recent years suicide rates have been higher in midlife than among older adults, older white men still have the highest suicide rate of any group.<sup>3</sup> Although some may think that the onset of depression and anxiety among elders is understandable given the health and financial difficulties that may accompany aging, quality of life remains high. In fact, when external factors are controlled, age is not associated with quality of life.<sup>4</sup> Thus, the development of psychopathology, or suicidal behavior, in late life is *not* inevitable.

There is a great need for research examining what factors lead older adults to develop psychopathology. One area that has received increased attention of late is sleep disorders. Sleep disorders are highly prevalent among older adults, and many increase in prevalence as we age. For instance, insomnia has been found to be more prevalent among older adults than any other age group.<sup>5</sup> Further, although prevalent, insomnia may be underreported, as many older adults change their view of acceptable sleep or assume that they should not be able to sleep as well as they could when they were younger.<sup>6,7</sup> In addition to insomnia, many other sleep disorders become

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more prevalent as we age, including obstructive sleep apnea,<sup>8</sup> restless leg syndrome,<sup>9</sup> and rapid eye movement (REM) sleep behavior disorder.<sup>10</sup> Lastly, although commonly thought of predominantly as a childhood disorder, research has demonstrated that nightmares can persist into late life.<sup>11,12</sup>

Although both psychopathology and sleep disturbances are prevalent among older adults, the extant literature examining their relation in older adulthood is not well developed. The present article reviews this literature, outlines areas where further research is necessary, and highlights opportunities for intervention.

## SLEEP DISTURBANCES AND DISORDERS

From pain, to light, to things that go bump in the night, there are many factors that impact our sleep. Sleep disturbances include difficulty with initiating or maintaining sleep, waking too early, and dysfunctions that occur during sleep, such as sleepwalking or nightmares. The term *sleep disturbance* is used in a variety of manners. In its broadest usage, a sleep disturbance refers to any sleep problem, whether it is acute, chronic, or meets the diagnostic criteria as a sleep disorder. Here, the authors adopt the convention that sleep disturbances are problems with sleep commonly described as symptoms but that are not severe enough to be causing the individual significant impairment and/or to meet the diagnostic criteria for a sleep disorder. Once the individual is impaired and/or the symptoms associated with sleep disturbance are severe enough, then a sleep disorder diagnosis should be considered. Several classification manuals include sleep disorders, including the *International Classification of Diseases*,<sup>13</sup> the *Diagnostic and Statistical Manual of Mental Disorders*,<sup>14</sup> and the *International Classification of Sleep Disorders*.<sup>15</sup> There are 6 major categories of sleep disorders: insomnia, sleep-related breathing disorders, central disorders of hypersomnolence, circadian rhythm sleep-wake disorders, parasomnias, and sleep-related movement disorders.<sup>15</sup>

## DEPRESSION AND SLEEP DISORDERS

Although depression is less prevalent among older adults than younger adults,<sup>16</sup> it is still a major concern for older adults, with approximately 13% to 15% prevalence in community samples.<sup>2,17</sup> Further, it is associated with decreased functioning and an increased risk of morbidity,<sup>17</sup> and more than half of all older adults who experience a depressive episode had their first episode 60

years of age or later.<sup>18</sup> Older adults who develop depression late in life are more likely to have vascular risk factors and cognitive deficits, whereas those who develop depression earlier are more likely to have a family history of depression and comorbid personality disorders.<sup>17,19</sup> Depression among older adults is more likely to present via physical complaints than affective complaints<sup>20</sup> and has higher rates of sleep complaints than depression in younger adults.<sup>21</sup> In fact, meta-analytic work has found that sleep disturbances more than double the risk of developing depression among older adults.<sup>22</sup>

## Depression and Insomnia

Although commonly thought of as a symptom of depression,<sup>14</sup> numerous studies,<sup>23–25</sup> including those that focused on older adults,<sup>26</sup> have found that insomnia itself is a risk factor for developing depression (Table 1). Further, in the Improving Mood-Promoting Access to Collaborative Treatment (IMPACT) study, participants were between 1.8- and 3.5-times more likely to remain depressed than those who did not have insomnia.<sup>27</sup> The presence of insomnia also affects depression treatment, with less complete depressive symptom and suicidal ideation remission and higher rates of relapse in patients who have comorbid insomnia.<sup>28,29</sup> However, research on younger adults has found that adding cognitive-behavioral therapy (CBT) for insomnia to antidepressant treatment results in enhanced depression treatment outcomes.<sup>30</sup> Given this important finding, research examining the impact of treating insomnia on older adult depression treatment outcomes is warranted.

