

Development and implementation of a digital sleep and circadian management tool for optimising sleep, health and safety in shift workers

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ABSTRACT

Employees undertaking shift work in complex, high-risk environments such as mining are at considerable risk of experiencing sleep and circadian rhythm disruptions, which can adversely impact their health, alertness and safety. Evidence-based tools that effectively target improvements in sleep health amongst shift workers are needed. Variability in work hours and individual differences in response to shift work mean that a 'one-size-fits-all' solution is often insufficient in complex work environments.

To address this, the authors have developed an innovative digital tool that provides automated, personalised sleep and circadian intervention strategies to optimise sleep, alertness and performance in shift workers. The prototype technology, 'SleepSync' has been designed with shift workers across multiple industries. Users input information on their work schedule, non-duty commitments and habitual sleep-wake practices. SleepSync uses evidence-based algorithms to deliver biologically-driven, practical and personalised recommendations to support sleep, reduce fatigue and manage shift work. Feedback on rest and recovery is offered to increase adherence, engage users and provide tangible behaviour change targets.

Preliminary testing of SleepSync in 43 shift workers for a four-week period has led to improvements in sleep for more than 70% of users, with an average increase in daily sleep duration of 40 minutes. Users also reported a significant improvement in their knowledge of sleep practices, and mental health, as measured by validated psychological inventories. Four weeks of SleepSync use was associated with better alertness and performance during shift, as measured using objective cognitive assessments, such as the Psychomotor Vigilance Task. Results demonstrate the efficacy of the SleepSync app in aiding sleep and performance in shift workers, and the potential to optimise health and safety in the mining industry.