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Editorial

EDITORIAL

Emerging evidence for sleep instability as a risk mechanism for nonsuicidal self-injury

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Accumulating evidence shows that disrupted sleep is a risk factor for suicidal thoughts and behaviors [1–3], including insufficient sleep [4, 5], insomnia [6–9], nightmares [10–12], and simply being awake at night [13–15]. Less attention, however, has been paid to sleep disruption as a risk factor for nonsuicidal self-injury (NSSI), broadly defined as self-harm *without* suicidal intent. Although distinct from suicidal behaviors, NSSI is quite common among young adults and college students (12-month prevalence: 8.4%; lifetime prevalence: 18%) [16, 17], and is associated with increased suicidal ideation and suicide risk [18]. Accordingly, Burke and colleagues' study [19] connecting collegiate sleep irregularity with NSSI in this issue of SLEEP is a welcome addition to the literature on psychiatric/behavioral disorders.

This study is not the first to connect irregular sleep with suicidality and NSSI. Bernert and colleagues [20] found that actigraphic sleep variability (defined as the standard deviations of sleep onset and offset) was prospectively associated with suicidal ideation, and more weekend recovery sleep [21]. Greater variation between weekday and weekend sleep durations [22] has also been associated with NSSI. Indeed, our group recently reported [23] that college students with NSSI in the past 3 months had 21 minutes more of absolute social jetlag (the absolute difference between weekday and weekend sleep periods) than those with only lifetime NSSI. Moreover, absolute social jetlag was the only significant predictor of recent NSSI following stepwise modeling of multiple sleep variables.

What makes Burke and colleagues' contribution unique was their prospective collection of objective sleep data in combination with high-frequency sampling of NSSI urges. Participants with and without a prior history of NSSI provided 10 days of actigraphy, sleep diary, and ecological momentary assessment data assessing sleep timing, duration, and regularity as predictors of NSSI urges. Of particular interest was the Sleep Regularity Index (SRI) [24], which assessed sleep/wake patterns by comparing if a participant was awake or asleep during the same periods across consecutive days. Individuals with consistent sleep/wake schedules over the recording interval had a higher SRI (max 1), whereas those with random sleep/wake schedules had a low SRI (approaching 0). Using this metric, the authors reported that only the SRI differed between those with and without prior NSSI, with greater sleep irregularity predicting worse urges for NSSI above and beyond sleep duration, sleep timing, and concurrent negative affect. The authors argue that irregular sleep patterns may exacerbate emotional dysregulation, a hypothesized mechanism for NSSI, and consequently that regularization of sleep schedules may reduce risk for NSSI.

Despite the significant relationship between SRI and NSSI, use of the SRI may also represent a key limitation. The SRI was touted as both highly granular and an effective summary of sleep instability (Discussion, paragraph 3), but is simultaneously affected by changes in sleep timing, duration, night awakenings, napping, social jetlag, and other variables. Combining these effects into a single metric makes granularity impossible and simultaneously renders the summary value less meaningful. For instance, highly irregular sleep may stem from chronic insomnia, sleep schedule changes due to shiftwork or weekends (e.g. social jetlag), or insufficient sleep. Similarly, repeated daytime napping because of poor nighttime sleep may actually manifest as

high sleep regularity. It is possible that actigraphy data made this approach more attractive, but actigraphy data can easily be processed to provide more robust nonparametric estimates of sleep regularity such as interdaily stability, intradaily variability, and relative amplitude [25]. Future studies would benefit from more commonly used and more easily interpretable measures of sleep variability in assessing this association.

Another limitation is the lack of ecological momentary assessment sampling during the night. By design, text message surveys were only distributed between 10:00 am and 10:00 pm, a window which may make practical sense for self-report but which misses periods of nocturnal wakefulness when suicidal behaviors appear most likely to occur [13–15, 26]. This may also explain why the mean daily negative affect (4.2 out of 9) and max daily NSSI urges (0.28 out of 9) averaged across participants were so low—evaluations came when negative mood is expected to be minimal [27–30]. Consequently, future studies should examine self-reports during the typical sleep period, as prolonged nocturnal wakefulness may yield greater increases in suicide- and NSSI-related impulses.

Despite these limitations, the work of Burke and colleagues represents an important incremental step forward in evaluating sleep, suicidality, and NSSI, particularly in highlighting how disrupted sleep is associated with impulsivity. Equally important, this study paves the way forward for use of text-based ecological momentary assessments to prospectively map these associations. The ease in developing and executing such studies is encouraging, as such work provides far more sophisticated data than is currently offered by cross-sectional survey data. Finally, this methodology can be used to productively explore nocturnal wakefulness and other specific facets of disrupted sleep as suicide and NSSI risk factors [26].

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