

Integrative oncology approaches to sleep disturbances and insomnia

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Abstract

Sleep disturbances and insomnia affect nearly half of all cancer patients. Often, these sleep problems persist through treatment into survivorship, impacting care and quality of life. At present, treatments with high quality evidence such as Cognitive Behavioral Therapy for Insomnia are challenging to access due to cost and time. This chapter reviews integrative modalities with higher quality evidence including exercise, tai chi and qigong, mindfulness-based interventions, melatonin and lavender, as well as emerging options with less robust evidence, such as yoga, valerian, and CBD. We recommend an individualized approach, tailoring treatment recommendations to each patient's needs, preferences and stage in their cancer journey.

Introduction

Evidence shows that poor sleep increases the risk of many chronic diseases including cancer, where the interaction is bidirectional - cancer disrupts sleep, and poor sleep impacts cancer development and progression.¹

There are three classification systems for sleep disorders coming from the World Health Organization, The American Psychiatric Association and the American Academy of Sleep Medicine (AASM). These three organizations describe a series of disorders and conditions summarized in [Table 30.1](#).² Sleep disturbances and disorders are used interchangeably to describe the umbrella¹ under which insomnia is just one condition but the one which is most clinically impactful for patients with cancer.³

In this chapter we will discuss sleep disturbances and insomnia in cancer and what integrative modalities can be considered for supporting patients.

Epidemiology

Sleep disturbances impact up to 67%⁴ of all patients with cancer. Insomnia alone has slightly lower prevalence ranging from 30% to 50%, though high-quality epidemiology studies across cancer types is limited.^{5,6} Symptoms often appear at diagnosis, persist through treatment,⁵ and extend well into survivorship.⁶

The risk factors for developing cancer related insomnia are unclear, but several factors found to be frequently associated are noted in [Fig. 30.1](#). Some of these play a role in the pathophysiology (discussed in more detail below).

There are many impacts from sleep disorders and insomnia. These are summarized in [Table 30.2](#).

Pathophysiology

Sleep disorders are complex conditions in cancer further complicated by a co-occurring cluster of symptoms; most commonly fatigue, pain, depression, anxiety, and sleep disturbances.¹⁶ This creates a bidirectional relationship, with sleep disturbances worsening these symptoms in cancer patients while at the same time cancer itself being a pro-inflammatory state causing worsening of sleep quality.¹⁷

In patients with cancer there is a marked increase in pro-inflammatory cytokines linked in epidemiological studies to cancer development risk as well as 15%–20% of deaths from cancer.¹⁸ Key molecules in cancer related

TABLE 30.1 Types of sleep disturbances.

Type	Definition
Insomnia	Trouble falling asleep, staying asleep or poor quality sleep over three times a month resulting in daytime impairment.
Hypersomnia	Prolonged sleep or excessive daytime sleep over three times a month
Parasomnia	Abnormal behaviors during the transitional stage of sleep such as night terrors or sleep walking
Restless leg syndrome	A nervous disorder characterized by aching, crawling, or creeping sensations of the legs that occur especially at night usually when lying down (as before sleep) and cause a compelling urge to move the legs
Obstructive sleep apnea	Hypoxemia and frequent nighttime arousals caused by recurring interruption of breathing during sleep due to obstruction most often from collapse of the pharyngeal tissues
Circadian rhythm disorder	When the normal sleep wake cycle is disrupted

Definitions taken from Miriam Webster Online Dictionary – edited for readability. Merriam Webster Online Dictionary. Merriam-webster: America's most Trusted Dictionary. Accessed 1/12/25

inflammation include nuclear factor- κ B, and pro-inflammatory cytokines IL-6 and TNF- α .¹⁷ See Fig. 30.2.

The circadian rhythm, governed by the suprachiasmatic nucleus (SCN), regulates sleep-wake cycles, hormone release and other metabolic functions. It is disrupted by factors such as artificial light and irregular schedules. Circadian rhythm disturbances are particularly prevalent in cancer patients.²⁰ In addition, the circadian rhythm has emerged as a homeostatic regulator of inflammatory biology with sleep loss leading to systemic inflammation

and proinflammatory molecules leading to sleep disturbances possibly through the onset of depression symptoms.¹⁷ Emerging evidence suggests sleep disturbances often precede depression, predict its progression, and are among the last symptoms to improve.¹⁹

Another contributing mechanism is the hypothalamic-pituitary axis hyperactivation. Anxiety and stress are common in cancer, often triggering hyperarousal which interferes with relaxation and sleep initiation, increases mid-sleep arousals and shortens sleep duration. This cycle