## Depression and Obstructive Sleep Apnea

Obstructive sleep apnea (OSA) is a sleep-related breathing disorder characterized by excessive daytime sleepiness and frequent awakenings preceded by episodes whereby airflow is significantly reduced, or ceases entirely, despite the presence of respiratory effort.<sup>15</sup> The prevalence rates of OSA range dramatically (4%–50%) based on methodology, sex, and sample constitution; but epidemiologic studies all show an increase in prevalence rates with older age, with some plateauing within older age groups.<sup>31–33</sup> Results from mixed-sample studies of middle- and older-aged adults show that individuals with OSA often present with, or are at risk for developing, medical comorbidities (eg, cardiovascular disease, obesity) and have reductions in physical functioning and quality and frequency of social interactions, each of which can contribute to the onset or

**Table 1**  
**Summary of psychiatric illness, suicide, and sleep disorder research in older adults**

	<b>Insomnia</b>	<b>OSA</b>	<b>Nightmares</b>	<b>Sleep Quality</b>
<b>Depression</b>	Insomnia symptoms increase the likelihood of depressive symptom onset and maintenance; there is a poor response to depression treatment.	No studies have targeted older adults specifically in regard to the prevalence of depression in OSA and the impact of CPAP adherence on remission of depressive symptoms.	Nightmares are strongly related to depressive symptoms. There is a lack of research replicating this finding and exploring the impact of nightmares on depression treatment outcomes.	Sleep quality predicts the onset and recurrence of depressive symptoms. The relationship seems stronger for men and those with earlier onset of depression (ie, 60–74 y).
<b>Anxiety</b>	Insomnia symptoms often co-occur with GAD and panic disorder. Alcohol consumption may moderate the association between insomnia symptoms and GAD. Anxiety symptoms may precede insomnia symptom onset.	Similar to depression, no studies have targeted older adults specifically in regard to the prevalence of anxiety in OSA and the impact of CPAP adherence on remission of anxious symptoms.	About 17% of those with significant anxiety report nightmares. Those with GAD report more bad dreams than those without GAD. Receiving CBT for anxiety may lead to fewer bad dreams after treatment and throughout the ensuing year.	
<b>Suicide</b>	Insomnia symptoms prospectively predict suicide across cultures. Depressive symptoms mediate the relation between insomnia symptoms and suicide ideation. Suicide attempt history is associated with more severe insomnia symptoms.	Suicide ideation has been reported among adults and older adults with OSA. CPAP adherence may be related to a remission of suicide-related thoughts. No studies have investigated for relationships between OSA and suicide risk.	The association between nightmares and suicide ideation is mediated by insomnia symptoms. The nightmare duration is independently related to suicide risk, even when controlling for insomnia symptoms.	Poor sleep quality prospectively predicts a fatal suicide attempt when controlling for depression (1.2-times greater risk).

*Abbreviations:* CBT, cognitive-behavioral therapy; CPAP, continuous positive airway pressure; GAD, generalized anxiety disorder; OSA, obstructive sleep apnea.

exacerbation of depression.<sup>34,35</sup> Greater OSA severity has been associated with the presence of depressive disorders,<sup>36</sup> and one study of Veterans Health Administration patients with OSA (N = 118,105; more than 38% were 65 years or older) estimated the prevalence of depression to be 21.8%.<sup>37</sup> There exists, however, a definitive and accessible intervention for OSA (ie, continuous positive airway pressure [CPAP]) that has been identified as the standard of care<sup>38</sup> and has been associated with decreases in depressive signs and symptoms among adult patients with OSA.<sup>39–41</sup> Given the prevalence of both depression and OSA in the general population, and their heightened prevalence in older cohorts, the relatively small number of studies at their intersection is somewhat striking.

