

Sleep During the Pandemic

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KEYWORDS

• Pediatric sleep • COVID-19 pandemic • Sleep disorders

KEY POINTS

- The pandemic significantly disrupted childhood sleep routines, sleep quality, and duration of sleep.
- The increase in mental health issues due to the pandemic exacerbated sleep disturbances.
- Pediatric sleep medicine clinics have adapted practice styles due to pandemic challenges.

BACKGROUND

In March 2020, the World Health Organization (WHO) declared the novel coronavirus outbreak (coronavirus disease 2019 [COVID-19]) to be a global pandemic. The resulting stay-at-home orders and widespread closures disrupted nearly every aspect of family's lives. The COVID-19 pandemic altered daily routines, changed home environments, and increased stress and anxiety. Children and families faced numerous challenges with remote learning, modified parent work schedules, and limited childcare. This abrupt transformation of day-to-day life had a significant impact on many aspects of children's lives including sleep. The manner in which sleep was affected varies across age range but research suggests that infants through adolescents were affected.¹ As the pandemic persists and stretches into a multiple-year period, the nature in which this unprecedented stressor affects families has shifted. This article will review the variety of sleep changes noted at different stages of the pandemic. Contributing factors to these disruptions, including physical activity and outdoor exposure, screen usage, and rising stress and anxiety will be considered. Alterations made by the sleep medicine field to ensure continuity of important sleep services in a safe environment will be discussed, as will areas for future research.

Changes in Childhood Sleep During the Pandemic

During the initial lockdown period in 2020, COVID-19 significantly disrupted day-to-day routines.

School, work, and childcare center closures resulted in virtual learning and many parents working remotely from home while simultaneously caring for young children. These modified schedules and arrangements caused numerous changes to family's daily schedules, and as byproduct to sleep, which is highly connected to structure, routine, and predictability. Research on this crisis period has examined the impact of the initial COVID-19 shutdowns on sleep. Dellagiulia and colleagues² investigated changes in preschooler sleep during the first 4 weeks of the emergency lockdown in Italy and found that parents reported more challenging bedtime routines and a decrease in child sleep quality. The overall amount of child sleep time decreased initially, then stabilized, suggesting some eventual adjustment. Markovic and colleagues³ observed a similar pattern of initial disruption followed by a rebound to preconfinement sleep quality with babies and children.

A range of sleep changes has been reported across other studies. Lecuelle and colleagues⁴ found that French families with young children aged 6 months to 4 years reported an increase in overall sleep disturbance, decreased number and duration of naps, more difficulty initiating and maintaining sleep, and more frequent parasomnias. Liu and colleagues⁵ examined sleep patterns among Chinese preschoolers aged 4 to 6 years and found several distinct differences when compared with a prepandemic sample. Notably, children during the COVID-19 pandemic had later bedtimes and wake times, longer nocturnal but shorter nap duration with comparable overall 24 hours sleep duration. Interestingly,

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parents in this study reported fewer sleep disturbances during the pandemic period. Certain behavioral practices were associated with fewer sleep disturbances, including sleeping arrangement (separate rooms or room sharing but not bed sharing), reduced electronic device use, following a regular diet, increased parent-child communication, and harmonious family atmosphere.⁵ Room sharing, which increased during the pandemic due to conversion of home space to workspace, is associated with longer sleep onset latency and more parental frustration.⁶ Room sharing may also be more likely to occur in low-income families, who were disproportionately affected by the pandemic. Considered together, these studies suggest that changes in children's schedules, even for relatively brief periods, can cause significant disruptions in sleep.