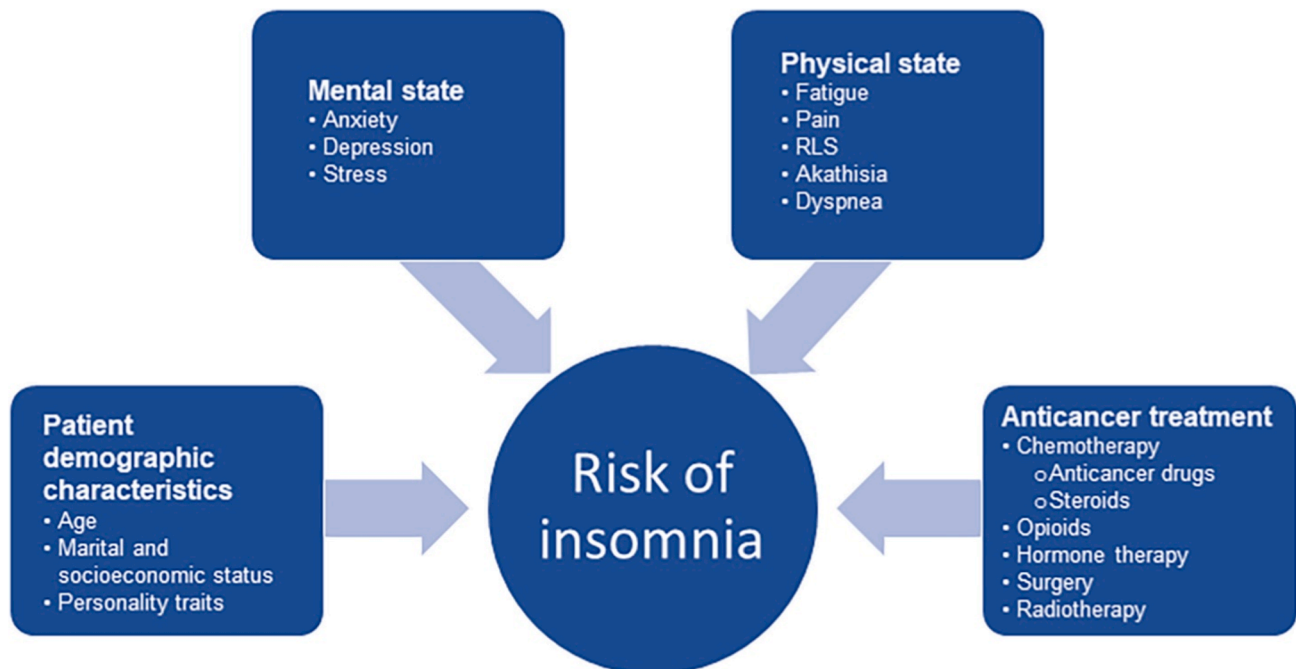
**FIGURE 30.1** Factors associated with insomnia in patients with cancer. *RLS*, restless legs syndrome.⁷

TABLE 30.2 Impacts of sleep disruption and insomnia.

Impact	Evidence	Population studied
Increased risk of cancer development	Epidemiological data of increased rectal cancer rates in long term night shift workers (>15 years) Epidemiological data of increased rates of prostate cancer risk in patients who were exposed to night shift work (any exposure vs rotating vs constant) assessed based on chronotype. Working night shifts especially rotating night shifts for those with an evening chronotype increased risk for developing prostate cancer	Nurses – Nurses health study ⁸ Patients presenting to a hospital in Spain ⁹
Mortality	Curvilinear relationship between sleep and mortality in advanced cancer patients with both short and long sleep durations associated with increased mortality.	Advanced cancers of the hepatobiliary and pancreatic systems ¹⁰
Impact on immune function	During chemotherapy a stronger drop in blood cell counts were noted with higher rates of infections in those with documented insomnia vs those with good sleeping patterns. Sleep disturbance and the extreme of long sleep were associated with higher levels of CRP and IL-6; shorter sleep duration (but not extremely short sleep) was associated with higher levels of CRP but not IL-6.	Small cohort study of breast and gynecologic patients undergoing chemotherapy ¹¹ A meta-analysis of 72 studies analyzing CRP, IL-6 and TNF α ¹² Not specifically looking at patients with cancer but highlights sleep impact on inflammation (see pathophysiology section below on role of inflammation).
Worsened Quality of Life	Overall, more negative outlook on cancer experience in patients with sleep disturbances Problem often lasts long into survivorship and causes problems with functioning and quality of life that persist.	Qualitative study looking at breast, prostate, colorectal, and gynecological cancers ¹³
Fatigue	High levels of Obstructive sleep apnea, insomnia and other sleep disturbances in patients with fatigue.	Cohort of all cancer types referred to cancer-related fatigue clinic at large medical center ¹⁴
Cognitive impairment	Compared to non-cancer controls the rate of cognitive impairment was doubled both before and during chemotherapy and the factors of sleep disturbance, fatigue and stress wove together to increase the risk of cognitive impairment vs either one by itself.	Cohort of patients with mixed cancer types both pre and during chemotherapy ¹⁵

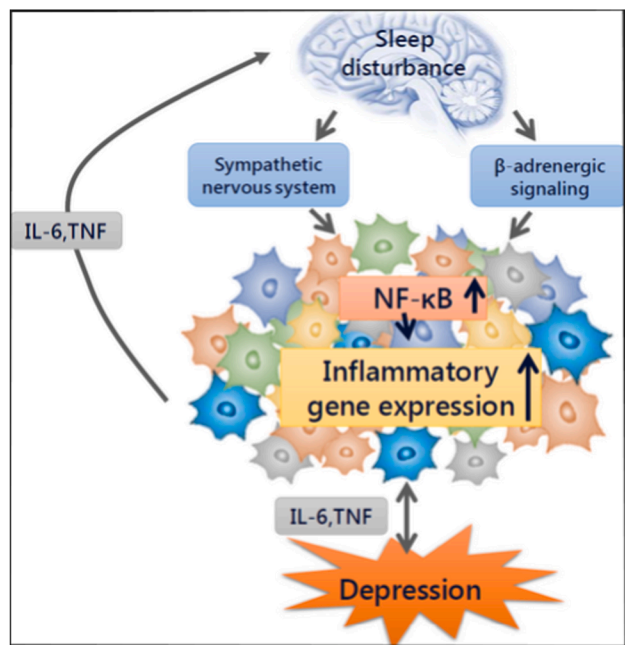


FIGURE 30.2 The inflammation mechanism between sleep disturbance and depression. Sleep disturbance activate the sympathetic nervous system and β -adrenergic signaling, triggering neuromediators and activating nuclear factor (NF)- κ B mediated inflammatory programs. NF- κ B increases inflammatory cytokines such as IL-6 and TNF by activating the expression of inflammatory genes. (Originally Published in Fang, H et al. 2019 Available for reprint under Creating Common License - CC.). Fang, H., Tu, S., Sheng, J., & Shao, A. (2019). Depression in sleep disturbance: a review on a bidirectional relationship, mechanisms and treatment. *J Cell Mol Med*, 23(4), 2324–2332. <https://doi.org/10.1111/jcmm.14170>.¹⁹

reduces the ability to cope with stress, further worsening sleep quality.⁷ Similarly, pain, a frequently reported symptom in cancer patients, interferes with several aspects of sleep, and poor sleep can exacerbate pain²¹.

