

Insomnia and Chronic Spinal Pain

Subjects: Others

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Insomnia is a major problem in the chronic spinal pain (CSP) population and has a negative impact on health and well-being. The following factors are associated with a significantly higher rate for insomnia: high pain intensity, anxiety and depression. Low-quality evidence showed increased odds for insomnia when one of the following factors was present: female sex, performing no professional activities and physical/musculoskeletal comorbidities. Higher healthcare use was also significantly related to the presence of insomnia.

Keywords: back pain ; neck pain ; associates ; socio-demographic factors ; psychosocial factors ; lifestyle factors ; sleep–wake disorders

1. Introduction

Chronic spinal pain (CSP) is a highly prevalent and debilitating condition associated with poor quality of life and high socioeconomic impact ^{[1][2][3][4][5]}. Furthermore, CSP can coexist with many comorbidities (like other chronic diseases), which generally leads to larger negative effects on physical and mental functioning, a reduced treatment response, higher levels of disability and higher costs compared to CSP alone ^{[6][7][8]}.

Insomnia, defined as the presence of a long sleep latency, frequent nocturnal awakenings, prolonged periods of wakefulness during the sleep period or early awakenings, is common in people with CSP ^{[9][10][11][12]}. Up to 59% report insomnia, making it one of the most reported comorbidities in CSP ^{[9][10][11][12]}. Moreover, people with chronic low back pain are 18 times more likely to experience insomnia compared to people without chronic low back pain ^[11]. If left untreated, insomnia negatively impacts mood, physical symptoms, pain sensitivity, fatigue and health-related quality of life ^{[13][14]}. Additionally, insomnia is related to less productivity and increased work absenteeism ^[15]. Considering all of the above, co-occurring CSP and insomnia present a serious public health challenge which is currently rarely addressed in treatment ^[11].

2. Associates of Insomnia in People with Chronic Spinal Pain

The pooled data regarding sex as an associate showed that the odds for insomnia were 1.45 times higher for females compared to males (low-quality evidence). Similar results are found in the general population, with woman being almost 1.5 times more likely to develop insomnia compared to men ^[16]. It is suggested that this higher rate of insomnia in females might be explained by a higher prevalence of anxiety and depression, potentially indirectly induced by genetic factors ^[16]. However, underlying reasons for these sex differences still remain unclear since insomnia could not be solely explained by the higher prevalence of anxiety and depression alone. Different to the CSP population, age does appear to be associated with insomnia in the general population, with older adults showing a higher prevalence of insomnia ^{[16][17]}. As people get older, normal changes occur in our sleep architecture (e.g., more light sleep and fragmentation) ^[18]. However, these changes can contribute to the development of insomnia. Besides these natural changes of sleep, other comorbidities and specific sleep pathologies which can negatively influence sleep are also more common as people get older ^{[19][20]}. Furthermore, sleep difficulties in older adults seem to be more related to age-related conditions rather than to age itself ^{[21][22]}. Not finding this relation with age in people with CSP can be explained by the possible dominating influence of the characteristics of the pain condition. It is likely that pain is the predominant reason for insomnia in people with CSP, which could potentially overshadow or negate the effect of age on sleep. Another explanation might be the low number of included studies. Additional studies might increase the precision of the OR_p. However, it is likely that age has a negligible influence on the presence of insomnia in CSP since the 95% CI is relatively small and the OR_p is very close to one. Yet, as age and sex are fixed factors, that cannot be targeted in therapy, focusing on other modifiable factors (such as comorbidities, pain intensity, depression and anxiety) seems more clinically relevant.

