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LETTER TO THE EDITOR

General correspondence

COVID-19: sleeping with both eyes open

With the continuation of the COVID-19 pandemic, focus has been on vaccination rates and pharmacological treatment options. We believe it is important to highlight a commonly forgotten aspect of health – sleep disturbance, its relationship on the immune system and the impact on outcomes in COVID-19.

Dysfunctional sleep impacts immunity and increases the risk of poorer outcomes from respiratory infections.[1,2] In addition, an increased incidence of cardiovascular diseases, such as coronary artery disease, hypertension, arrythmias and obesity, are observed with deprived sleep.[3] These studies suggest the lowest morbidity and mortality generally occurred among patients achieving 7–8 h of sleep per night. Consequently, in COVID-19-positive patients, poor sleep behaviour burden, including insomnia, daytime sleepiness and late chronotype was associated with needing hospitalisation and greater mortality.[4] Sleep apnoea has also been identified as another risk factor for COVID-19-related death.[5] Overall poor outcomes from sleep disturbances and sleep-related conditions are now evident and perhaps accentuated by COVID-19.

The possible explanation for this lies in the evidence of bidirectional interaction between sleep and the immune system.[6] Sleep is part of a hormonal milieu that supports immune function, and any disturbance of this equilibrium promotes a chronic inflammatory state. Normal sleep promotes immunity and Th1 response. Slow wave sleep downregulates hypothalamic–pituitary–adrenal axis and sympathetic nervous system to reduce cortisol, adrenaline and noradrenaline, while simultaneously raising substances promoting cell activation, growth and differentiation.[7] The peak differentiation of immune cells in lymph nodes and peripheral blood peaks occurs during sleep. Following sleep deprivation, elevated levels of pro-inflammatory cytokines and activation signals are observed.[8] The Th2 pathway is favoured over the Th1, which leads to an increase infection risk and alteration in vaccination response.[6] Robertson and Goldin recently stressed the potential detrimental effects of sleep on vaccine efficacy, particularly in a time where vaccination rates are the cornerstone of public healthcare.[9] Alternatively, in response to infection or stress, the body has an increased drive to sleep to counteract pathology and enhance removal of neurotoxic waste products.[10]

Certainly, prior to the pandemic, multiple institutional factors were present to affect sleep in both intensive care and hospital ward settings. One of the most common contributing factors to sleep disturbance is noise from alarms, staff interactions and patient care interventions. The lack of natural light in negatively ventilated rooms abolishes the physiological regulation of melatonin secretion critical for the TH1 response.[11] Further COVID-19-specific management therapies exist to aggravate this issue. Pronation is a technique encouraged to improve oxygenation and reduce intubation. However, prone is the least common body position during sleep and healthy controls change sleeping positions up to 40 times per night.[12] Last, dexamethasone, a potent glucocorticoid that is prescribed for up to 10 days to reduce mortality, commonly leads to steroid-induced sleep disruption. All these facets of COVID-19 care ultimately lead to the immune dysregulation from metabolic consequences of disrupted sleep.

Unfortunately, the problem of sleep and COVID-19 exists outside of inpatient care. Following hospital discharge, critically ill patients experience sleep disturbance for up to 12 months.[13] Public health measures of repeated lockdown and travel restrictions have led to a negative impact on mental health. Psychosocial distress, anxiety and depression have been associated with sleep disturbances and contributed to the high prevalence of sleep problems observed during the pandemic at 40%.[14]

During the COVID-19 pandemic, when sleep is arguably needed the most, the chance of a good night's rest is not favourable. Hospital systems have been presented the opportunity to promote sleep health through the implementation of quiet time. Interventions such as noise and light reduction strategies and minimising interaction might lead to the improvement of sleep quality and physiological parameters. Evaluating the impact of such changes could lead to a better understanding of the influence of sleep on COVID-19 and immunity.

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