Cancer treatments itself often disrupts sleep, with chemotherapy worsening sleep both during and after treatment.²² Patients report more sleep issues post radiation therapy²³ compared to those who never receive it. In addition, hormone-targeting therapies commonly lead to hot flashes, further disrupting sleep.²⁴

Evaluating insomnia and sleep disturbances

Insomnia is diagnosed based on self-reported symptoms. Criteria from the International Classification of Sleep Disorders third Edition TR, include (1) a report of sleep initiation or maintenance problems, (2) adequate opportunity and circumstances to sleep, and (3) daytime consequences; chronic insomnia is symptoms lasting >3 months.²⁵ Evaluation should also consider co-morbidities, prior treatments, medication, substance use, duration of symptoms and sleep environment.

Self-reported scales

The Insomnia Severity Index (ISI)²⁶ is commonly used to assess for symptoms. Sleep diaries²⁷ are often utilized during treatment and can serve as a valuable tool, however, they can be time consuming, labor-intensive, and patient adherence can be a challenge.^{28,29} Self-reported questionnaires, including the Pittsburgh Insomnia Rating Scale (PISR),³⁰ the Bergen Insomnia Scale,³¹ the ISI²⁶ and the Epworth Sleepiness Scale³² can be useful for evaluating fatigue, sleep quality, sleep-wake cycles. While these tools are descriptive, they may not always align with formal diagnostic criterion.

Objective evaluation

Sleep studies, such as polysomnography (PSG), home sleep apnea testing (HSAT), or actigraphy, are not required for the diagnosis of insomnia. Testing may be considered based on patient history to evaluate for co-morbidities.

Consumer sleep technologies (CSTs), including wearables, apps, and devices, are rapidly expanding in the field of sleep medicine. While CSTs offer advantages such as patient accessibility, concerns exist regarding lack of validation trials or FDA clearance.³³ CSTs may overestimate or underestimate sleep problems, disrupt sleep hygiene (e.g., screen use) and encourage reliance on technology over personal awareness and judgment.

Integrative treatments for insomnia

There is often a sense of urgency when sleep is disrupted, leading to patients and practitioners seeking quick fixes. However, the foundation of good sleep typically lies in adopting healthy lifestyle habits and addressing hyperarousal symptoms.

Nutrition

Given the potential role of inflammation we recommend following the guidelines from the American Institute for Cancer Research (AICR) which emphasize a diet rich in whole grains, vegetables, fruit, and beans while limiting highly processed foods, red meat, sugar sweetened beverages and alcohol.³⁴

Exercise

A meta-analysis of 9 studies with 893 participants found that insomnia was significantly reduced in those engaging in various forms of exercise; aerobic (biking, treadmill walking), resistance (elastic tubing vs. weights), stretching, compared to controls (SMD = -0.28 , 95% CI = -0.41 to -0.15 , $P < 0.0001$). There was no difference between type of exercise with significant heterogeneity. Duration ranged from 15 minutes twice a week up to 30 minutes daily 5 days a week.³⁵

Another meta-analysis of 22 trials expanded on this to include mindful movements (yoga, tai chi, and qi gong). All forms of physical activity improved total sleep scores as measured by the Pittsburgh Sleep Quality Index (PSQI) with physical exercise (SMD -0.32 ; 95% CI -0.54 to -0.10) and mindful movement (SMD -0.27 ; 95% CI -0.44 to -0.09).³⁶

Given the significant spectrum options we recommend working with patients to choose an option that they are motivated to participate in aiming for 20–30 minutes at least 3 days a week.

Sleep hygiene

The term “sleep hygiene” describes behaviors that promote better overall sleep³⁷ encompassing decreased screen time prior to bedtime, regular sleep and wake times and avoiding elements of increased stimulus. There is not a clear consensus though as to what specific elements comprise sleep hygiene³⁸ alone and many elements are included in CBT-I (see below). The AASM does not recommend sleep hygiene monotherapy because it is not likely to be effective in the absence of other strategies.³⁹ That said we advise always discussing this with patients in combination with the other therapies mentioned here – see [Table 30.3](#) for details.

Standard CBT-I

Cognitive-behavioral therapy for insomnia (CBT-I) is a treatment for insomnia that is recommended by the National Comprehensive Cancer Network (NCCN) in their Survivorship Guidelines.⁴¹ CBT-I is a multi-modal treatment, incorporating cognitive and behavioral strategies to address the factors causing persisting insomnia symptoms. Beyond improving sleep, there is evidence that CBT-I can improve a host of other symptoms, including depression, anxiety, daytime sleepiness, and fatigue.⁴² A full course of CBT-I is delivered in four to six 45-minute sessions over 3 months,⁴³ during which patients are provided with guidance on the domains of sleep restriction, stimulus control, cognitive therapy, and relaxation (which we will discuss further below in mindfulness section).