### ***Depression and Nightmares***

Numerous studies of younger adults and mixed-age samples<sup>42</sup> have demonstrated a relation between nightmares and depressive symptoms, especially melancholic features of depression,<sup>43</sup> with some showing that the relation between depression and nightmares is independent of the effects of insomnia.<sup>44</sup> The few studies that have been conducted on nightmares and depression in older adults have shown a significant relationship between depressive symptoms and nightmares<sup>11,45</sup> and bad dream frequency.<sup>12</sup> In fact, the correlation between nightmares and depressive symptoms among older adults ( $r = 0.70$ )<sup>11</sup> is substantially higher than the correlation found among younger adults ( $r = 0.33$ ).<sup>46</sup> Although this is based on very few studies, it is suggestive that nightmares are strongly related to depressive symptoms among older adults.

Although research has demonstrated a relation between nightmares and depression in older adults, it has yet to examine the impact of nightmares on the treatment of depression. Given the findings that insomnia symptoms are associated with poorer depression treatment outcomes,<sup>28</sup> and the strong relation between nightmares and depression among older adults,<sup>11</sup> research examining whether nightmares negatively affect depression treatment, particularly among older adults, is warranted.

### ***Depression and Sleep Quality***

Although not a sleep disorder per se, poor sleep quality has been found to prospectively predict both the onset and recurrence of depression in older adults.<sup>47–49</sup> Interestingly, the association between sleep disturbances and depression seems to be moderated by sex and age at depression onset.

Research has demonstrated that the relation between sleep quality and depression is stronger among men than women.<sup>50</sup> Additionally, adults with very late depression onset (aged 75 years or older) report fewer sleep disturbances than either those aged 18 to 59 years or 60 to 74 years.<sup>51</sup> Based on these findings, it seems that the relation between depression and sleep quality may be especially important for men up until 75 years of age.

## **ANXIETY AND SLEEP DISORDERS**

Anxiety disorders are very common among older adults, with prevalence estimates as high as 14%.<sup>52</sup> Sleep disturbances are common in anxiety,<sup>53</sup> with daytime sleepiness, poor sleep quality, long sleep latency, and extended wake after sleep onset being common sleep complaints among those with anxiety.<sup>54,55</sup> In a sample of 2759 older adults aged 65 years and older, a sleep latency greater than 30 minutes was associated with a greater likelihood of meeting the criteria for an anxiety disorder and a decreased likelihood of meeting the criteria for a mood disorder.<sup>56</sup>

### ***Anxiety and Insomnia***

Anxiety and insomnia are commonly comorbid among older adults.<sup>5</sup> Specifically, insomnia has been found to commonly co-occur with panic disorder and generalized anxiety disorder (GAD).<sup>57</sup> Within a sample of older adults with GAD, more than 90% reported sleep dissatisfaction and 52% to 68% reported moderate to severe symptoms of insomnia.<sup>58</sup> It has been proposed that, in contrast to depression, anxiety likely precedes the development of insomnia<sup>59</sup> or both develop concurrently.<sup>25</sup>

Overall, the relation between insomnia and anxiety has been found to be very robust, with a large cross-sectional study finding that anxiety symptoms were associated with poorer sleep efficiency and greater sleep fragmentation after controlling for depressive symptoms, medical conditions, and antianxiety medication use.<sup>60</sup> However, one factor that has been shown to affect the relation is alcohol consumption. Surprisingly, mild to moderate drinking of alcohol seems to serve a protective function in older adults with GAD, as those who drank alcohol more often during the week had lower levels of anxiety, worry, and insomnia.<sup>49,61</sup>

Although the literature consistently shows that anxiety is associated with insomnia, there is still much we do not know. Anxiety is a very broad area that encompasses several disorders. Further research is necessary in order to understand how each anxiety disorder is associated with insomnia and how they may differ in this regard.

