Sleep Disorders and Chronic Pain

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Sleep disturbance is one of the most common reported comorbid problems for patients with chronic pain. Links between the two have been long observed and suspected. Specific research delineating this as a causal or associative relationship is lacking and not completely understood, but the literature that is available seems to support a positive relationship between them. A Pain Related Beliefs and Attitudes about Sleep Scale has been developed to help standardize the assessment and treatment of the two linked conditions.[1]

The DSM-5 defines insomnia as dissatisfaction with sleep quantity or quality, associated with one (or more) of the following symptoms: difficulty initiating sleep, difficulty maintaining sleep, frequent awakenings or problems returning to sleep after awakenings, with duration of the symptoms lasting over 12 weeks and occurring at least 3 nights per week.[2,] The different definitions of insomnia in studies and varying groups of patients make comparison between research studies difficult. It is hard to assess self-reported sleep disturbance, but patient perception of quality of sleep is important in the diagnosis of insomnia and other sleep disturbance. There is a suggested hierarchy of symptoms that suggest daytime consequences. These are self-reported dissatisfaction with sleep, non-restorative sleep, difficulty resuming or maintaining sleep, and difficulty initiating sleep.[3] Thirty percent of adults report symptoms of insomnia. Between 6 and 10% of people meet the diagnostic criteria for insomnia. It is more common in women and older adults. Sleep quality progressively decreases with age, but this seems to be related to co-morbidities, not aging itself. Therefore, poor sleep does not appear to be an inevitable consequence of aging.

The question remains, does poor sleep increase the chances of chronic pain or do people with chronic pain disorders develop poor sleep as a consequence of their pain? The emerging view supported by research is that it appears to be a reciprocal relationship.[4,5,6,,7]

More than half of patients seeking treatment for pain disorders report insomnia as a major symptom and half of patients with insomnia report chronic pain.[8,9,] This includes all types of chronic pain, such as osteoarthritis[10,11], complex regional pain syndrome, back pain, migraines, and fibromyalgia.[12,13,14,15,16] In addition to pain, psychological conditions and other chronic health problems are linked to insomnia. [17,18,19] Patient with poor sleep and reports of pain often display a constellation of symptoms including hyposomnia, fatigue, chronic pain, and depression.

Findings show a strong relationship between insomnia symptoms and the transition from relatively localized pain (LP) to generalized widespread pain (WSP).[20] One type of pain associated with sleep disturbance (primarily insomnia, or interrupted, or poor sleep) is musculoskeletal pain, which can occur at multiple sites. This is considered chronic widespread pain (CWP) and is common in fibromyalgia. The American College of Rheumatology defines CWP as pain above and below the waist, on both sides of the body and in the axial skeleton, lasting for over 3 or more months.[23] Prevalence of CWP is between 10-18% and is greater in women. It increases with age but decreases after the 7th decade (likely due to decreased occupational exposures or stoicism).[21,22]

Sleep disturbance is part of the classification criteria for fibromyalgia.[23,24] In fact, some research on fibromyalgia and other pain disorders suggests that high levels of pain and fatigue could be explained by an alpha-delta sleep anomaly.[25,26,27] This is an electroencephalogram (EEG) sleep pattern in which alpha waves (a waking pattern) are superimposed upon normal delta waves during non-REM sleep. So normal restorative sleep is interrupted by arousal periods. Of note, this pattern is also seen at times in patients who do not have chronic pain disorders.[28]

Sleep disruption has been shown to trigger pro-inflammatory responses, reduce endogenous pain inhibitory control, amplify pain experience, lower pain tolerance, and increase somatic symptoms,[29,30,31,32] all which have been linked to chronic pain disorders.

Research supports previous findings that sleep problems were associated with the new onset of CWP.[33] One large population study in older adults found that non-restorative sleep was the strongest predictor of the onset of CWP.[34] Two major studies have been done to determine if CWP leads to insomnia. One showed that CWP predicted insomnia eleven years later and doubled the risk of developing insomnia.[35] Another one found that CWP was significantly associated with the development of sleep disorders not related to age, gender, or other health factors.[36] Research also shows that restorative sleep predicts the resolution of CWP,[37] which can be hopeful for those seeking treatment.

Continuing efforts in both experimental and clinical research are needed to develop a translationally meaningful understanding of how sleep disorders impact pain, and conversely, how pain affects sleep.

Subjective Findings and History

- Insomnia.
- Chronic pain of any kind.
- Depression and/or anxiety.
- Restless legs syndrome.

Objective Findings

- Physical exam.
- BMI.
- Mental status exam.
- Actigraphy.
- Hormonal assessment when appropriate.

Assessment

- Medical history.
- Sleep-log book over 2-week period.
- Blood tests (thyroid, renal function).
- Arterial blood gas (ABG) and COPD evaluation for nocturnal hypoxemia.
- Evaluate patient medications.
- Sleep study if obstructive sleep apnea is indicated.
- Stress and psychological history.

Plan

There are no comprehensive guidelines for treating these linked conditions. It is important to recognize and address underlying causes. Treating only the pain will not necessarily improve the sleep disorder. Treatment options should be multi-disciplinary and target the improvement of sleep quality, related daytime impairments, as well as pain control.[38] For sleep disorder patients with concomitant Fibromyalgia, treatment guidelines are available from the European League Against Rheumatism (EULAR), and more detail can be found in CHP's Fibromyalgia pathway.

Among psychological therapies, cognitive behavioral therapy (CBT) has the most research behind it to improve both sleep quality and pain, though results are mixed, and some aspects of sleep are better treated than others.[39,40,41,42,43,44,45,46]

Additional treatments include:

- Good sleep hygiene (quiet dark room, fixed bedtimes, stimulant control therapy, screen avoidance, relaxation, intention, imagery).
- Avoiding caffeine and alcohol intake.
- Regular exercise as tolerated (yoga, Pilates, aquatic aerobics).
- Mindfulness/Meditation.
- Massage.

- Hypnosis.
- Herbal therapies for pain and/or insomnia.
- Acupuncture.
- Melatonin.
- Cortisol level assessment when indicated and treatment.
- Physical therapy and yoga in appropriate musculoskeletal cases.[47]

The use of pharmacologic medications for pain and related insomnia is controversial[48]. As with all pain medications and sedatives, oversight and management are necessary.[49]

- Analgesic medications (e.g., NSAIDS, opioids) are often used to treat pain. Their use and potential short-term improvements must be weighed against potential adverse effects, including tolerance and addiction.[50] In some cases, opioids and other analgesic may make sleep disruption worse as they alter the stages of sleep. They may increase sleep latency, increase the number of awakenings, and in turn delay the onset of deeper sleep. This can inhibit prostaglandin synthesis and suppress nighttime melatonin levels.[51]
- Sleep medications (e.g., trazadone, Ambien, benzodiazepines, suvorexant.[52]) This includes medications for neuropathic pain (e.g. gabapentin, amitriptyline), which are also sedating.
- Anti-depressant medication (SSRIs and SNRIs) and antipsychotic medications (quetiapine).

Length of Treatment

Treatment should continue until patient's symptoms are improved. Referral to a sleep and/or pain specialist can occur as appropriate.

Resources for Clinicians

Mcbeth J, Wilkie R, Bedson J, Chew-graham C, Lacey RJ. Sleep disturbance and chronic widespread pain. *Curr Rheumatol Rep*. 2015;17(1):469.

Resources for Patients

Pain and Sleep. https://www.sleepfoundation.org/articles/pain-and-sleep

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