Sleep disorder

Sleep disorders affect more than 10% of the population.

Sleep disordered breathing affects about 20% of community people above age 65 [1], and up to 44% of patients with Alzheimer's disease in clinic and community-based studies [2] [3]

Classification

Sleep disorders include:

Sleep apnea (periodic interruption of breathing)

Insomnia

Parasomnias

Rapid eye movement sleep behavior disorder

Narcolepsy.

Etiology

A single, severe traumatic brain injury can result in chronic sleep disturbances that can persist several years after the incident. In contrast, it is unclear whether there are sleep disturbances after a sports related concussion (SRC). Considering growing evidence of links between sleep disturbance and neurodegeneration, this review examined the potential links between diagnosed SRCs and sleep disturbances to provide guidance for future studies.

Methods: The scoping review undertook a systematic search of key online databases (Scopus, MEDLINE, SportDiscus, and Web of Science) using predetermined search terms for any articles that examined sleep after concussion. A screening criterion using agreed inclusion and exclusion criteria was utilized to ensure inclusion of relevant articles.

Design: This scoping review is guided by the PRSIMA Scoping Review report.

Results: Ten studies met the inclusion criteria, reporting on 896 adults who had experienced an SRC. Comparison with 1327 non-SRC adults occurred in 8 studies. Nine studies subjectively examined sleep, of which all but one study reported sleep disturbances after an SRC. Three studies objectively measured sleep, with 2 studies indicating large coefficients of variation of sleep duration, suggesting a range of sleep responses after an SRC. The only study to examine overnight polysomnography showed no differences in sleep metrics between those with and without an SRC. No studies examined interventions to improve sleep outcomes in people with concussion.

Conclusions: This scoping review indicates preliminary evidence of sleep disturbances following an SRC. The heterogeneity of methodology used in the included studies makes consensus on the results difficult. Given the mediating role of sleep in neurodegenerative disorders, further research is needed

to identify physiological correlates and pathological mechanisms of sleep disturbances in SRC-related neurodegeneration and whether interventions for sleep problems improve recovery from concussion and reduce the risk of SRC-related neurodegeneration [4].

Traumatic brain injury (TBI) can cause sleep-wake disturbances and excessive daytime sleepiness. The pathobiology of sleep disorders in TBI, however, is not well understood, and animal models have been underused in studying such changes and potential underlying mechanisms.

Skopin et al. used the rat lateral fluid percussion (LFP) model to analyze sleep-wake patterns as a function of time after injury. Rapid-eye movement (REM) sleep, non-REM (NREM) sleep, and wake bouts during light and dark phases were measured with electroencephalography and electromyography at an early as well as chronic time points after LFP. Moderate TBI caused disturbances in the ability to maintain consolidated wake bouts during the active phase and chronic loss of wakefulness. Further, TBI resulted in cognitive impairments and depressive-like symptoms, and reduced the number of orexin-A-positive neurons in the lateral hypothalamus [5].

Sleep dysfunctions, including rapid eye movement sleep behavior disorder, sleep fragmentation, excessive daytime sleepiness and various other dysfunctions, can seriously affect quality of life in patients with Parkinson's disease (PD). Emerging evidence suggests that deep brain stimulation (DBS) exerts a substantial effect when used to treat sleep dysfunctions, which are common nonmotor symptoms experienced by patients with PD. However, far less is known about the specific mechanisms underlying the effects of DBS on sleep processes and the factors that potentially influence these effects. These issues therefore need to be further clarified. Intriguingly, a number of recent studies have evaluated the effects of applying DBS to various brain targets on sleep in patients with PD. Deeper research into the efficacy of applying DBS to each brain target may help determine which region should be targeted during surgery in PD patients. Furthermore, compared with pharmacological therapy, DBS had more beneficial effects on sleep symptoms, and appropriate management involving the joint application of dopamine replacement therapy and DBS might accelerate the effects of treatment [6].

A nationwide survey confirmed sex differences in the association between various self-reported sleep disturbances and cognitive impairment in people aged 65 and older [7].

Treatment

Effective treatments are available for some, whereas the cause and cure for others remain unknown.

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