### ***Anxiety and Obstructive Sleep Apnea***

Few studies have focused on exploring for the relationships between OSA and anxiety among older adults. In fact, a recent review of the general research literature concluded that the relation between OSA and anxiety continues to be poorly illustrated.<sup>62</sup> At present, the literature is mixed, with some studies showing the prevalence of anxiety among individuals with OSA as high as 70%,<sup>63</sup> whereas others have found no relation between the severity of apnea symptoms and anxiety symptoms.<sup>64</sup> Thus, there is a great need for more research in this understudied area to help us better understand whether sleep apnea is associated with anxiety across the adult life span. Also, and similar to depression, relatively few studies have examined the impact of CPAP adherence on anxiety in older adults with OSA; but decreases in anxious symptoms have been observed among adult patients with OSA.<sup>48</sup>

### ***Anxiety and Nightmares***

Despite research demonstrating that 17% of older adults with clinically significant symptoms of anxiety experience nightmares,<sup>65</sup> as opposed to 4% prevalence for older adults without anxiety,<sup>66</sup> few studies have examined this relation. One of the few studies that has been conducted examined bad dreams within the context of late life GAD, finding that older adults with GAD endorsed significantly more bad dreams than those without GAD. Further, the frequency of bad dreams was associated with greater worry, poorer quality of life, and increased symptoms of anxiety and depression.<sup>12</sup> However, these effects may be mitigated through CBT for anxiety. Older adults who received CBT for anxiety reported fewer bad dreams at post-treatment as well as throughout a year of follow-up.<sup>12</sup>

## **SUICIDE AND SLEEP DISORDERS**

Older adults, but especially Caucasian older adult men, are at an elevated risk of suicide.<sup>3</sup> There are now 2 meta-analyses and several review articles confirming an association between sleep disturbance and/or specific sleep disorders and suicide outcomes, such as suicidal ideation, nonfatal suicide attempts, and death by suicide.<sup>67-70</sup>

Late-life suicide is also associated with some key demographic risk factors that may overlap with factors related to late-life sleep disorders. For example, the 2015 US suicide rates indicate a notable increase in the number of women aged 45 to 64 years who died by suicide when compared with 1999 data, with a similar though

less dramatic increase among women aged 65 to 74 years. Whereas women's risk peaks in midlife, men's risk continues to be highest after 75 years of age.<sup>3</sup> The baby boom cohort, which has had relatively higher rates of suicide across the life cycle when compared with other birth cohorts, is beginning to leave the middle years and enter older adulthood in increasingly large numbers each year. This change is likely to have a pronounced effect on the incidence and prevalence of both sleep disorders and suicide in older adults.

### ***Suicide and Insomnia***

The relation between insomnia and suicide has been well examined among younger adults, and several studies have been conducted in older adults. One study measuring sleep quality in older adults showed that poor sleep at baseline significantly predicted death by suicide when controlling for depression.<sup>71</sup> The same research team recently completed a case-control cohort study of older adults showing that poor subjective sleep at baseline was associated with a 1.2-times greater risk for a fatal suicide attempt by the 10-year follow up, even when controlling for depressive symptoms.<sup>72</sup> Additionally, difficulty falling asleep was associated with a 2.24-times greater suicide risk, and nonrestorative sleep was associated with a 2.17-times greater risk for suicide.<sup>72</sup> This finding mirrors studies that have taken place outside the United States, where insomnia has been prospectively linked with suicide among Taiwanese older adults<sup>73</sup> and in an epidemiologic survey of Chinese older adults,<sup>74</sup> suggesting these findings may generalize across cultures.

There have also been cross-sectional studies that have examined the relation between insomnia and suicidal risk among older adults. In a sample of older adults recruited from a community medicine clinic, insomnia symptoms were found to be related to suicide ideation, even when controlling for nightmares, though the relation was mediated by depressive symptoms.<sup>11</sup> Additionally, a recent study found that participants with a history of a suicide attempt had more severe insomnia symptoms than those with depression or suicidal ideation, even when controlling for demographics, past month alcohol abuse, cognitive ability, depression severity, anxiety, and perceived physical health burden.<sup>75</sup> Thus, there is consensus in the literature that insomnia is associated with suicide risk among older adults. However, it is not clear whether treating insomnia reduces suicide risk; future research investigating this important question would be of great value to the literature.

