Chapter 11
Sleep Disorders and Neurodegeneration:
Updates and Future Directions

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ABSTRACT

Dementia affects millions of people around the world each year. At this moment, 55.2 million people are living with dementia in the world, with an estimated social cost of US$1.3 trillion. Dementia associated with Alzheimer's disease and other forms of dementia was ranked as the 7th leading cause of death. One of the risk factors for developing neurodegenerative disorders is sleep disorders. Scientific evidence shows that sleep impairment accelerates cognitive decline by up to three years. Taken together, a better understanding of age-related changes in sleep architecture, their potential impact on cognition, and their underlying mechanisms are essential to developing an efficient treatment of sleep disorders in older people, serving as a promising target for dementia prevention. This chapter will discuss sleep changes and sleep disorders that are predictors of cognitive decline in aging, explaining the pathophysiological mechanisms, and pointing out the gaps that still need to be answered in this area through future research perspectives.

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SLEEP DISORDERS AND NEURODEGENERATION: A THEORETICAL REVIEW, UPDATES AND FUTURE DIRECTIONS

Recent advances in health technology have significantly increased global life expectancy, transforming disease diagnosis and treatment. Population aging is now a worldwide reality, presenting varied challenges across countries. For example, France had 150 years to adjust to a 20% increase in its elderly population, while Brazil will only have 20 years (WHO, 2018). This situation poses new challenges for healthcare systems globally, as aging brings about changes requiring responsive public policies.

Today, while improved socioeconomic conditions enable a better quality of life for many in old age (World Economic Situation and Prospects as of mid-2023, 2023), there's also a rise in age-related neurodegenerative diseases. Age remains the primary risk factor for dementia, leading to increased dependence and diminished quality of life (Ponjoan et al., 2019).

Dementia is a widespread issue globally, affecting millions annually. According to the Global Action Plan on the Public Health Response to Dementia 2017–2025 and the Global Dementia Observatory (WHO, 2018), approximately 55.2 million people are currently living with dementia worldwide, incurring an estimated social cost of US$1.3 trillion. In 2019, dementia, including Alzheimer's disease and other forms (for example, dementia with Lewy bodies disease, Frontotemporal dementia, Huntington's disease), ranked as the 7th leading cause of death, predominantly affecting women. Projections for Latin America indicate a significant and rapid increase in dementia cases within a short timeframe (Patterson, 2018). This region faces substantial barriers related to diagnosis and treatment, including challenges within healthcare systems, limited access to care, and the necessity to standardize protocols and diagnostic methods (Baez & Ibanez, 2016). Understanding the aging process is crucial for implementing preventive interventions that could potentially alter future projections of dementia prevalence worldwide (Prince et al., 2013).

Sleep is essential for maintaining overall health and well-being, serving as a period for restorative processes, memory consolidation, and regulating bodily functions. Changes in sleep patterns negatively affect cognitive processes such as memory, attention, and executive functions (Almondes, 2017; Castro & Almondes, 2018; Khan & Al-Jahdali, 2023; Lima, Kirov & Almondes, 2022). Individuals with sleep disorders like insomnia or obstructive sleep apnea syndrome, as well as those experiencing partial or acute sleep deprivation, exhibit significant cognitive changes (Almondes, Júnior, Leonardo, & Alves, 2020; Bucks, Olaithe, Rosenzweig, and Morrell, 2017; Seda & Han, 2020).

Persistent sleep disorders, with limited clinical improvement and ongoing cognitive impairment and daytime dysfunction, may indicate a potential risk for developing