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Sleep Disturbances in Persons Living with HIV

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Abstract

Up to 70% of persons living with HIV (PLWH) experience sleep disturbances. Insomnia and obstructive sleep apnea syndrome (OSAS) are common disorders seen in the primary care of PLWH. This paper reviews the current evidence and practice recommendations for treating these conditions. Insomnia is evaluated by clinical interview, questionnaires, and sleep diaries. The recommended first-line treatment is cognitive-behavioral therapy for insomnia (CBT-I), delivered by a trained therapist. Certain sedative medications may be useful, but over-the-counter treatments (particularly those containing antihistamines) are not recommended. OSAS is diagnosed by overnight sleep study but can be screened for in primary care. The STOP-BANG is a useful 8-item screening tool. The gold standard of treatment for OSAS is the use of a continuous positive airway pressure device. Treatment of insomnia and OSAS is important for improving quality of life and preventing associated health problems (especially cardiovascular disease in OSAS) in PLWH.

Keywords

HIV; insomnia; Obstructive Sleep Apnea Syndrome; sleep

Sleep is defined as “perceptual disengagement from and unresponsiveness to the environment” (Carskadon & Dement, 2005, p. 13). Adults need about 7 to 9 hours of sleep per night (Carskadon & Dement, 2005). Sleep deprivation causes negative consequences that may be physical (hypertension, insulin resistance), cognitive (slowed reaction time, poorer problem solving), or emotional (depression, poor emotional regulation; Dinges, Rogers, & Baynard, 2005). Thus, encouraging and supporting adequate sleep is an important part of a comprehensive plan of care for all patients and especially for those with a chronic illness such as HIV infection. Insomnia and obstructive sleep apnea syndrome (OSAS) are sleep disorders that are commonly encountered in the care of persons living with HIV (PLWH). The purpose of this paper is to review the epidemiology, causes, and consequences of these two disorders in PLWH and to inform clinicians of current practice recommendations for evaluation and treatment of these conditions.

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Insomnia

Epidemiology of Insomnia in PLWH

Evidence has suggested that PLWH experience a higher prevalence of insomnia than the general population. Whereas the overall prevalence of insomnia is about 30% among U.S. adults, it may be as high as 70% in PLWH (National Sleep Foundation, 2005; Rubinstein & Selwyn, 1998). Insomnia is defined as difficulty falling asleep, difficulty staying asleep, awakening too early, or unrefreshing sleep in combination with at least one daytime symptom such as sleepiness or irritability (American Academy of Sleep Medicine, 2005). The onset of insomnia is frequently precipitated by an acute event, such as illness, life stress, or taking sleep-disrupting medication (Morin & Benca, 2012; Siebern & Manber, 2012). Persons with insomnia tend to develop predictable maladaptive patterns of behaviors and cognitions that actually worsen insomnia (Morin & Benca, 2012). For instance, individuals will extend their time in bed to provide more opportunity for sleep or they will lie still in bed attempting to sleep; both of these common behaviors create associations between the sleep setting and wakefulness rather than sleep (Schutte-Rodin, Broch, Buysse, Dorsey, & Sateia, 2008). Cognitively, persons with insomnia tend to experience intrusive thoughts during the night or excessive worry about the daytime consequences of sleep loss, which further interferes with sleep (Harvey, Tang, & Browning, 2005).

In addition to these general insomnia-related patterns, there are factors specifically related to HIV that could increase the risk for insomnia. Some research has examined potential physiologic causes of insomnia in PLWH. There is some indication that HIV infection may reduce slow wave sleep (i.e., deep sleep stages; Norman et al., 1992; Norman, Chediak, Kiel, & Cohn, 1990; White et al., 1995), but these findings have also been contradicted (Ferini-Strambi et al., 1995). Disease exacerbation (based on CD4+ T cell count, mRNA viral load) may be associated with poor sleep quality (Foster et al., 2012), but some studies did not support this association (Jean-Louis et al., 2012; Lee et al., 2009). Thus, it remains unclear to what degree physiological factors related to HIV infection contribute to insomnia in PLWH.

The majority of research on insomnia in PLWH has focused on psychosocial factors. The stress of chronic illness may precipitate acute onset of insomnia, which then becomes a chronic condition that is co-morbid to HIV infection (Cruess et al., 2003). Symptoms of HIV, including pain and depression, may exacerbate insomnia and, in turn, be exacerbated by insomnia, leading to a vicious cycle of insomnia and other disease symptoms (Crum-Cianflone et al., 2012; Jean Louis et al., 2012; Phillips & Skelton, 2001; Robbins, Phillips, Dudgeon, & Hand, 2004; Wibbeler, Reichelt, Husstedt, & Evers, 2012). Medications are often implicated in sleep disturbance, and the antiretroviral medication most consistently associated with insomnia is the first-line non-nucleoside transcriptase inhibitor efavirenz (Kenedi & Goforth, 2011; Omonuwa, Goforth, Preud'homme, & Krystal, 2009), although side effects often resolve after 3 months of use (Omonuwa et al., 2009). Little research has been done on effects of other medications, antiretroviral therapies (ART), or street drugs, and the implications for insomnia in PLWH remain unclear.