### ***Suicide and Nightmares***

Although a small literature, there is evidence that nightmares are associated with suicide.<sup>11,45</sup> Among a sample of older adults recruited from a primary care clinic, nightmares were found to be associated with suicidal ideation, though this relation was mediated by insomnia symptoms.<sup>11</sup> However, recent research suggests that the duration of time that one has had nightmares may be more important than how severe their symptoms are currently. In a sample of older adults recruited through Amazon's Mechanical Turk, Golding and colleagues<sup>45</sup> found that the nightmare duration was associated with suicide risk independent of current symptoms of insomnia, nightmares, anhedonia, and feelings of burdensomeness and lack of belongingness. There is a great need for additional studies investigating this relation in order to determine whether the nightmare duration should be considered a risk factor for suicide among older adults as well as whether treating nightmares may ameliorate the consequences of long-term nightmares.

### ***Suicide and Obstructive Sleep Apnea***

As noted earlier, beyond increasing the overall disease burden, the presence of OSA-related comorbidities can contribute to depression. Not surprisingly, these factors are also associated with a greater risk of suicide.<sup>76,77</sup> Nonetheless, only 2 published observational studies<sup>78,79</sup> and one case study<sup>80</sup> have examined the relation between OSA and suicidality; only 2 of the 3 included older adults.<sup>78,80</sup> Among 228 patients with OSA who adhered to CPAP treatment (31% older than 65 years of age), 18% endorsed suicide ideation before treatment and none endorsed thoughts of suicide at the 3-month follow-up.<sup>78</sup> In addition, a significant decrease in depression and OSA severity were observed following 3 months of CPAP. Similarly, a remission of suicide-related thoughts in a 74-year-old man adhering to nasal CPAP was outlined in the case study.<sup>80</sup>

Two of the 3 studies that examined the relationship between suicide risk and OSA relied on single items to assess suicidal ideation, and only one used objective sleep measures.<sup>79</sup> The lack of research concerning the relationship between OSA and suicidality is an important gap to address.

## **NEURODEGENERATIVE DISEASES AND SLEEP DISORDERS**

### ***Rapid Eye Movement Sleep Behavior Disorder and Parkinson Disease***

Parkinson disease (PD) is a prevalent neurodegenerative disease in late life that results in cognitive

impairment ranging from mild cognitive impairment through dementia.<sup>81</sup> It is also closely related to dementia with Lewy bodies, a related dopaminergic disorder that is the second most common type of degenerative dementia.<sup>82</sup> REM sleep behavior disorder (RBD), a parasomnia whereby there is an absence of full atonia and paralysis during REM sleep resulting in the individual acting out his or her dreams,<sup>83</sup> is commonly comorbid with PD (**Table 2**). Further, it is debated in the literature whether RBD may either be a prodromal symptom of PD<sup>84</sup> or part of a distinct clinical entity.<sup>85</sup> Proponents of RBD being a prodromal symptom of PD point to research demonstrating that patients with idiopathic RBD have up to a 72% chance of developing PD<sup>86</sup> and an 80% risk of developing a neurodegenerative synucleinopathy.<sup>84</sup> Further, patients with RBD evidence basal ganglia dysfunction similar to patients with early stage PD.<sup>87</sup> However, those arguing for a different clinical entity cite research that when RBD precedes PD, there is no difference in the clinical presentation of the patients with PD; but when RBD comes after PD, patients with PD had worse PD symptoms and required higher doses of dopaminergic agonists.<sup>85</sup> Additionally, on autopsy, those who have both PD and RBD showed more synuclein pathology than those who just had PD.<sup>88</sup> Regardless of this debate, the literature is in strong agreement regarding the relation between RBD and PD.

