The Use of Technology at Night: Impact on Sleep and Health

Commentary on Gradisar et al. The sleep and technology use of Americans: findings from the National Sleep Foundation's 2011 Sleep in America Poll. *J Clin Sleep Med* 2013;9:1291-1299.

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Since mankind first tamed fire, we have been using artificial light to extend the waking day. As technology has progressed, our relationship with the night has changed. With widespread use of electric lights, the night has essentially become optional. But this is not an ideal perspective for health and well-being. Adverse outcomes arise from extending wakefulness^{1,2} or even shifting it later.^{3,4} In recent years, the use of electronic devices in the bedroom has increased dramatically. However, not much is known at the population level about who uses technology in the bedroom, what sort of technology is used, how much is used, and how this use affects sleep.

In this issue of *JCSM*, Gradisar and colleagues report results of the 2011 Sleep in America Poll conducted by the National Sleep Foundation, which focused on technology use and relationships to sleep.⁵ The results show that approximately 90% of Americans report some technology use in the hour before bed. Although television was the most popular overall, young adults were more likely to be using cell phones. Other demographic differences existed as well, with younger adults being more likely to use computers/laptops and video game consoles. Differences regarding gender, race/ethnicity and relationship status were also reported.

The authors also found that technology use was associated with sleep patterns. For example, the more types of devices used, the more individuals reported difficulty falling asleep and maintaining sleep, especially if the use of technology was active. Regarding intrusions into sleep, 22% reported going to sleep with cell phone ringers on in their bedroom and 10% reported awakenings at least a few nights per week due to their phone. Among those with the ringer on, being awakened by the cell phone was significantly associated with difficulty maintaining sleep.

This study had a number of important strengths. The random sample contributes to the generalizability of these findings. Also, this study represents one of the first times that technology use in the bedroom is surveyed, especially relative to sleep. In addition to its strengths, a number of significant limitations suggest future research directions. For example, the lack of precision in the survey instrument makes conclusions difficult to draw. For example, using a phone or tablet or computer could indicate a passive activity (e.g., watching a movie, browsing the internet) or an interactive one (e.g., communicating with people, playing video games, social networking). Some activities may

have varying degrees of interactivity; for example, playing a video game or talking on the phone may be more impactful on sleep than texting or browsing the internet. In addition, future research that includes more standard assessments of sleep would aid in interpretations of results and more complex statistical analyses will more thoroughly elucidate relationships.

The landscape of technology use in the bedroom is changing rapidly. We need to design research studies that will effectively assess patterns of use in the real world. For example, it is plausible that individuals who use smartphones are using them in the bedroom—to check emails, send texts, use social networks, play games, or simply use its alarm to wake up in the morning. Perhaps more carefully assessing quantity and timing of passive versus active consumption of technology would be helpful, as would be assessing interruptions by and uses of devices in the middle of the night.

One particular challenge in conducting this type of research is that individual users may themselves not be able to recall specific events in granular detail. An individual user may text for a few minutes, check e-mails, watch a video, then send additional texts before going to bed, all within 15-20 minutes. Indeed, it may be that the only way to accurately capture this data would be through monitoring applications installed on the devices themselves. This requires that researchers not only understand the possible technologies in play, but they may also need to directly manipulate/measure them, with the consent of the user.

Despite these challenges, the issue of technology relative to sleep is an important one. Nearly all adults, especially young adults, use technology before bed. As the possibilities increase for talking, texting, browsing, emailing, working, playing, posting, and reading before bed, and as a portal to information and social networks becomes an arm's reach away in the middle of the night, and as the devices that go "beep" in the night become more common in the bedroom, it is important for sleep researchers to understand how these changing patterns of use affect sleep and, in turn, health and well-being.

CITATION

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