Increased sleep disturbance during the pandemic seems to have affected all ages of younger children^{7,8} including infants,^{9,10} toddlers,^{3,11} and school-age youth.¹²⁻¹⁴ Conversely, some studies show that teens and young adults were sleeping more and had fewer sleep issues during the pandemic due to the virtual learning environment.¹⁵ Asynchronous online lessons and elimination of school commutes allow for youth to sleep in later in the morning and may be a more optimal schedule for teenagers. Further, this flexibility may eliminate irregular schedules that typically results from early weekday waking followed by sleeping in on weekends.¹⁶ In contrast to prepandemic studies that widely demonstrated that teens are sleep-deprived and typically do not receive sufficient hours of overnight sleep, these findings offer a promising upside to virtual learning environments.¹⁷

Impact of Decreased Activity and Outdoor Exposure on Sleep

Daytime physical activity and daylight exposure have long been linked to positive sleep outcomes for children. During the pandemic, many children were faced with staying indoors all day resulting in less sunlight exposure and physical activity. Particularly for families who did not have access to outdoor space within their home, children had more sedentary time than typical. Shinomiya and colleagues¹⁰ found that parents reported decreased outdoor play for both babies and toddlers. A global study of 3-to-5-year-old children during the pandemic showed that children had more sedentary screen time, decreased outdoor time, and worse sleep habits.¹⁸ Children who could go outside were more likely to meet WHO movement guidelines and parents whose children

sleep worsened during the pandemic attributed reduced exercise as a factor in this exacerbation.¹⁹ In a study of Canadian children during the pandemic, only a minority (18%) met physical activity recommendations,²⁰ and this percentage continued to worsen during subsequent waves of the virus.²¹ These findings all continue to point to physical activity and outdoor time as important contributors to healthy sleep habits in children.

Impact of Stress and Anxiety on Sleep

The pandemic has clearly brought with it enormous amounts of stress for children and families because they navigated an unknown virus, disruptive school closures, balancing working from home with childcare, and increased isolation. Rates of mental health issues, particularly anxiety and depression, have drastically increased among youth during the pandemic.^{22,23} In 2021, the US Surgeon General issued an advisory warning of the unprecedented levels of mental health disorders since the start of the pandemic, including a doubling of anxiety and depression symptoms and increasing rates of ER visits for suicidality.²⁴ The American Academy of Pediatrics (AAP), American Academy of Child and Adolescent Psychiatry, and Children's Hospital Association similarly issued a declaration of a national emergency in child and adolescent mental health driven by the stress of the pandemic.

Pervasive anxiety and worry about virus exposure, loss of loved ones, missed milestones, and social isolation have marked the experience of many adolescents during the pandemic. Teens have witnessed parents who are stressed by job instability, financial concerns, and food insecurity. Stress has long been linked with poor sleep quality and duration, and sleep disturbances are hallmark symptoms of anxiety and depression. Thus, with growing rates of mental illness, come increasing sleep issues among youth. Research during the pandemic has shown that anxiety symptoms in youth are linked with sleep disturbance.²⁵

Parental mental health has also been linked to childhood sleep disturbance during the pandemic. Top and Cam found that youth of parents who felt helpless, apprehensive, and frightened during the pandemic experienced more sleep difficulties.¹⁴ Similarly, children of mothers with acute levels of anxiety had worse sleep quality.²⁶ Caregiver stress level has been identified as an important risk factor for lower sleep quality in both babies and young children.³ A study examining sleep quality in children who were medically hospitalized during COVID-19 found that they had worse sleep, despite having fewer overnight room entries,

which historically are associated with reduced sleep quality. Caregivers attributed the poor sleep quality to increased stress and anxiety, and parents themselves also expressed feeling more sad, weary, and less calm during this time as compared with prepandemic.²⁷ The record levels of mental health issues facing youth and parents today are yet another pandemic byproduct that will need to be addressed going forward.

Impact of Screen Use on Sleep

Excessive screen time has long been established as detrimental to sleep for a variety of reasons. Exposure to bright light and the subsequent impact on melatonin production, engagement in potentially arousing or stressful activities, and the displacement of sleep-inducing activities such as exercise are all potential contributors to this relationship. Using screens in bed can be particularly problematic for sleep initiation, and the AAP recommends youth avoid screens for at least 1 hour before bedtime. With the transition to virtual learning and lack of available alternative activities, although, youth have been spending increased amounts of time on electronics during the pandemic.^{28,29} Although some increase was inevitable as virtual school was the primary learning modality for most children, screen time use has extended beyond educational purposes, and many youth report using electronics for social media, texting, video chatting, streaming services, video games, and Internet browsing during lockdown.²⁹ Bruni and colleagues¹⁵ found that school-age children increased screen time to 3 to 4 h/d, excluding school lessons. Even parents of infants reported longer television and smartphone use times for their babies.¹⁰ Notably, more screen use was associated with poorer mental health and greater perceived stress, as well as sleep disturbance.^{25,29}