People with CSP with high pain severity (NRS/VAS ≥ 7) are almost 3 times more likely to have insomnia (moderate-quality evidence). However, since only 2 studies were included in the meta-analysis, some caution is warranted regarding the strength of the results. Nevertheless, the results are in accordance with the findings of a recent review investigating relationships, comorbidities and treatments in chronic pain and sleep disturbances, which indicated that sleep problems in people with chronic pain are associated with greater pain severity [23]. Evidence strongly suggests a bidirectional relationship, with pain and sleep co-existing and impacting each other [24][25]. Insomnia and pain seem to share similar pathways, such as mesolimbic dopaminergic pathways and serotonergic pathways [26][27]. Generally, pain is associated with an increased stress-response and elevated levels of arousal [28], which can negatively affect sleep [29]. Furthermore, people with chronic pain are prone to start worrying about their health, which can further aggravate poor sleep [11][30][31][32]. Additionally, even a limited amount of sleep loss appears to have a de-activating effect on several analgesic systems, while activating hyperalgesic systems [26]. Furthermore, impaired sleep can result in low-grade inflammatory responses [33][34], which is found to potentially affect brain function [35] and increase pain sensitivity [34][36][37]. This bidirectional relationship creates a vicious cycle which can perpetuate and amplify sleep problems and pain (i.e., increasing pain disrupting the sleep and sleep disturbances exacerbating the pain). Taking all findings into account, the results of our analysis regarding pain intensity seems to be in line with the current research findings of the general chronic pain population, indicating that pain intensity has a clear impact on sleep. However, underlying mechanisms explaining the relation between sleep and pain are still not fully understood [26]. Addressing the vicious pain–sleep cycle in the evaluation and treatment of CSP seems to be essential to deliver the best possible care.

Similar to the link with pain intensity, the presence of depression and/or anxiety in CSP is linked to the prevalence of insomnia according to our results (moderate-quality evidence). However, since only two studies were included in the meta-analysis of both anxiety and depression, some caution is warranted regarding the strength of the results. Nevertheless, the strong associations of both factors do not come as a surprise since depression and anxiety are considered as the most prevalent comorbidities of both pain [38][39] and insomnia [40]. Furthermore, people with co-occurring pain and sleep problems appear to be more likely to present comorbid depression, catastrophizing, anxiety and suicidal ideation [23]. Moreover, previous research has demonstrated complex interactions between pain, sleep and depression, without a clear causal ordering [23][24]. Similarly, anxiety is found to be closely related with pain and insomnia, but the direction and underlying mechanisms of these relations are still unclear [39][41]. Given their relationship with pain and insomnia, addressing both depression and anxiety symptoms as an integral part of the evaluation and treatment of people with CSP and comorbid insomnia seems warranted.

Two studies looked at physical activity, which was found to be a non-significant associate after pooling (very-low-quality evidence). However, one could expect that inactivity would be an associate since there is sufficient evidence that physical activity has small but still positive effects on sleep in the general population [42]. Furthermore, physical activity has been identified as a strong “Zeitgeber” (i.e., a cue that helps to synchronize our biological rhythm to a 24 h cycle) [43]. Moreover, evidence shows that physical activity is beneficial, and therefore recommended, in people with CSP [44][45][46][47]. Importantly, our analysis showed that statistical heterogeneity was present, indicating a discrepancy between the data of both studies. After applying a subgroup analysis based on pain location, the heterogeneity improved, and physical activity became a small but significant protective factor for insomnia in people with chronic low back pain (low-quality evidence). This implies that physically active back pain patients are less likely to have insomnia.

A notable significant OR of 7.16 was found for pain catastrophizing, indicating that people with CSP with high levels of catastrophizing are much more likely to have insomnia [48]. However, pain catastrophizing was only investigated by one study, which only included people with chronic neck pain [48]. Therefore, the strength of the relation between insomnia and pain catastrophizing is rather indicative. It might be that studies that investigated anxiety and depression as factors considered catastrophizing as a part of the anxiety/depression complex since they share common elements and are closely related [49].

3. Clinical Implications

While insomnia is a common and important issue in people with CSP, it is rarely addressed in the treatments for CSP. The results of this study can be helpful for clinicians to identify people with CSP early, who are very or less likely to have or develop insomnia based on the presence of several identified associated factors and the strength of the association. Based on the results, people with high pain intensity scores, who report depressive symptoms, who have anxiety and who catastrophize pain, have the highest chance of displaying insomnia. Furthermore, the identified associated factors might be a starting point to improve future treatment approaches. Nevertheless, more longitudinal research is needed to make firm conclusions regarding causality, the predictive value of the associated factors and the effectiveness of new treatment approaches, specifically targeting these associated factors.

Several significant factors associated with insomnia in CSP were identified: moderate-quality evidence was found for the factors high pain intensity scores (NRS/VAS ≥ 7), depressive symptoms (HADS-D ≥ 8) and anxiety (HADS-A ≥ 8), and low-quality evidence was found for the factors female sex, the presence of comorbidities, performing no professional activities, pain catastrophizing and higher healthcare use. Low-quality evidence suggested that physically active low back pain patients are also less likely to suffer from insomnia. Having knowledge of these factors can help clinicians to identify patients who are (less) likely to have insomnia.

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