Behavioral and cognitive factors may also contribute to insomnia in PLWH, but research in this population is lacking. Given that persons with other chronic illnesses demonstrate typical insomnia behaviors and cognitions (e.g., excessive worry during nighttime awakenings, extending time in bed, etc.; Siebern & Manber, 2012), it seems probable that PLWH would respond likewise, but this cannot be confirmed without research. However, given common socioeconomic strains (e.g., homelessness, transient housing), addressing behavioral factors in PLWH may be more challenging than in other populations.

Assessment and Clinical Measurement Tools

Insomnia is frequently recognized and managed in primary care. It is useful for primary care clinicians to have a basic clinical interview prepared to assess patients with suspected insomnia, as well as a standard battery of scales for assessing a patient's sleep patterns, insomnia symptoms, and daytime impact of insomnia. Interview questions (see Table 1) clarify the characteristics of insomnia and its course and contributing factors (Morin & Espie, 2004). The following well-validated clinical instruments (see Table 1) are specifically recommended in the American Academy of Sleep Medicine (AASM) clinical guidelines for evaluation of insomnia (Schutte-Rodin et al., 2008). These instruments have been used in clinical studies of PLWH and have effectively measured sleep disturbances in this population (Crum-Cianflone et al., 2012; Lerdal, Gay, Aouizerat, Portillo, & Lee, 2011; Wibbeler et al., 2012). The Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989) and the Insomnia Severity Index (ISI; Bastien, Vallieres, & Morin, 2001) assess overall sleep quality and insomnia symptoms, respectively.

Daytime consequences of insomnia can be assessed using the Epworth Sleepiness Scale (Johns, 1991) and the Fatigue Severity Scale (Krupp, LaRocca, Muir-Nash, & Steinberg, 1989; Morin & Benca, 2012). Finally, it is important to assess mood disturbances that may be co-morbid or contributing to insomnia using instruments such as the Patient Health Questionnaire-9 (Kroenke, Spitzer, & Williams, 2001). If the initial assessment shows evidence of insomnia, a 2-week sleep diary may be useful for examining patients' actual sleep patterns (one example is shown in Table 1). Objective measurement of sleep (e.g., polysomnography) is not recommended for insomnia (Schutte-Rodin et al., 2008).

Cognitive-Behavioral, Pharmacological, and Complementary-Alternative Treatments

Recommended for practice—There are currently no standards of practice for treating insomnia in PLWH. A search of the literature revealed only three intervention trials testing insomnia treatments in PLWH (Dreher, 2003; Hudson, Portillo, & Lee, 2008). Therefore, the recommendations below are based on treatments shown to be effective in general samples of persons with insomnia and in persons with insomnia co-morbid to a chronic condition (Schutte-Rodin et al., 2008). These recommendations represent the evidence presently available on treatments most likely to be safe and effective, but research is needed in PLWH.

Sleep hygiene: Although cognitive-behavioral therapy for insomnia (CBT-I) is the current standard of practice for first-line insomnia treatment, sleep hygiene is addressed first in this article because it can be easily implemented in primary care. There is limited research showing that sleep hygiene education improves sleep in PLWH (Dreher, 2003; Hudson et al., 2008), but other studies in general samples of people with insomnia have not shown sleep hygiene to be effective (Stepanski & Wyatt, 2003). Although any effects of sleep hygiene are likely modest, it is safe and easily implemented. Practitioners might approach sleep hygiene education by providing specific behavioral goals, such as wearing earplugs so they are not disturbed by noise or not consuming coffee or cola after 2 pm, rather than offering a patient a list without any guidance. Sleep hygiene practices may need to be tailored to be appropriate for PLWH. For instance, those in street or communal living situations may not have control over their sleep timing. In persons with chronic illnesses, the recommendation to avoid naps might not be feasible or even necessary, given that some evidence shows little interference with nighttime sleep, at least in older adults (Campbell, Stanchina, Schlang, & Murphy, 2011; Dautovich, McCrae, & Rowe, 2008).

Cognitive-behavioral therapy for insomnia: Cognitive-behavioral therapy for insomnia (CBT-I) is recommended as first-line treatment in the AASM's clinical guidelines on

chronic insomnia (Schutte-Rodin et al., 2008). Numerous studies support the effectiveness of this intervention for primary and co-morbid insomnia (Morin & Benca, 2012; Siebern & Manber, 2012). To be implemented in a safe and effective manner, CBT-I is best delivered by a trained therapist. Access to CBT-I is currently limited due to an insufficient number of trained providers (Manber et al., 2012). Although CBT-I-trained practitioners usually work in association with a sleep medicine center, almost any advanced practice providers (physician, psychologist, or advanced practice nurse) may become trained and certified. A variety of short programs (e.g., weekend courses) are available for basic provider training.