Sleep restriction therapy limits the amount of time in bed, with the goal of helping reduce sleep onset latency and wake after sleep onset by increasing the intrinsic need for sleep.⁴⁴ To learn what the appropriate amount of time in bed should be, patients are asked to track their sleep using daily sleep diaries²⁷ or using consumer wearables both of which have their unique limitations.^{29,45}

Patients with insomnia develop negative associations with their bed and bedroom because of how much frustrating time is spent there. Consequently, their sleep environment does not result in the desired conditioned

response of sleepiness.⁴⁶ To address this, patients are instructed around stimulus control meaning to only use their bed for sleep and to leave their bed for 15–20 minutes if they are unable to sleep.⁴⁷ They are encouraged to return to bed only when they feel like they are ready to fall asleep.

The fundamental cognitive therapy techniques developed for depression and anxiety disorders^{48,49} are used with clinicians working to challenge and restructure the maladaptive and dysfunctional beliefs and attitudes that patients with insomnia develop over time.

Modifications in cancer setting

It is important to acknowledge the challenges that a cancer patient or survivor may have with implementation. Specifically, some of the behavioral changes required can be burdensome when already experiencing other cancer treatment-related sequelae (e.g., fatigue). There have been increasing efforts to adapt CBT-I in cancer⁵⁰ through addressing these issues.

The brief period of sleep deprivation that occurs with sleep restriction can be difficult and exacerbate other common symptoms, such as fatigue⁵¹ and pain.⁵² It may be beneficial for clinicians to discuss choosing a particular treatment cycle or recovery period that may be most suitable for intervention. Alternatively, a more gradual limiting of time in bed called sleep compression can also be utilized as an alternative.⁵³

Cancer patients and survivors are often advised to rest as much as possible. While it may be beneficial at times during their cancer treatment, it can be a behavior that persists, even when extended bedrest is no longer a valuable. Napping can dysregulate a more consistent sleep and wake schedule, ultimately impairing the ability to fall asleep and stay asleep at night.⁵⁴ It is helpful for patients to be challenged on their perceptions of the benefits accrued by spending extended time in bed, including an open discussion with their medical team about this issue.

Common dysfunctional beliefs about sleep reported by patients include the idea that not sleeping well will impair their immune system, ultimately resulting in cancer metastasis or recurrence.⁵⁵ While there is evidence to support the relationship between poor or insufficient sleep and cancer outcomes,⁵⁶ the patient perception can be exaggerated compared to the science. Worrying about sleep may increase the pressure they feel to sleep well, which has the effect of worsening their sleep. An important element of cognitive therapy for this patient population is during the sleep restriction phase, where it can be valuable to explain to patients that the sleep debt they accrue over the first week or so of limiting their time in bed is unlikely to cause long-term health consequences, and is likely to improve their overall health in the future.

TABLE 30.3 Summary of sleep hygiene recommendations for patients with sleep disorders.^{37,40}

Techniques	Description	Considerations
Regular sleep schedule	Going to bed and waking up at the same time every day, even on weekends to regulate circadian rhythm. Consider establishing a bedtime routine (e.g., reading, taking a warm bath, or listening to calming music).	Clinical sleep treatments encourage regularity only in wake time, which is counter to some sleep hygiene recommendations to adopt regular bed- and wake-times. Leave the bed if unable to fall asleep within 20 minutes and return when sleepy
Limit naps	Limit naps to <30 minutes, avoid them later in the afternoon. May help support sleep pressure	Most research suggests that daytime naps do not have a substantial impact on subjective or objective nocturnal sleep, despite sleep hygiene recommendations to avoid naps
Enhance sleep environment	Consider earplugs to reduce noise stimulation while sleeping. Use blackout curtains, adjust room temperature (65–70°F). Choose a mattress and pillows that support your preferred sleeping position.	Night time noise increases arousals and habituation to noise can occur, but EEG arousals persist. Higher temperatures are associated with decreased sleep efficiency ⁴⁰
Limit screen time	Avoid electronic devices such as phones, tablets, and computers at least 30-60 minutes before bed.	Reduces blue light exposure, which interferes with melatonin production.
Limit alcohol, nicotine use	Acute and chronic nicotine and acute alcohol use disrupts sleep.	Acute alcohol use before bed decreases sleep onset latency but increases arousal during second half of night.
Limit caffeine use	Caffeine (eg. coffee, tea, sodas) administration close to bedtime disrupts sleep and has a dose dependent relationship to sleep.	Harmful effects of caffeine on sleep may be limited to caffeine-sensitive individuals. Tolerance to caffeine's effects on sleep develops within days

Some relaxation techniques can be challenging for cancer patients and survivors to implement. For example, progressive muscle relaxation involves the tensing and relaxation of muscles, which can be difficult for some following treatment (e.g., surgery). Helping a cancer patient understand which relaxation strategy is most suitable for their health condition could involve a conversation with their other providers (e.g., physical therapist) to ensure the right fit.⁵⁷

Delivery approaches in the oncology setting

The majority of National Cancer Institute (NCI)-designated comprehensive cancer centers do not have on-site resources to deliver CBT-I.⁵⁸ A sleep champion who prioritizes the issue at the hospital can be an asset to program development.⁵⁹ While CBT-I has been developed and tested as an individual, in-person therapy that took place over the course of several months, there have been many promising trials of varied treatment approaches and delivery modalities among cancer patients and survivors. This includes delivery of CBT-I in the group setting,⁶⁰ through telehealth,⁶¹ using automated online programs,⁶² and utilizing stepped care approaches.^{62,63} More recent efforts have further embraced technological advancements, such as the use of smart speakers within the home to deliver CBT-I.⁶⁴

Mind-body medicine (MBM) approaches

Cancer survivors with sleep problems used MBM 27.6% of the time with the most used MBM practices being spiritual meditation (14.3%), followed by yoga (17.9%), mantra meditation (5.6%), mindfulness meditation (6.0%), progressive relaxation (5.5%), guided imagery (3.8%), tai chi (2.7%), and qigong (0.8%).⁶⁵

Mindfulness

One of the most studied mindfulness-based interventions (MBI) is mindfulness-based stress reduction (MBSR). It is an 8-week group-based program consisting of formal and informal mindfulness meditation practices (e.g., body scan, sitting, walking, and yoga), aiming to reframe beliefs of sleep and/or alter psychological flexibility to identify and modify maladaptive sleep behaviors.⁵⁵ Similar programs include mindfulness-based cognitive therapy and mindfulness-based cancer recovery.

