Sleep Medicine Reviews 44 (2019) 83–84

Contents lists available at ScienceDirect

Sleep Medicine Reviews

journal homepage: www.elsevier.com/locate/smrv

GUEST EDITORIAL

Surviving the long night: The potential of sleep health for suicide prevention

In November, the CDC reported that the US life expectancy in 2017 fell for the third year in a row [1]. One of the key reasons for this is suicide. From 1999 to 2017, the age-adjusted suicide rate increased 33 percent, reaching its highest rate in decades [2]. Hardest hit are young adults, for whom suicide is the second leading cause of death (behind accidents). These statistics underscore the need to understand why people die by suicide, and why so many others attempt suicide. Unfortunately, suicide is a complex, multifactorial phenomenon that spans biological, social, and psychological mechanisms. If there is to be any progress in understanding suicide, then significant, proximal, and modifiable risk factors must be identified.

Sleep disturbance within this context represents one such factor. One of the first meta-analyses addressing this issue found that sleep was a significant and independent predictor of suicidal ideation, attempts, and completions [3]. A 2015 clinical review updated the meta-analytic data connecting insomnia and suicide and furthered the conversation by discussing potential mechanisms, and emphasizing the potential of sleep treatment to reduce risk [4]. Two articles published in *Sleep Medicine Reviews* address the most recent understanding of this connection and what can be done about it.

Porras-Segovia and colleagues' review of the topic not only reinforces previous findings but expands the discussion to nearly every aspect of sleep [4a]. Suicidal behavior was two to four times more likely in individuals with general sleep disturbance than those without, and insomnia tripled the risk of suicide attempts. Nightmares were also associated with suicidal behavior. Even sleep-disordered breathing had a fifty percent increased likelihood of suicidal ideation and planning and increased the risk of death by suicide by 1.7 times in men and 4.3 times in women. Moreover, potential mechanisms such as nighttime wakefulness, executive dysfunctions, and circadian gene polymorphisms were also explored. Perhaps most importantly, the authors implicate sleep disturbance as a proximal risk factor for suicidal behavior – including attempts and completions. While risk factors for suicide remain plentiful, recognizing acute sleep disturbance as a significant proximal trigger highlights the potential of sleep interventions to reduce suicidality. Specially, cognitive behavioral therapy for insomnia (CBTI) reduces hopeless thinking surrounding poor sleep even as it increases sleep quality. Thus, CBTI not only reduces the impact of sleep disturbance as a risk factor, but it may provide the necessary cognitive skills to combat hopeless thinking elsewhere. The discussion of image rehearsal therapy for nightmares, mobile technology for managing sleep disturbances, and pharmacological interventions is also a welcome addition.

In contrast to the broad approach adopted by Porras-Segovia and colleagues', Russell and colleagues focused on the population most affected by increased suicidality: adolescents and young adults [4b]. This builds on a recent cross-sectional meta-analysis showing that the risk of suicidal ideation, planning, and attempts decreased roughly 11 percent per each additional hour of sleep, reaching a minimum between 8 and 9 h per night [5]. In their review, Russell and colleagues found evidence linking poor sleep quality, insomnia symptoms, and nightmares with increased suicidality, often independent of other covariates. They also highlight the role of sleep in the Interpersonal-Psychological Theory of Suicide [6,7], and suggest that poor sleep may enhance thwarted belongingness due to isolation from others during the night. This accords with our work and the work of others highlighting nocturnal wakefulness as a risk factor for completed suicides [8,9]. Unfortunately, research on young adults is often restricted to single-item assessments of both sleep and suicidality and completely lacks investigation of circadian factors.

One key limitation of these reviews is the limited discussion of mechanistic links between sleep and suicide risk, besides the general overlap between sleep disturbance and affective dysregulation. This is largely due to the dearth of literature exploring these connections. Future studies must identify mechanisms which can reasonably and rationally be targeted. One of the most prominent candidate mechanisms, serotonin dysregulation, may be the most amenable to treatment with existing serotonin reuptake inhibitors, but more work is needed to fully understand the deficit before any interventions can be made. Another candidate mechanism is that wakefulness during the biological sleep period (whether experienced as insomnia or sleep deprivation) is associated with hypofrontality and this could lead to executive and affective dysfunction in the middle of the night. Another key mechanistic consideration would be the changes in expression of circadian rhythms across young adulthood, which may be a vulnerability for affective and cognitive regulation in this population. These and other potential mechanisms need to be more thoroughly explored. In addition to risk factors and potential mechanisms, the role of sleep interventions in suicide prevention efforts also need to be better explored. Randomized clinical trials of sleep interventions in vulnerable populations such as college students, prisoners, or previous attempters are critical to determine whether sleep is, in fact, a viable target for suicide prevention. Studies that examine the added benefit of a sleep intervention could be helpful in this regard.