CBT-I includes several components: Sleep Restriction Therapy, Stimulus Control Therapy, Sleep Hygiene, and Cognitive Therapy (Morin & Benca, 2012). In Sleep Restriction Therapy (SRT), a person is allowed to remain in bed only for the amount of time he/she is able to sleep, based on a 2-week sleep diary. Once sleep is compressed to occupy the majority of the time permitted in bed the patient is allowed to be in bed a bit longer every 1 to 2 weeks until the target time in bed is reached (Spielman, Saskin, & Thorpy, 1987). It is recommended that SRT only be implemented by trained therapists because it requires skilled patient coaching, can cause profound sleepiness, and can exacerbate certain conditions such as mania (Perlis, Jungquist, Smith, & Posner, 2005).

Stimulus Control Therapy (SCT) restricts activities in the bedroom to sleep and sex (Bootzin, Epstein, & Wood, 1991). Sex in the bed is permitted not because of any particular implication for sleep, but rather because exclusion of sex from activities allowed in the bedroom is somewhat intrusive and usually unnecessary for effective treatment. SCT is an aspect of CBT-I that can be implemented fairly easily by primary care providers through patient education and coaching. Specific SCT guidelines dictate that the patient is only allowed to go to bed when sleepy and must get out of bed whenever awake (Siebern & Manber, 2012). This approach is based on the premise that persons with insomnia develop a classically conditioned association of the sleep setting (i.e., bedroom and bed) with wakefulness, rather than sleep; SCT aims to recondition the patient to associate the sleep setting with sleepiness.

Other aspects of CBT-I include sleep hygiene (as discussed in the previous section) and cognitive therapy. The approaches used for cognitive therapy vary between therapists but are generally aimed at reducing excessive worries and catastrophic thinking about the consequences of sleep disturbance (Morin & Benca, 2012).

Pharmacological treatment: The AASM clinical guideline on insomnia recommends only short-term use of sedating medications for insomnia. Medications used for insomnia include benzodiazepines, benzodiazepine receptor agonists (BzRAs), antidepressants, and drugs selected from other classes (see Table 3). Prescribing of benzodiazepines has declined due to a relatively long half-life that results in persistent effects (i.e., residual sedation) in the morning, as well as the potential for physical and psychological dependence (Lader, 2011; Schutte-Rodin et al., 2008). BzRAs have been shown highly effective in treating insomnia, have a lower risk for abuse and dependence than benzodiazepines, and have a short to intermediate half-life meaning that they are unlikely to cause residual sedation in the morning (Omonuwa et al., 2009; Zammit, 2009). Ramelteon is an agonist at the melatonin receptor, which is the neurological mechanism that signals time for sleep onset. This drug is FDA approved for sleep onset difficulties (i.e., trouble falling asleep) but not sleep maintenance difficulties (i.e., awakening during the night; Spadoni, Bedini, Rivara, & Mor, 2011). For persons with insomnia and depression, the AASM recommends treatment with select antidepressants (see Table 3), although none of these medications are FDA-approved for insomnia (Omonuwa et al., 2009; Schutte-Rodin et al., 2008).

In persons with HIV, caution must be exercised in the use of pharmacological treatment of insomnia. The high prevalence of substance abuse in this population should be considered when prescribing benzodiazepines and BzRAs (Omonuwa et al., 2009; Volkow & Montaner, 2011). Ramelteon may be preferable in persons with prior substance abuse given that it is not a sedative and is not associated with risk for substance abuse (Borja & Daniel, 2006). Additionally, effects on drug metabolism must be considered. Protease inhibitors and anti-fungals used to prevent/treat opportunistic infections (fluconazole, ketoconazole) are known to inhibit important drug-metabolizing enzymes, leading to reduced clearance of certain insomnia medications (zolpidem, eszopiclone, temazepam, amitriptylene, and trazodone; Omonuwa et al., 2009). Furthermore, many PLWH have renal failure (e.g., HIV-associated nephropathy) or hepatic disease (hepatitis B or C, alcoholic cirrhosis). Drug clearance pathways should be considered when prescribing to such individuals.

Effectiveness not established—Complementary and alternative medical (CAM) therapies are popular for self-management of health conditions, especially in the case of symptoms such as insomnia (Pearson, Johnson, & Nahin, 2006). Among the potential CAM therapies for sleep disturbance, only acupuncture has been tested in PLWH. This small study ($N = 21$) showed improvement in self-reported sleep but did not include a comparison group (Phillips & Skelton, 2001). Limited evidence supports the safety and efficacy of other CAM therapies for insomnia, but these have not been tested for PLWH. Acupressure, which involves manual rather than needle stimulation of acupuncture points, has been shown to improve sleep in two studies of persons with insomnia (Sarris & Byrne, 2011). Mindfulness meditation, a cognitive practice that involves non-judgmental awareness of the present moment, has been shown to reduce insomnia both as a single treatment and as the cognitive component of CBT-I (Ong, Shapiro, & Manber, 2009; Ong & Sholtes, 2010). Yoga and Tai Chi are CAM practices that involve meditative cognitive awareness as well as strengthening and stretching postures. Several studies (including controlled trials) have shown reduction of sleep disturbances with various yoga practices (Irwin, Olmstead, & Motivala, 2008; Khalsa, 2004; Li et al., 2004; Manjunath & Telles, 2005; Sarris & Byrne, 2011).