A Cochrane review in breast cancer patients showed MBSR improved quality of sleep on average 0.27 SDs lower (0.63 lower to 0.08 higher) than in the usual care groups at 3–6 months post intervention, a small effect with moderate certainty, although with limited evidence for longer term benefit.⁶⁶ A meta-analysis of 15 studies with heterogeneous cancers comparing mindfulness to usual care

or wait list noted immediate (SMD = -0.74 , 95% CI: -1.10 to -0.37 , $P = .00$), mid-term (SMD = -0.75 , 95% CI: -1.13 to -0.38 , $P = .00$) and long-term (SMD = -0.94 , 95% CI: -1.54 to 0.34 , $P = .00$) positive effects on subjective questionnaire-based sleep disturbance noting high heterogeneity in the studies. However, in seven studies with active controls (including breathing control, education and CBT), there were no significant effect. Meta-analysis of three studies comparing mindfulness to usual care or wait list noted improvement in sleep onset latency (WMD = -5.21 , 95% CI: -8.70 to -1.73 , $P = .00$) and total sleep time (WMD = 13.94 , 95% CI: 3.47 to 24.41 , $P = .01$) but no significant improvement in sleep efficiency (WMD = 1.09 , 95% CI: -2.93 to 5.12 , $P = .59$) or wake after sleep onset (WMD = -4.44 , 95% CI: -31.77 to 22.90 , $P = .75$).⁶⁷ One randomized controlled trial (RCT) comparing MBSR with CBT-I noted change observed in the MBSR group at 5 months was within the noninferiority margin; however, CBT-I produced greater improvement in insomnia severity immediately after the program including in several objective factors such as sleep onset latency, sleep efficiency, sleep quality, and dysfunctional sleep beliefs.⁶⁸ Further evaluation of the efficacy of MBI are needed focusing on criterion-based insomnia diagnoses with active comparators and precision of insomnia improvement. Although marketed, consumer based and digital mindfulness products (e.g., apps) have no trials or data recommending their use for insomnia in oncology. However, with preliminary positive data, high interest and limited side effects, mindfulness may offer an alternative to CBT-I for management of insomnia in cancer patients.

Relaxation techniques

Relaxation techniques (e.g., muscle tensing and release, and guided imagery), which are also used in CBT-I, are useful in reducing sympathetic tone, decreasing mind noise, and familiarizing patients with the waking state of rest that serves as a transition to sleep. One RCT evaluating post-op pain in patients with head and neck cancers noted significant benefit in sleep disturbances, although used visual analog scale with generalized estimation equation models.⁶⁹ Another RCT in hospitalized patients noted no significant changes in sleep satisfaction.⁷⁰ Neither of these studies were isolated toward patients with insomnia, however. Although promising with limited side effects, further high-quality studies are needed to assess benefits of relaxation techniques alone for insomnia management.

Hypnotherapy

One small study of 28 cancer survivors of self-hypnosis through web with a waitlist control group showed

feasibility but with limited efficacy data, more studies are needed.⁷¹

Mindful movement

There are many forms of movement which are often included in the category of mindful movement and defined as combining elements of movement with placing attention more deliberately on the body and in some cases also including breath work.

Yoga

Yoga is a mind-body therapy consisting physical postures, breathing techniques, and meditation training. Yoga is recommended by the NCCN as a first line intervention for fatigue⁷² but the evidence for insomnia is not as strong. There are many different forms of yoga that vary in their emphasis on relaxation. Given what is known about the role of hyperarousal it is hypothesized that forms that emphasize relaxation and restoration over strenuous physical postures will have more potential benefit.

Several studies have born this out with one showing a 4-week yoga intervention for patients with breast cancer consisting of breathing exercises, gentle restorative poses, and meditations improved subjective sleep quality compared to standard care with overall statistically significant improvements in the Pittsburgh Sleep Quality Index (PSQI) ($P < 0.01$) with a change of 0.62 in the yoga group vs. 0.37 in the control group. In addition, yoga participants reduced their sleep medication use by 21% per week compared to 5% per week in the control group.⁷³

Another study in breast cancer, yoga compared to control showed significant improvement in PSQI scores with a 50% improvement in total scores ($P < .001$) along with lower 6:00 a.m. cortisol (31.82% change, $P < .05$) and improvement in natural killer cell count percentages (16.94% change compared to -15.49% in control group, $P < .05$) following a program similar to the one described above.⁷⁴

And lastly in a recent survey of over 1000 breast cancer survivors who self-reported using yoga to manage symptoms, insomnia was among the symptoms cited as significantly improved with 60% of women citing a greater than two point change in symptoms which was noted to be clinically significant.⁷⁵ Although more studies in a broader range of populations are needed, there is growing evidence to support gentle yoga programs for insomnia in cancer.