Meaningful advances in this field will also require increased methodological rigor. There is a wide continuum of outcomes including death ideation, actual suicide ideation, suicide planning, suicide attempt, and death by suicide. The sleep field has generally

https://doi.org/10.1016/j.smrv.2019.01.001

been unable to explore this nuanced landscape with much precision. Single item assessments, approaches without strong empirical or theoretical frameworks, and single time-point questionnaires should be replaced with validated questionnaires addressing theoretically-driven questions evaluated in a longitudinal fashion. There is a particular need for research addressing the circadian changes in young adults, as disruption of this system may cause psychological and neurobiological harm. If the evolving literature continues to support the hypothesis that there is increased suicide risk in the early hours of the morning, then interventions may be needed to protect college students during this period.

Suicide is a crisis in the United States and throughout the world, and sleep may play a critical role. The reviews in this volume provide a valuable starting point from which further discussion can emerge – understanding who is at risk, the mechanisms of that risk, and the treatments that can ameliorate that risk. Unlike other known risk factors for suicide, sleep is readily modifiable. There is a great need for additional work in this area, and many promising avenues for research. With more attention and thoughtful investigation, sleep health may help people survive the night.

References

[1] Murphy SL, Xu J, Kochanek KD, Arias E. Mortality in the United States, 2017. NCHS Data Brief; 2018. p. 1–8.
[2] Hedegaard H, Curtin SC, Warner M. Suicide mortality in the United States, 1999–2017. NCHS Data Brief; 2018. p. 1–8.
[3] Pigeon WR, Pinquart M, Conner K. Meta-analysis of sleep disturbance and suicidal thoughts and behaviors. J Clin Psychiatr 2012;73:e1160–7.
[4] Woznica AA, Carney CE, Kuo JR, Moss TG. The insomnia and suicide link: toward an enhanced understanding of this relationship. Sleep Med Rev 2015;22:37–46.
a Porras-Segovia A, Pérez-Rodríguez MM, López-Esteban P, Courtet P, Barrigón M ML, López-Castromán J, et al. Contribution of sleep deprivation to suicidal behaviour: A systematic review. Sleep Med Rev 2019;44:37–47.
b Russell K, Allan S, Beattie L, Bohan J, Bohan J, MacMahon K, et al. Sleep problem, suicide and self-harm in university students: A systematic review. Sleep Med Rev 2019;44:58–69.
[5] Chiu HY, Lee HC, Chen PY, Lai YF, Tu YK. Associations between sleep duration and suicidality in adolescents: a systematic review and dose-response meta-analysis. Sleep Med Rev 2018;42:119–26.
[6] Joiner TE. Why people die by suicide. Cambridge, Mass: Harvard University Press; 2005.
[7] Van Orden KA, Witte TK, Cukrowicz KC, Braithwaite SR, Selby EA, Joiner Jr TE. The interpersonal theory of suicide. Psychol Rev 2010;117:575–600.
[8] Perlis ML, Grandner MA, Brown GK, Basner M, Chakravorty S, Morales KH, et al. Nocturnal wakefulness as a previously unrecognized risk factor for suicide. J Clin Psychiatr 2016;77:e726–33.
[9] Perlis ML, Grandner MA, Chakravorty S, Bernert RA, Brown GK, Thase ME. Suicide and sleep: is it a bad thing to be awake when reason sleeps? Sleep Med Rev 2016;29:101–7.

Andrew S. Tubbs
Sleep and Health Research Program, Department of Psychiatry, University of Arizona College of Medicine, Tucson, AZ, USA

Michael L. Perlis
Behavioral Sleep Medicine Program, Department of Psychiatry, Perelman School of Medicine, University of Pennsylvania, Philadelphia, PA, USA
E-mail address: grandner@email.arizona.edu.

Michael A. Grandner*
Sleep and Health Research Program, Department of Psychiatry, University of Arizona College of Medicine, Tucson, AZ, USA

* Corresponding author. Department of Psychiatry, 1501 N Campbell Ave, PO Box 245002, Tucson, AZ 85724-5002, USA.