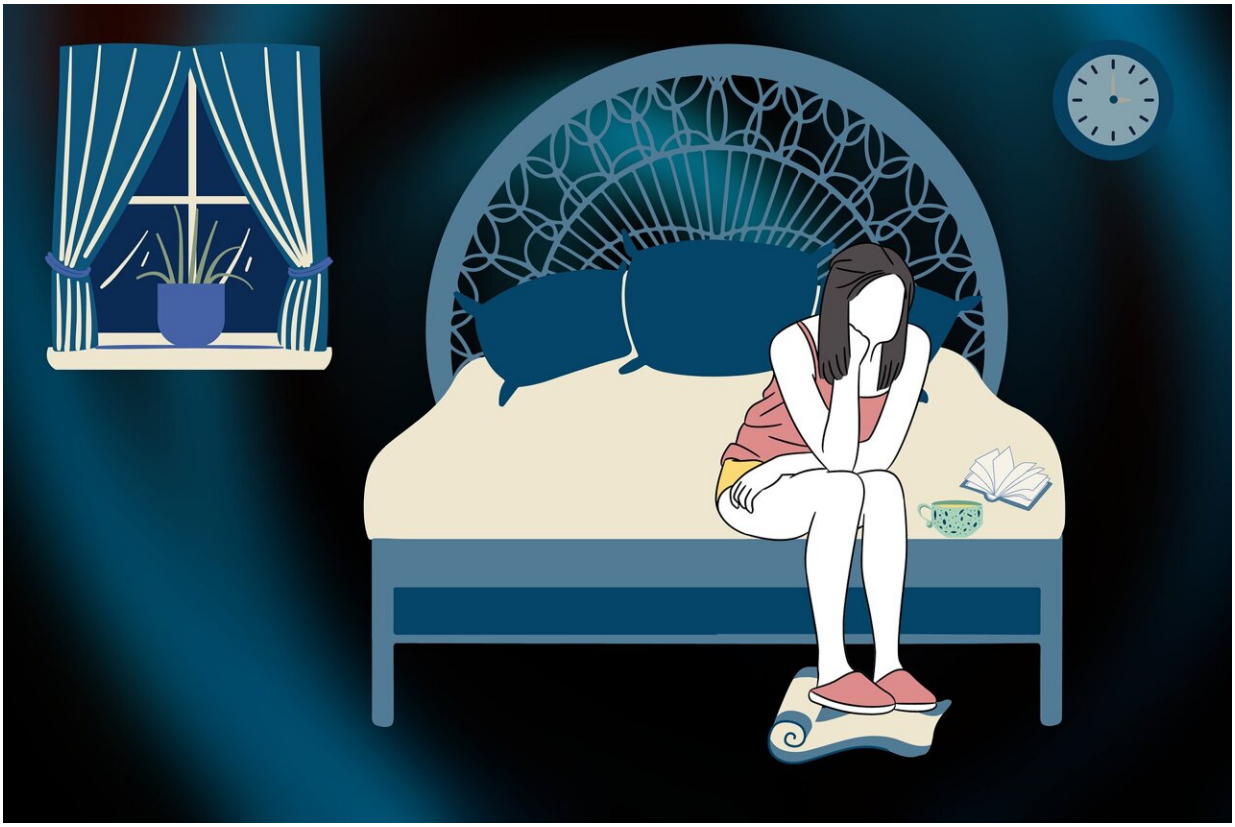
Understanding the relationship between our sleep, body clock and mental health

February 19 2024



Credit: Pixabay/CC0 Public Domain

Problems with our sleep and internal body clock can trigger or worsen a range of psychiatric disorders, according to a new review of recent research evidence.

The review, published today in *Proceedings of the National Academy of Sciences*, suggests gaining a better understanding of the relationship between sleep, circadian rhythms and mental health could unlock new holistic treatments to alleviate mental health problems.

"Sleep–circadian disturbances are the rule, rather than the exception, across every category of psychiatric disorders," says Dr. Sarah L. Chellappa from the University of Southampton, senior author of the review. "Sleep disturbances, such as insomnia, are well understood in the development and maintenance of psychiatric disorders, but our understanding of circadian disturbances lags behind.