Qigong and Tai Chi

A 2017 meta-analysis found seven studies that measured sleep as an outcome. The study suggested that qigong and tai chi showed promise for improving sleep [ES = -0.49,

$P = 0.018$], but cautioned larger studies were needed.⁷⁶ An interesting and well-done study in breast cancer survivors compared a manualized form of tai chi (with an emphasis on reducing arousal) with CBT-I and assessed insomnia response and remission through 15 months post treatment and showed that tai chi was not inferior to CBT-I.⁷⁷

Acupuncture

Acupuncture has been shown to impact the central and autonomic nervous systems, through neurotransmitters and hormones critical for sleep regulation. Acupuncture enhances the production of serotonin, increases melatonin levels, boosts nitric oxide, and reduces serum cortisol and ACTH, all of which are linked to improved sleep quality.⁷⁸⁻⁸⁰ In addition, acupuncture modulates the autonomic nervous system by increasing vagal activity while inhibiting cardiac sympathetic nervous activity.⁸⁰

One RCT of 160 participants comparing acupuncture to cognitive behavioral therapy for insomnia (CBT-I) in cancer survivors found CBT-I to be more effective overall. The acupuncture group received two sessions per week for the first 2 weeks, followed by weekly sessions for six additional weeks. The CBT-I group underwent five weekly sessions, followed by two bi-weekly sessions. At week 8, both groups showed a clinically significant reduction in insomnia severity from baseline ($P < .001$), with participants assigned to the CBT-I group demonstrating a significantly greater reduction in insomnia severity compared to the acupuncture group ($P < 0.001$, Cohen's $D = 0.32$). These improvements were sustained at week 20. While CBT-I was more effective for overall insomnia severity, both treatments provided clinically significant benefits, with a reduced need for sleep medications. In addition, acupuncture was additionally effective for short-term pain reduction, making it a reasonable choice for patients experiencing both insomnia and pain⁸¹. Given the limited availability of CBT-I practitioners, acupuncture can serve as an alternative option.⁸² One RCT of 52 participants examined the effects of auricular acupuncture on sleep quality in breast cancer survivors, comparing it to psychoeducation. Participants were randomized to either 10 sessions of auricular acupuncture over 5 weeks or a one-time psychoeducation session. At 5 weeks, the auricular acupuncture group demonstrated a statistically significant improvement in Pittsburgh Sleep Quality Index (PSQI) ($P = .031$) scores compared to the psychoeducation group. However, these benefits were not sustained beyond the 5-week period.⁸³ When looking more broadly at the existing systematic reviews and meta-analyses, there is inconsistent research on the impact of acupuncture in treating cancer related insomnia.^{82,84} There are various outcome assessments used across numerous studies, with some showing improvement while others are less

favorable. The existing literature indicates that acupuncture may be more effective than sham and conventional pharmacologic therapy, however, the quality of evidence and number of high-quality studies is low and the effect size is small making it difficult to draw firm conclusions.⁸⁴

Common across many studies is that acupuncture safety is recognized and that side effects were minor and include minimal pain, bleeding, dizziness, bruising.^{82,84} While outcomes are mixed, acupuncture may be a reasonable therapy based on patient values and preference, access to treatments, and coexisting conditions impacting sleep and insomnia.

Acupressure

Acupressure is a widely used nonpharmacological intervention that is gaining attention for its potential to alleviate symptoms in cancer patients. Self-acupressure is a more accessible and cost-effective alternative to acupuncture as patients can practice independently with minimal training. A systematic review of 11 studies, mainly feasibility or pilot RCTs, found inconclusive evidence regarding self-acupressure's effects on insomnia, with some studies showing improvement and others finding no significant benefit.⁸⁵ One RCT specifically examined the impact of relaxing acupressure on fatigued breast cancer survivors ($n = 74$) and found significantly lower PSQI scores compared to both the stimulating acupressure group (-0.47 compared to 2.11) and the usual care group (-2.59 compared to -0.92). In this study, participants received a 15-minute training session prior to performing daily relaxing acupressure for 6 weeks. This benefit did not persist after a 4-week washout period, suggesting its benefit in sleep quality is tied to active use. Despite this, quality of life significantly improved in the relaxing acupressure group at both weeks 6 and 10, which was not observed in the usual care group.⁸⁶ Due to its ease of use, accessibility and low risk, self-acupressure may be a reasonable adjuvant for managing sleep disturbances and insomnia in cancer patients. [Fig. 30.3](#)

Delivery approaches in the oncologic setting

Safety, cost, and efficiency, for both practitioners and patients, are important considerations when delivering acupuncture in oncology settings. One study exploring patients' preferences for insomnia interventions in cancer care found that most patients favored group treatments over individual sessions, citing emotional support and camaraderie as key benefits.⁹⁰ This suggests that group acupuncture may be more appealing to patients. Auricular acupuncture is particularly well-suited to a group setting as

it allows patients to be clothed, seated, and interact. In addition, self-administered acupressure may improve sleep quality in cancer patients and can be easily self-administered after a brief training session.^{86,91,92} Acupressure's ease of self-administration makes it a potentially practical, accessible, and empowering alternative to acupuncture.

Although evidence for acupuncture's effectiveness in cancer related insomnia is mixed, it may be appropriate for patients who have previously benefited from it or are interested in trying it. For those who have experienced side effects from multiple medications, acupuncture offers a non-pharmacological alternative.