Certain supplements used for sleep may be beneficial in PLWH, but research is insufficient to make practice recommendations. Melatonin and serotonin are endogenous hormones that regulate sleep. While some evidence shows improvement of sleep with supplementation of these hormones or their precursors (L-tryptophan and 5-hydroxytryptophan), evidence is insufficient to recommend clinical use of these supplements (Birdsall, 1998; Garfinkel & Zisapel, 1998; L-Tryptophan, 2006; Lemoine, Garfinkel, Laudon, Nir, & Zisapel, 2011).

Not recommended—Over-the-counter sleep aids that contain sedating antihistamines and herbal supplements are not recommended by the AASM for insomnia due to lack of data on efficacy and safety (Schutte-Rodin et al., 2008). Commonly used herbs include valerian (*Valeriana officinalis*), hops (*Humulus lupuli*), passion flower (*Passiflora incarnata*), lemon balm (*Melissa officinalis*), skullcap (*Scutellaria lateriflora*), and kava (*Piper methysticum*). Although some animal studies have shown these herbs to have sedative properties, current clinical research does not support the efficacy of these herbs, alone or in combination, for treating sleep disturbance in humans (Taibi, Landis, Petry, & Vitiello, 2007).

Obstructive Sleep Apnea

Epidemiology of Obstructive Sleep Apnea in PLWH

OSAS is characterized by periodic cessation of breathing during sleep accompanied by reduced blood oxygen levels and followed by brief arousal to reinitiate breathing. In the general population, OSAS affects about 4% of men and 2% of women (Patil, Schneider, Schwartz, & Smith, 2007). Although PLWH have HIV-related risk factors beyond those in

the general population, the prevalence of OSAS in this group has not been documented. In PLWH, OSAS risk is increased by several factors. ART regimens that cause lipodystrophy may lead to fat deposition in the neck that impinges on the airway, as well as fat deposition in the thorax and abdomen, increasing respiratory effort (Patil et al., 2007). The latter issue leads to hypoventilation both during the day and nighttime. PLWH may also experience general weight gain due to reduced physical activity or medication side effects, which would lead to the same problems caused by lipodystrophy. Furthermore, inflammation related to HIV disease itself may increase the risk of OSAS, given that inflammation is a known risk factor (McNicholas, 2009). Evidence has also demonstrated higher rates of sleep apnea with the use of opioid medications, which is of concern for PLWH given that many of these patients may be on opioids for chronic pain or for treatment of opioid dependence (i.e., methadone maintenance therapy; Sharkey et al., 2012; Webster, Choi, Desai, Webster, & Grant, 2008).

Treatment of OSAS in PLWH is crucial to reduce symptoms and prevent negative cardiovascular health outcomes. Chronic carbon dioxide retention and the occurrence of numerous apnea-related nocturnal arousals (transitions to light sleep without fully awakening) lead to fatigue and profound daytime sleepiness (Patil et al., 2007). It is common for persons with OSAS to experience inability to remain awake in quiet situations, such as watching television, or even driving. OSAS is also associated with cardiovascular risk due to hypoxia, hypercapnia, and inflammation-related endothelial dysfunction (Jaffe, Kjekshus, & Gottlieb, 2012). Given that PLWH have an elevated risk of cardiovascular mortality (Triant, 2012), treatment of OSAS to prevent cardiovascular complications is particularly important.

Assessment and Clinical Measurement Tools

The role of primary care is to assess the patient for sleep apnea risk, provide referral for assessment and treatment by a sleep specialist, and reinforce the importance of adherence with treatment (Thornton, et al., 2010). Although it is commonly assumed that persons with OSAS fit a certain profile (i.e., male, overweight, stocky build), it cannot be assumed that persons not fitting this profile would not have OSAS. Any patient with loud snoring would benefit from OSAS screening (Chervin, 2005). Additionally, clinicians should also recognize that OSAS and insomnia may occur concurrently, and patients who undergo treatment for OSAS may also need treatment for insomnia.

Recommended assessment of persons with suspected OSAS is shown in Table 4. The AASM recommends assessment of the following information in patients with suspected sleep apnea: evaluation of snoring, witnessed apneas, gasping/choking episodes, total sleep amount, nocturia, morning headaches, and excessive daytime sleepiness (Epstein et al., 2009). A quick and useful screening tool is the STOP-BANG, which has been shown to be clinically valid for differentiating between persons with and without sleep apnea (Chung et al., 2012; Chung et al., 2008), although it has not been studied in PLWH. The STOP-BANG includes eight items that are answered *yes* or *no*. An answer of *Yes* to three or more items indicates risk of OSAS. The scale has been shown sensitive for detecting OSAS in the general population but has not been tested in PLWH. Patients with a positive STOP-BANG and a clinical evaluation suspicious for OSAS should be referred to a sleep clinic for evaluation. Diagnosis and treatment evaluation for OSAS are accomplished by overnight sleep study. Primary care providers may also need to treat medical problems associated with OSAS, such as hypertension, and adjust treatments if these problems improve following OSAS treatment.