"It is important to understand how these factors interact so we can develop and apply sleep-circadian interventions that benefit the sleep and mental health symptoms of patients."

An international team of researchers from the University of Southampton, Kings College London, Stanford University and other institutions explored recent evidence on sleep and circadian factors, focusing on adolescents and young adults with psychiatric disorders. This is a time when people are most at risk of developing mental health disorders and when disruption to sleep and circadian rhythms are likely to occur.

Insomnia is more common in people with mental health disorders than in the general population—during remission, acute episodes and especially in early psychosis, where difficulty falling and staying asleep affects over half of individuals. Around a quarter to a third of people with mood disorders have both insomnia and hypersomnia, where patients find it hard to sleep at night, but are sleepier in the daytime. Similar proportions of people with psychosis experience this combination of sleep disorders.

Meanwhile, the few studies looking at circadian rhythm sleep-wake

disorders (CRSWD) suggest that 32% of patients with bipolar disorder go to sleep and wake later than usual (a condition called Delayed Sleep–Wake Phase Disorder). Body clock processes (such as endogenous cortisol rhythms) have been reported to run seven hours ahead during manic episodes and four to five hours behind during the depressive phase. Timing is normalized upon successful treatment.

What are the mechanisms?

The researchers examined the possible mechanisms behind sleep–circadian disturbances in psychiatric disorders. During adolescence, physiological changes in how we sleep combine with behavioral changes, such as staying up later, getting less sleep on school nights and sleeping in on weekends.

Dr. Nicholas Meyer, from King's College London, who co-led the review said, "This variability in the duration and timing of sleep can lead to a misalignment between our body clock and our sleep–wake rhythms can increase the risk of sleep disturbances and adverse mental health outcomes."

Researchers also looked at the role of genes, exposure to light, neuroplasticity and other possible factors. Those with a genetic predisposition towards a reduced change in activity levels between rest and wake phases are more likely to experience depression, mood instability, and neuroticism.

Population-level surveys show self-reported time outdoors was associated with a lower probability of mood disorder. Sleep is thought to play a key role in how the brain forms new neural connections and processes emotional memories.

New treatments

Dr. Renske Lok, from Stanford University, who co-led the review said, "Targeting sleep and circadian risk factors presents the opportunity to develop new preventative measures and therapies. Some of these are population-level considerations, such as the timing of school and work days, or changes in the built environment to optimize light exposure. Others are personalized interventions tailored to individual circadian parameters."

Cognitive Behavioral Therapy for Insomnia (CBT-I) has been shown to reduce anxiety and depressive symptoms, as well as trauma symptoms in people experiencing PTSD.

In unipolar and bipolar depression, light therapy (delivered on rising in the morning) was effective compared with a placebo. Using it in combination with medication was also more effective than using medication alone. Other findings suggest light is effective in treating perinatal depression.

The timing of medication, meals and exercise could also impact circadian phases. Taking melatonin in the evening can help people with Delayed Sleep–Wake Phase Disorder to shift their body clock forward towards a more conventional sleep pattern and may have beneficial effects in comorbid psychiatric disorders.

Nightshift work can adversely affect mental health but eating in the daytime rather than during the night could help, with research showing daytime eating prevents mood impairment.

The review also points to innovative multicomponent interventions, such as Transdiagnostic Intervention for Sleep and Circadian dysfunction (Trans-C). This combines modules that address different aspects of sleep

and circadian rhythms into a sleep health framework that applies to a range of mental health disorders.

Dr. Chellappa said, "Collectively, research into mental health is poised to take advantage of extraordinary advances in sleep and circadian science and translate these into improved understanding and treatment of psychiatric disorders."

More information: Meyer, Nicholas et al, The sleep–circadian interface: A window into mental disorders, *Proceedings of the National Academy of Sciences* (2024). DOI: 10.1073/pnas.2214756121. doi.org/10.1073/pnas.2214756121

Provided by University of Southampton