Dietary supplements

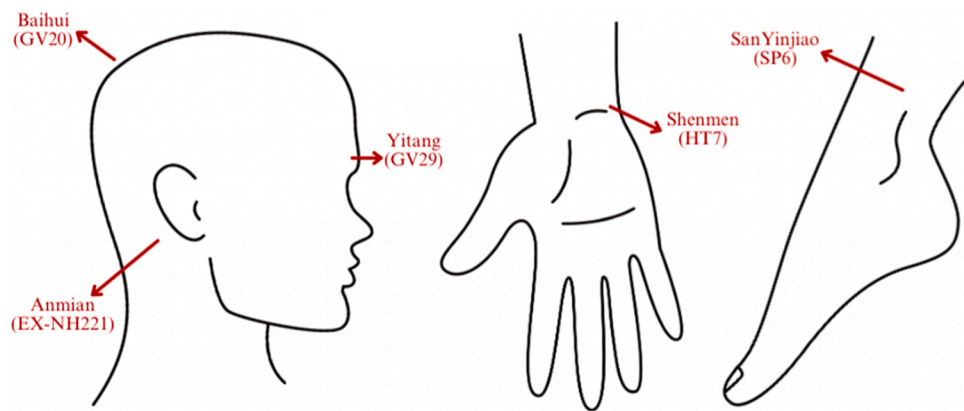
Melatonin

Melatonin is a key hormone regulating the circadian rhythm and has been studied in the treatment of insomnia. A systematic review assessing oral melatonin in cancer patients identified six relevant studies, with conflicting conclusions regarding efficacy.⁹³ A meta-analysis of five trials focusing specifically in breast cancer found that melatonin improved sleep quality. The dose range for melatonin in these studies ranged from 3 to 20 mg, with duration ranging from 10 days to 4 months. Higher doses (>20 mg) were used for shorter durations while lower doses (<10 mg) were used for longer durations. The estimated average effect size (Hedges' $g = -0.79$, $P < .001$) indicated a moderate effect in improving sleep quality. Based on this study, the use of melatonin in this population may improve sleep quality, although given the heterogeneity across studies there was no clear optimal dose or duration identified.⁹⁴ According to the American Academy of Sleep Medicine guidelines, the evidence for the use of melatonin to treat insomnia in general is weak.²⁵ In addition, there is lack of standardization in melatonin products with one study showing deviation from label ranging from 0.37% up to 466%⁹⁵ suggesting only products with third-party verification should be considered. Further research is needed to determine appropriate dose, duration, and efficacy of melatonin for insomnia in cancer patients.

Lavender

Aromatherapy with lavender essential oil has been investigated in cancer patients. A meta-analysis of 10 randomized controlled trials (RCTs) involving cancer patients found the use of single essential oils - particularly lavender - had a notable impact on improving sleep quality (SMD = -1.06 , 95% CI -1.49 to -0.63), $P < .01$). The analysis highlighted moderate improvements in sleep latency (SMD = -0.78 , 95% CI -1.15 to -0.42 , $P < .01$) and

FIGURE 30.3 Common acupuncture points for insomnia. Several acupuncture points are frequently used to treat insomnia including Shenmen (HT7), Baihui (GV20), Anmian (extra point), yintang (extra point/GV29), Sanyinjiao (SP6),^{87–89} with HT7 as the point with the highest frequency of use.^{87,88} *Original Figure by Savanna Carlson.*



reduced sleep disturbance (SMD = -0.58 , 95% CI (-0.80 to -0.36), $P < .01$) with no serious adverse events reported. The recommended dosage for lavender essential oil in these trials ranged from two to eight drops.⁹⁶ Furthermore, a small pilot study found that hospitalized cancer patients who used lavender aromatherapy through a diffuser experienced better subjective sleep quality and reduced sleep disturbance however use of diffusers are not recommended in hospital settings due to risk of allergic reactions.⁹⁷

Valerian officinalis

Valerian is an herb often used in the non-cancer setting for sleep disturbances and has been found to be safe with the only major side effect being daytime sleepiness. In a randomized, placebo-controlled, double-blind study of cancer patients undergoing cancer treatment, valerian at 450 mg nightly was compared to usual care. While valerian did not significantly improve overall sleep quality, as measured by PSQI, it did reduce fatigue and drowsiness at 4 and 8 weeks ($P = .04$ and $P = .03$, respectively) and showed improvements in sleep problems at 4 and 8 weeks ($P = .005$ and $P = .03$, respectively) compared to placebo.⁹⁸ More studies are needed in this population, but valerian could be considered in select patients.

Cannabis

Several studies have examined the use of cannabis in cancer patients, but few have focused specifically on sleep as a primary outcome. Research to date has evaluated combinations of THC and CBD, the active molecules from the cannabis plant, with limited data on the effects of CBD alone. THC has been studied more extensively with inconsistent effects on different sleep stages and total sleep time, whereas data on CBD remains limited and contradictory.⁹⁹ Findings regarding the use of cannabis for

insomnia are mixed, with some studies indicating improvements in sleep quality and decreased sleep disruption, and others showing no significant changes.¹⁰⁰ Further research is needed to better understand both THC and CBD's potential role in improving sleep for cancer patients.^{99,100} While current evidence is insufficient to recommend cannabis broadly for cancer related insomnia, it may be considered for refractory insomnia in select patients as discussed in the most recent guidelines by Multinational Association of Supportive Care in Cancer (MASCC).⁹⁹ According to the 2024 American Society of Clinical Oncology (ASCO) cannabis guidelines there is conflicting evidence regarding the use of cannabis for insomnia and sleep disturbance and therefore no definitive guideline. However, ASCO recommends nonjudgmental inquiry about cannabis use and either guidance on or direction to appropriate resources. Furthermore, dosing should start at the lowest dose and be increased slowly to gauge effects and minimize side effects.¹⁰¹

Conclusion

Sleep related disturbances and insomnia can be challenging to treat in the general population and especially challenging in the cancer population. We recommend screening your patients for both insomnia and the symptoms that travel alongside including fatigue, pain, depression and anxiety and looking for overlapping modalities when possible. Individualizing the treatment plan with a focus on overall healthy lifestyle and choosing interventions based on access, patient preference and ability to engage will result in the most benefit. Please refer to [Table 30.3](#) for a review of the options and [Table 30.4](#) for resources for. There remains much research to be done in cancer related sleep disturbances as more effective treatments for this high impact condition are needed.

TABLE 30.3 Evidence Review Table for therapeutic review.