Obstructive Sleep Apnea Treatments

Recommended—The following treatments are included in the AASM's evidence-based practice recommendations for treatment of OSAS (Epstein et al., 2009). Although these recommended treatments meet the standard of care in sleep medicine, it is worth noting that none have been specifically tested in PLWH.

Continuous positive airway pressure: Continuous positive airway pressure (CPAP) is the gold standard of treatment for OSAS and is recommended by the AASM for first-line treatment of OSAS (Epstein et al., 2009). CPAP is the delivery of airway pressure to prevent obstruction from airway collapse during inspiration. CPAP is delivered via a mask worn over the nose, or over the nose and mouth, that is connected to a small machine at the bedside. CPAP has been shown to be highly effective in eliminating apneic episodes and reducing the number of nocturnal arousals, daytime sleepiness, and hypertension (Gay, Weaver, Loubé, & Iber, 2006). Persons with OSAS usually undergo two nights of sleep studies – one to diagnose OSAS and another to titrate CPAP to the correct level of pressure for preventing apnea (Epstein et al., 2009). However, in many cases, diagnosis and titration can be accomplished in one night.

Oral appliances and upper airway surgery: Although CPAP is highly effective, some patients have difficulty tolerating the treatment. Other treatments are available, although these are less effective and tend to be recommended only for mild to moderate OSAS. Oral appliances treat OSAS by increasing space in the upper airway or reducing the collapsibility of the airway. Devices include mandibular repositioning devices and tongue repositioning devices (Epstein et al., 2009; Ferguson, Cartwright, Rogers, & Schmidt-Nowara, 2006). These devices are effective in reducing apneic episodes, reducing sleepiness, and improving quality of life for persons with mild to moderate OSAS but are not recommended for severe OSAS (Ferguson et al., 2006). Surgical modification of the upper airway may be an option for patients who cannot tolerate CPAP and for whom oral appliance devices are not effective (Aurora et al., 2010). Limited research (mostly case-series reports) supports the efficacy of upper airway surgeries for reducing OSAS, but more rigorous studies on safety and efficacy are needed before this treatment would be considered first-line (Caples et al., 2010).

Weight loss: In cases where excess body weight contributes to OSAS, weight loss is important for reducing OSAS severity (i.e., the number of apneic episodes and reduction of oxygenation; Morgenthaler et al., 2006). Clinicians should encourage weight loss and physical activity in addition to first-line treatments (CPAP or mandibular advancement) in patients with OSAS who are overweight. Additionally, bariatric surgery may be useful as an adjunct treatment in patients with morbid obesity (Epstein et al., 2009).

Other evidence-based treatments: Clinicians can instruct patients with OSAS that sleeping in a side-lying position reduces the number of apneas (Morgenthaler et al., 2006). Special pillows and nightshirts are available that maintain a side-lying position, though a regular pillow behind the back or a tennis ball placed under the back of a sleep shirt may also work. It is important to instruct patients with OSAS who do not use CPAP that it is important to avoid consumption of alcohol in the evening because alcohol reduces muscle tone in the airway and significantly worsens apnea (Horner, 2011). The stimulant modafenil (Provigil®) is useful for counteracting excessive daytime sleepiness in persons not experiencing relief of this symptom with OSAS treatments (Epstein et al., 2009; Morgenthaler et al., 2006). Evidence has suggested that nasal corticosteroids may be useful as an adjunct to primary treatments to reduce apnea in persons with OSAS and rhinitis (Epstein et al., 2009; Morgenthaler et al., 2006).

Efficacy not established—Nasal dilator strips may improve respiration in persons with nasal involvement in OSAS (Gosepath, Amedee, Romantschuck, & Mann, 1999; Krakow et al., 2006). However, more research is needed to establish this treatment as a practice recommendation.

Not recommended—Some pharmacologic treatments have been suggested for OSAS, but these are not recommended due to lack of evidence. In particular, selective serotonin reuptake inhibitors, short-acting nasal decongestants, and estrogen therapy are not recommended for treatment of OSAS (Epstein et al., 2009; Morgenthaler et al., 2006).

Case Study

Gloria is a 45-year-old Latina woman diagnosed with HIV infection 5 years ago; her risk for HIV infection was from unprotected heterosexual intercourse. Her clinical status is stable, and she has been on lopinavir/ritonavir coformulation (Kaletra®) and emtricitabine/tenofovir (Truvada®) for 4 years. Her CD4+ T cell count and viral load are within normal ranges and are stable. Gloria is generally healthy, although she is overweight (Body Mass Index [BMI] = 31 kg/m²) and takes hydrochlorothiazide for mild hypertension. She also has evidence of early osteoarthritis in both knees. Gloria lives alone in a one-bedroom apartment, but her adult children sometimes stay with her for extended periods. Gloria is at the primary care clinic for her regular check-up.

