

- Biological rhythm

Sleep and circadian rhythm problems linked with poor mental health

The Witness · 27 Jun 2024 · 7 · SARAH CHELLAPPA · Sarah Chellappa is an associate professor, cognitive and affective neuroscience, University of Southampton (UK).

Every cell in the body has a circadian rhythm. This rhythm follows a near 24-hour cycle that is synchronised to day and night. These circadian rhythms are critical for health and wellbeing. But our circadian rhythm can become disrupted when our lifestyle does not correspond with this natural day-and-night cycle. For example, if we work night shifts or experience jet lag. Factors such as ageing, genetics and certain medical conditions (autoimmune diseases and Alzheimer's disease) are also linked with long-term circadian rhythm disruptions.

Sleep and circadian rhythm disturbances can also predict the onset and relapse of certain mental health disorders, including depression, anxiety, bipolar disorder and schizophrenia. The more severe the sleep and circadian disruptions are, the worse a person's mood, risk of relapse and mental health treatment outcomes are.

But despite evidence showing this link, why it exists remains largely unknown. This is what research conducted by myself and my colleagues sought to understand.

We found that sleep and circadian rhythm disruptions appear to trigger or worsen a range of mental disorders, including bipolar disorder and depression. We also uncovered some of the specific biological mechanisms which may underpin this link.

Our review assessed all research published in the past 10 years on different mental disorders, including depression, anxiety and psychosis. We mainly focused on adolescents and young adults.

We found that the majority of young people diagnosed with a mental health condition also had sleep problems such as insomnia (trouble falling asleep and staying asleep), delayed sleep timing and worsened daytime alertness. We also found that onethird of people with bipolar disorder (and other mental disorders) had a disrupted circadian rhythm, where they go to sleep and wake up later than usual.

Our study also pinpointed some of the mechanisms that may explain the link between sleep problems and mental health disorders. Among these mechanisms are an increased vulnerability at the genetic or molecular level to circadian rhythm disruption.

We also found that some participants experienced changes in their brain activity caused by chemical signalling problems that can affect sleep and mood levels. Inappropriate light exposure (getting too little natural daylight or too much artificial light at night) and eating too late in the evening or at night may also trigger sleep and circadian rhythm problems.

Importantly, we showed that most studies have only looked at the effect of sleep on mood or the effects of circadian disruption on mood separately. Both were rarely studied in conjunction, as assessing sleep is far more common (and easier) than assessing circadian rhythms. This is one key research area that needs to be addressed in future studies.

CIRCADIAN MISALIGNMENT

One in seven 10 to 19-year-olds experience a mental disorder worldwide. Depression and anxiety are among the leading causes of illness and disability among adolescents, with suicide being the

fourth leading cause of death among 15 to 29-year-olds. Moreover, not addressing adolescent mental disorders can cause these problems to extend into adulthood.

Adolescence is not only a particularly vulnerable time for developing mental disorders. It's also a time when sleep and circadian rhythms change. Adolescents often sleep later, due to a delay in their circadian rhythm caused by their development, but have to wake up early due to school. As a consequence, they often experience shorter sleep than needed, which can further worsen their mental health.

Our review highlights how important it is to pay attention to circadian rhythm disruptions in young people, especially when it comes to risk of certain mental health problems. Our review also highlights the need to consider sleep and circadian problems when someone experiences mental health problems. By addressing such problems, it may be possible to improve one's mental health.

SLEEP AND CIRCADIAN INTERVENTIONS

At the moment, treatments for sleep problems (such as insomnia) involve cognitive behavioural therapy and sleep restriction. These focus on improving sleep, while mental health problems due to circadian rhythm disruption are not directly addressed.

Our review highlighted treatments that may help improve mood and sleep quality and align circadian rhythms. This included timing medication intake, exposure to natural daylight (and reducing night-time light) as well as eating and being physically active during the day. More research will be needed, however, to better understand the benefits of these treatments.