Intervention	Rating	Dosing	Practical considerations
Exercise	B1	Doses vary in studies but we suggest aiming for: Aerobic exercise for 150 minutes a week of moderate or 75 minutes a week of vigorous exercise. Resistance training or weight training twice weekly.	Variety of exercises has been looked at from walking, aerobic, resistance training etc. Looking into cancer support group exercise programs or gentle group classes may be good ways to get people started.
CBT-i	A1	4–6 sessions over 3 months	Delivery in the oncology setting is best. Practically speaking if available outside of oncology that is still very applicable but may need guidance on how to weave into cancer treatments.
Mindfulness based interventions	B1	8 week programs are most studied	
Yoga	C2	Structured 4 week program consisting of gentle postures, breath work, and meditation.	Be careful to recommend a class that is geared to cancer patients or to carefully vet the class to avoid injury.
Qigong & Tai Chi	B1	Length varies – no specific recommendation here so consider available programming.	
Acupuncture	C2	No definitive recommendation for duration or frequency of treatment Consider twice weekly for the first 2–4 weeks, followed by weekly or bi-weekly maintenance	Acupuncture is a reasonable therapy for those who've benefited before, are interested, or seek a drug-free alternative Acupressure and auricular acupuncture may be considered as practical alternatives if total body acupuncture is not feasible, available, or based on patient preference
Melatonin	C1	Dosage: melatonin 10–20 mg for shorter duration (during and around active treatment); lower melatonin dose, <10 mg, for longer duration taken approximately 30–120 minutes prior to bedtime Consider sustained-release formulation to aid in sleep maintenance	Large variation exists in product standardization, consider use of third-party verification Generally good safety profile, well tolerated with lack of rebound or withdrawal Limited long-term data in use in pediatric population and women of reproductive age Use with caution in those on anti-coagulation activity due to potential interaction
Lavender	B1	2–8 drops of aromatherapy nightly	Can be applied using direct application to skin through massage, drops or spray on pillow/sheets or handkerchief, diffusers (avoid diffuser in health-care setting due to concern for potential allergic reactions) Of note lavender oil is highly toxic to cats.
Valerian	C1	450 mg 1–2 hours before bedtime as whole powdered root or ethanolic extract standardized to 0.8% valerenic acid For tea, use 2–3g of dried root in 1 cup of boiling water, steep 5–15 minutes	May take several weeks before full effect is felt
Cannabis	C2	Studies have shown that CBD in doses up to 300 mg or more per day may be beneficial for insomnia, however, agencies such as the FSA have set a recommended limit of 10 mg/day For patients who want to try the THC-CBD product, 1:1 dosing appears to be the best tolerated Start with lowest possible dose of THC, 2.5 mg or less, and titrate up slowly	MASCC guidelines recommend using only in refractory cases until higher quality evidence emerges ASCO 2024 guidelines have no definitive guideline for cannabis use and sleep

TABLE 30.4 Key Resources.

Patient education & support	Professional resources	Online tools/apps
Educational video about sleep hygiene from a sleep medicine physician Dr. Foldvary-Schaefer at Cleveland clinic. https://health.clevelandclinic.org/sleep-hygiene	National comprehensive cancer network in their survivorship guidelines (4)	CBTi coach App offered through the VA which can support patients through a CBT-I like program who can't access a full in person program. https://mobile.va.gov/app/cbt-i-coach
Patient handout from Dana Farber cancer center for patients dealing with insomnia during cancer. https://www.dana-farber.org/health-library/tips-for-managing-insomnia-during-cancer-treatment	National comprehensive cancer network (NCCN) as a first line intervention for fatigue ⁷²	

Multiple choice questions

1. How is insomnia disorder diagnosed?
- Insomnia Severity Index
 - Self-report of symptoms
 - Actigraphy
 - Polysomnography
 - Consumer wearable

Answer: B. Self-report of symptoms

While sleep testing can identify sleep disorders like sleep apnea the only reliable way to diagnosis insomnia is by self-report of symptoms and not by any objective measurement.

2. Insomnia is one of several symptoms that often cluster together in patients with cancer and can increase the risk of insomnia. Which of the following is NOT a symptom commonly seen in this cluster?
- Pain
 - Depression
 - Fatigue
 - Blurred vision
 - Anxiety

Answer: D. Blurred vision

Pain, depression and fatigue are a common cluster of symptoms seen together in cancer and can both cause inflammation and contribute to sleep disturbances and also be exacerbated by sleep disturbances in cancer.

3. Which modality has the most efficacy for improving insomnia in patients with cancer?
- Yoga
 - Acupuncture
 - Exercise
 - Mindfulness Based Stress Reduction
 - CBT-i

Answer: E. CBT-i

All of these modalities have some efficacy for improving insomnia but CBT-i has the most evidence at present.

4. Which of the following is an appropriate method of delivering lavender essential oil for managing insomnia?
- Oral ingestion
 - Aromatherapy
 - IV infusion
 - Nasal spray
 - Topical

Answer: B. Aromatherapy

The most appropriate and evidence-based method for delivering lavender essential oil for sleep improvement is aromatherapy (e.g., diffusion, inhalation). Oral ingestion can be toxic, essential oils are not designed for IV infusion and at this time nasal spray and topical use are not common or well-studied delivery methods.

5. Which of the following supplements has the highest quality evidence and should be first tried for sleep disturbances in cancer?
- Melatonin
 - Lavender
 - Valerian
 - Cannabis
 - L-Theanine

Answer: B. Lavender

Lavender has the best quality evidence at this time and the best safety profile and so should be considered first line. Melatonin has mixed evidence but some low-quality studies showing small improvement. Cannabis has only low-quality evidence and is recommended only for use in refractory insomnia not responding to other methods.

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