Primary Care Assessment

Upon meeting with the nurse practitioner (NP), Gloria reports no change in her health status except that she has difficulty sleeping that started 2 months ago during a stressful transition to a new job. Although she has adjusted well to the new job, her sleep problems persist. The NP proceeds with a clinical interview to further assess Gloria's sleep. Gloria reports that she goes to bed at 9:30 pm and gets up at 6:45 am (totaling 9.25 hours in bed) and sleeps about 5 hours per night. Gloria reports taking 2 hours to fall asleep and awakening 3–4 times per night. She states that she feels sleepy in the evening, but when she gets in bed, she is suddenly wide-awake. When she wakes up at night, she stays in bed and worries that she will be unable to concentrate well enough to do her job well the next day. Gloria describes her sleep as “terrible” and “restless.” When asked about reasons for waking up, she reports knee pain, or no apparent reason. She goes to bed and gets up at the same time daily and reports that her bedroom is quiet and comfortable. She reports that she currently has a glass of wine each night to help her sleep and takes an herbal sleep aid most nights of the week (contents unknown). She drinks four cups of coffee throughout the day to “get through.” She reports no use of tobacco or street drugs. The remainder of the clinical interview reveals no indication of other sleep disorders such as OSAS. Gloria's PSQI is 16 and her ISI score is 21, indicating clinical insomnia of moderate severity. Her ESS score is 5, indicating no clinically significant daytime sleepiness, and her FSS score is 44, indicating a high level of fatigue. Her score on the PHQ-9 is 14, indicating moderate depression.

The overall assessment indicates that Gloria has insomnia with difficulty initiating and maintaining sleep along with symptoms of depression. She has a history of insomnia caused by stress, and her current insomnia was precipitated by job stress. Given that the job stress has now mostly resolved, Gloria's insomnia is primarily maintained through the behavior of extended time in bed (9.25 hours) and conditioned association of the bedroom with worry/anxiety. She does not have excessive daytime sleepiness but does experience fatigue and poor concentration as consequences of her insomnia. Her medical issue of knee pain contributes to her sleep disturbance. Relevant sleep hygiene issues include the use of sleeping medications (herbs in this case – see Table 2, #6), use of caffeine (#7) and alcohol (#8), and “trying” to sleep (#9).

Recommended for Practice

Recognizing strong behavioral and cognitive contributions to Gloria's insomnia, the NP discusses referral to a sleep medicine clinic, but Gloria states that she is too busy to "go to another doctor." Therefore, the NP implements sleep hygiene and Stimulus Control Therapy (SCT) education. Sleep hygiene education addresses her caffeine and alcohol intake. She is instructed that although alcohol causes sedation, it leads to awakenings later in the night. Gloria agrees to reduce the number of nights on which she drinks wine. She is also instructed that consuming large amounts of caffeine and having caffeine in the afternoon may be contributing to her sleep problems. Gloria does not want to give up caffeinated coffee, but she agrees to reduce her consumption to one cup in the morning and one in the afternoon before 2 pm. She is also instructed in SCT – in particular, she is to get out of bed when she is awake more than a few minutes. She is instructed to read or watch something non-stimulating on television and return to bed when sleepy. The NP also advises Gloria to take acetaminophen as needed at bedtime to treat the knee pain that interferes with her sleep. Gloria is taught that current evidence does not show that herbal supplements are effective for insomnia and is advised that these can interact with her ART medications. She is instructed to make a follow-up appointment in 1 month. At her follow-up visit, Gloria reports successfully reducing her caffeine and alcohol intake. She reports non-adherence to the SCT recommendations because she's "just too tired to get up." The nurse practitioner reinforces the importance and rationale to SCT, and Gloria agrees to try again. Gloria continues to report symptoms of depressed mood, so she is prescribed doxepin 10 mg at bedtime to assist with sleep and mood. Gloria reports that she stopped taking the herbal supplement, but she drinks chamomile tea nightly. The nurse practitioner reinforces that herbs have not been shown effective. Gloria expresses understanding but states that she likes having the tea as a habit that replaces drinking wine in the evening. Because evidence does not show any drug interactions or safety concerns, the NP decides that there is no reason to ask the patient to stop having chamomile tea.

3-Month Follow-up

At her next primary care follow-up, Gloria reports being in bed from 11:30 pm to 6:30 am. She sleeps about 6.75 hours nightly. She has had some setbacks in her sleep quality but says that she has had overall improvement. She continues to report some fatigue but less than previously, and she states that her mood and job performance have improved. The NP encourages Gloria, complimenting her for maintaining a healthy sleep pattern. The NP reinforces the importance of avoiding alcohol in the evening and avoiding caffeine late in the day. The NP also encourages Gloria to return if she experiences further difficulty with her sleep.