### ***Sleep in Dementia***

Sleep disturbances are very common in dementia, with patients with dementia having significantly lower sleep efficiency and more time awake throughout the night.<sup>89</sup> Because patients with dementia are commonly awake and requiring care, these sleep disturbances are often one of the most distressing symptoms to caregivers of patients with dementia.<sup>90</sup> A recent review of the literature on sleep disorders and cognitive decline<sup>91</sup> found that sleep disorders significantly impact both physical and cognitive functioning as well as behavior problems among those with cognitive decline and dementia. Thus, in addition to being distressing to caregivers, sleep disorders may worsen the symptoms of cognitive impairment and dementia. Research has also suggested that OSA may increase the risk of cognitive impairment and dementia.<sup>92</sup> Additionally, prospective research found that both a short ( $\leq 6$  hours) and long ( $> 9$  hours) time in bed is associated with an increased risk of developing dementia at follow-up.<sup>93,94</sup>

Although there is a strong literature suggesting an association between dementia and sleep

**Table 2**  
**Summary of neurodegenerative diseases and sleep disorder research in older adults**

RSBD	Sleep Disturbance	Sleep Disorders
<p>PD RSD and PD often co-occur. Patients with idiopathic RSD have an increased risk of developing PD and a neurodegenerative synucleinopathy. Those diagnosed with RSD following a diagnosis of PD display worse PD symptoms than those with only PD.</p>	<p>Dementia Reduced sleep efficiency and more time awake throughout the night are common in dementia. Time in bed prospectively predicts the development of dementia (ie, 6 h and less or more than 9 h).</p>	<p>Sleep disorders impact both cognitive and physical functioning. OSA may increase the cognitive impairment risk.</p>

disturbances, relatively little work has been done on sleep interventions among individuals with dementia.<sup>95</sup> Cognitive therapies may not be appropriate due to cognitive impairments, and research has suggested that benzodiazepine medications also are not appropriate<sup>96,97</sup> nor effective<sup>98</sup> for individuals with dementia. Thus, there is a great need for research investigating sleep treatments for individuals with dementia. In particular, given the strong association between OSA and cognitive difficulties, apnea should be treated when possible.<sup>97</sup> Further, behavioral interventions to improve sleep quality may be an especially strong fit and are worthy of investigation.

## SUMMARY

### *Summary of Findings and Conclusions*

Although the late-life literature is still in its infancy compared with the literature on younger adults, the literature that exists consistently shows concurrence with the broader literature that psychopathology is highly comorbid with sleep disturbances in late life. That said, there are some notable differences between the older and younger adults. First, although psychopathology is prevalent in late life, the rates of psychopathology are lower among older adults than they are in young adulthood.<sup>17</sup> On the other hand, with some exceptions, such as nightmares,<sup>99</sup> sleep disturbances are more prevalent among older adults than they are earlier in the life span.<sup>100</sup> Thus, although we see a correlation between sleep disturbances and psychopathology across the life span, the strength of the association may change with age. A good example of this is the relation between insomnia symptoms, nightmares, and suicidal ideation. Among young adults, research has demonstrated that nightmares, but not insomnia

symptoms, are associated with suicidal ideation independent of each other.<sup>42</sup> However, among older adults we find that insomnia symptoms are associated with suicidal ideation independent of nightmares.<sup>11</sup> Given this, there is a need for further research extending the sleep and psychopathology findings from young adult and mixed-age samples to older adults.

Another area that is particularly promising and warrants further research is examining the impact of treating sleep disorders on psychopathology in older adults. Research in mixed-age samples has shown that for many forms of psychopathology treatment may be enhanced through the addition of sleep interventions. However, relatively little research in this vein has been done among older adults. Relatedly, although much of the early work providing evidence of efficacy of behavioral insomnia interventions was undertaken in older adults, there is a need for further research on sleep interventions among older adults with psychiatric comorbidities. It is often difficult to treat sleep problems among older adults because of cognitive and memory problems, which may interfere with CBT.

In conclusion, although research on the relationship of sleep difficulties and psychopathology among older adults lags in comparison with the work in younger populations, it is clear that there is an association between sleep disturbances and psychopathology across a spectrum of psychiatric disorders in older adults. This association provides an opportunity to intervene in sleep problems to potentially reduce the development or exacerbation of psychopathology as people age. It is also plausible that the efficacy of interventions to treat psychiatric disorders can be enhanced by addressing the sleep complaints that may be playing an important role behind the scenes.

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