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Clinical Considerations

- It is important for nurses to assess patients' sleep, given that 7 of every 10 PLWH seen in primary care are likely to experience sleep disturbance.
- Insomnia screening starts with interviewing patients about their sleep quality, sleep pattern, and daytime symptoms that could be related to insomnia (e.g., fatigue, poor mental concentration). Focused assessment involves standardized questionnaires and a 2-week sleep diary. The practice standard for treating insomnia is cognitive-behavioral therapy for insomnia (CBT-I), a treatment delivered through sleep clinics.
- HIV-related inflammation and treatment side effects (e.g., lipodystrophy) place PLWH at risk for obstructive sleep apnea syndrome (OSAS). The STOP-BANG is a useful tool to screen for OSAS risk in primary care. Persons with suspected OSAS should be referred to a sleep medicine clinic for evaluation and treatment.

Table 1**Assessment of Insomnia**

Clinical Interview ^a			
<ul style="list-style-type: none">• Characteristics of the sleep problem: pattern, onset, history, course, duration, severity• Daytime effects: tiredness, fatigue, sleepiness, irritability, poor concentration, other symptoms• Description of sleep quality	<ul style="list-style-type: none">• Medical and psychiatric history (assessing for potential contributing factors)• Self-treatment: over-the-counter medication, herbs/supplements, alcohol or street drugs.• Caffeine/stimulant use		
Questions to Rule out Other Sleep Disorders ^{a,b}			
Sleep Disorder	Assessment		
Sleep Apnea	STOP-BANG Questionnaire (See Table 4)		
Periodic Limb Movement Disorder (PLMD) or Restless Legs Syndrome (RLS) Circadian Rhythm Disorders	Do your legs sometimes twitch or can't keep still? Do you feel you want to sleep at the wrong time?		
Parasomnias	Do you sometimes act strangely during your sleep?		
Narcolepsy	Do you sometimes fall asleep without warning?		
Clinical Instruments			
Instrument (Abbreviation), Phenomenon Assessed	Number of Items	Scoring Range	Typical Cut-Point
Pittsburgh Sleep Quality Index (PSQI), general sleep disturbance	28	0–21	> 5, sleep disturbance
Insomnia Severity Index (ISI), insomnia symptoms	7	0–28	0–7, no significant insomnia 8–14, subthreshold insomnia 15–21, moderate insomnia 22–28, severe insomnia
Epworth Sleepiness Scale (ESS), sleepiness	8	0–24	10, normal > 10, sleepiness
Fatigue Severity Scale (FSS), fatigue	9	0–63	Higher scores = more fatigue
Patient Health Questionnaire-9 (PHQ-9), depressed mood	0	0–27	10, major depression
Sample Sleep Diary ^c			
Question	Rating		
What time did you go to bed to sleep last night?	Clock time		
How long did it take for you to fall asleep? (minutes)	Minutes		
After falling asleep, how many times did you wake up during the night?	Minutes		
How long were you awake during the night?	Minutes		
What time did you wake up for the last time this morning?	Clock time		
What time did you get out of bed this morning?	Clock time		

Clinical Interview^a

Did you use anything to help you <i>sleep</i> last night? If yes, what did use?	Report of medications, alcohol, or drugs used for sleep.
How would you rate your <i>sleep</i> last night (1 = <i>excellent</i> , 2 = <i>very good</i> , 3 = <i>fair</i> , 4 = <i>poor</i> , 5 = <i>terrible</i>)	Rating
How <i>rested</i> do you feel this morning? (1 = <i>extremely</i> , 2 = <i>very</i> , 3 = <i>somewhat</i> , 4 = <i>fairly</i> , 5 = <i>exhausted</i>)	Rating
Please write the times of any <i>naps</i> you took yesterday.	Clock time and duration

Note.

^aMorin & Espie (2004);

^bThese questions are for screening of the *most likely* cause of sleep disturbance. These are not diagnostic. All questions in this section except Sleep Apnea are from Morin & Espie (2004, p. 134). A positive STOP-BANG or answer of *yes* to these screening questions would prompt the need for focused assessment and possibly referral to a sleep medicine specialist;

^cTaibi, Price, & Voss (in press).

Table 2

Sleep Hygiene Recommendations

Sleep Hygiene Recommendation	Rationale
1. Regular bedtime, arising time, or both	Regular sleep patterns contribute to more robust physiological signals promoting sleep.
2. Exercise	Daytime exercise increases sleep propensity by expending energy. It also improves mood, which contributes to better sleep.
3. Eliminate noise from bedroom	Noise causes arousals during sleep that can leave a person feeling that sleep was poor, even if the person does not remember awakening.
4. Regulate temperature of bedroom	Reduced body temperature is a normal physiological signal promoting sleep. A room that is too warm interferes with this signal. A room that is too hot or too cold may also cause discomfort. It is recommended to keep the bedroom somewhat cool and regulate a comfortable temperature using covers.
5. Light snack at bedtime	A light snack can avoid sleep-disrupting hunger.
6. Avoid use of sleeping pills	Sleeping medications do not correct the psychological and behavioral patterns that contribute to chronic insomnia. While medication may be a useful adjunct to cognitive-behavioral treatment, it is not recommended as a long-term solution for insomnia.
7. Avoid caffeine	Although caffeine does not disrupt sleep for all individuals, it does for many. It is recommended to avoid caffeine after lunchtime.
8. Avoid alcohol	Alcohol is commonly used to self-medicate for insomnia. Although alcohol facilitates the onset of sleep, it causes light sleep and frequent awakenings later in the night.
9. Do not try to sleep	Cognitive focus on sleep can be distressing and frequently interferes with the ability to fall asleep. Some clinicians recommend “paradoxical intention” – try to stay awake. Taking the focus off of trying to fall asleep facilitates sleep in some persons.
10. Eliminate bedroom clock	Focus on the clock can be disruptive to sleep by causing worry about lost sleep time. It is recommended to set an alarm, but position the clock so the time is not visible.
11. Napping	The need to sleep builds up over the day and facilitates sleep onset the following evening. Naps that are too long relieve the need to sleep and may interfere with the ability to sleep the next evening. However, taking a short nap (15–30 minutes) may be helpful for getting through the day.
12. Relaxing activities before bed	A relaxing bedtime routine can relieve tension and anxiety and can serve as a mental cue that bedtime is approaching.
13. Limit liquids	Consuming liquids in the evening can cause the need for urination during the night.
14. Warm baths	Research evidence shows that a warm bath taken about an hour prior to bedtime can improve sleep onset. The body temperature normally declines around the time of sleep onset. Passive heating of the body augments the amount of temperature change, thus creating a stronger signal for sleep.
15. Use the bedroom only for sleep	Doing activities that are mentally activating or emotionally engaging/upsetting in the bedroom teaches the mind that the bedroom is not for sleep. It is helpful to train the mind that the bedroom is for sleep – and sleep only (although sex is acceptable).
16. Comfortable bed	A comfortable bed is subjective. Whatever is comfortable for the individual can facilitate sleep.
17. Make worry list before bed	Listing worries before bedtime relieves the need to remember these and facilitates mental relaxation to promote falling asleep.

Note. Sleep hygiene list and rationale from Stepanski & Wyatt (2003)

Table 3**Pharmacologic Treatments for Insomnia**

Class	Drug name	Half life (hours)^a	Recommended Dose^b	Possible interactions with PI, anti-fungals
Non-benzodiazepine receptor agonist	eszopiclone (Lunesta [®])	6–7	2–3 mg	Yes
	zaleplon (Sonata [®])	0.9–1.1	10 mg	No
	zolpidem (Ambien [®]) controlled release	2–2.5	10 mg	Yes
	zolpidem (Ambien CR [®])	2–4	12.5 mg	Yes
Benzodiazepine	lorazepam (Ativan [®])	12–15	2–4 mg	No
	temazepam (Restoril [®])	8–20	15 mg	No
Melatonin receptor agonist	ramelteon (Rozerem [®])	1–2.6	8 mg	Yes
Antidepressant	amitriptylene (Elavil [®])	10–100	10–50 mg	Yes
	doxepin (Sinequan [®])	10–50	10–25 mg	No
	mirtazapine (Remeron [®])	20–40	7.5–15 mg	No
	trazodone (Desrvl [®])	7–15	25–150 mg	Yes

Note. PI = protease inhibitor;

^aHalf-life obtained from Omonuwa et al. (2009) except for ramelteon and Ambien CR obtained from package insert;

^bDoses of all medications except for antidepressants obtained from FDA-approved package inserts. Common antidepressant doses for insomnia obtained from Omonuwa et al. (2009). Doses may require adjustment in different populations, such as persons with liver dysfunction or the elderly.

Table 4**Obstructive Sleep Apnea Screening**

STOP-BANG Assessment^a	
Item	Assessment
<u>S</u> nore	Do you <i>snore</i> loudly (louder than talking or loud enough to be heard through closed doors)?
<u>T</u> ired	Do you often feel <i>tired</i> , fatigued, or sleepy during daytime?
<u>O</u> bserved Apnea	Has anyone observed you stop breathing during your sleep?
<u>P</u> ressure	Do you have or are you being treated for high blood pressure?
<u>B</u> MI	Is your BMI more than 35 kg/m ² ? (Measured by clinician).
<u>A</u> ge	Are you over 50 years old?
<u>N</u> eck	Is your neck circumference greater than 40cm? (Measured by clinician).
<u>G</u> ender	Are you male?
Additional Assessments^b	
Non-refreshing sleep	Decreased concentration
Total sleep amount	Memory loss
Difficulty staying asleep	Decreased libido
Nocturia	Irritability
Morning headaches	

Note. BMI = body mass index;

^aChung et al., 2012; Chung et al., 2008;

^bEpstein et al., 2009.