Sleep Recommendations During a Pandemic

The Society of Behavioral Sleep Medicine convened a COVID-19 task force to address worsening sleep issues during the pandemic and offer guidance for providers. The task force suggested that attaining healthy sleep during a crisis period such as the pandemic may be supported by optimizing sleep schedules, limiting sleep-interfering factors, and increasing routine daytime behavior.³⁰ Maintaining a consistent routine with regular wake times, mealtimes, activity times, and bedtime is crucial to support children's sleep. Parents can help children manage anxiety at bedtime through the practice of relaxation techniques (ie, diaphragmatic breathing, progressive

muscle relaxation, guided imagery). Families should maintain prepandemic sleeping arrangements, to the extent possible, and encourage children to fall asleep independently without the presence of a parent. Behavioral interventions such as reward systems and gradual withdrawal of parents for difficult bedtime behavior remain very relevant. Limiting electronics use (tablet, television, smartphone) for at least an hour before bedtime and leaving devices outside the bedroom is particularly pertinent during a time of such increased screen time.

Changes to Pediatric Sleep Medicine Practice

The onset of the COVID-19 pandemic led to an abrupt halt of most in-person pediatric sleep medicine services. Many sleep centers were forced to temporarily close office and laboratory space due to stay-at-home orders and discontinuation of nonessential services across most medical center or practices.³¹ For a period of time, overnight sleep studies, pulmonary function test (PFT) laboratories, and surgical procedures related to sleep disturbances were unavailable. Even as the initial crisis period of COVID-19 has waned, ongoing social distancing requirements make traditional sleep medicine practices difficult to operate. These challenges necessitated a quick and creative rethinking of delivering sleep medicine services for children to ensure continuity of care.

Although home sleep apnea tests (HSATs) are not recommended for pediatric patients by the American Academy of Sleep Medicine,³² some sleep centers relied on these as an alternative option when in-person studies were available during the height of the pandemic.^{33,34} Going forward, HSATs may reasonably be considered for postpubertal teenagers or children with developmental delays, for whom the sleep laboratory environment is difficult to tolerate.³⁴ As the initial COVID-19 surge declined, sleep and PFT laboratories, as well as nonessential surgical procedures have largely resumed with new guidelines around safety, screening, and personal protective equipment.

Telemedicine has effectively been leveraged to allow for safe continuation of many sleep services during the ongoing pandemic period.³⁵ Behavioral sleep medicine is particularly well suited to telemedicine because these visits do not involve any physical examination, obtaining vitals, or other procedures requiring a patient to be physically present.³⁶ Particularly for parents of babies or toddlers, where recommendations are parent-directed, virtual visits allow for them to be seen at a convenient time without children present,

which may allow for better uptake of information.³³ Research suggests that the efficacy of many sleep interventions is not diminished through the virtual format. Cognitive behavioral therapy for insomnia, for instance, has been shown to be effective when delivered via the Internet.³⁷ CPAP follow-up has also been identified as ideal for telemedicine.³⁸

Telemedicine has added benefits of reducing school and work absences, having multiple caregivers present at once, reducing time, travel, and clinic space costs, and increased efficiency for providers.³⁹ Multidisciplinary approaches to sleep medicine with a variety of providers (pulmonology, psychology, neurology) can easily and efficiently see patients together in one virtual appointment while not being physically present in the same location. Many of these virtual services will likely continue on postpandemic due to convenience and patient preference.

Sleep Medicine Training

The temporary halt of sleep services posed a concern for fewer clinical training opportunities available in medical or psychology education programs. Given the profound impact the pandemic has had on pediatric sleep, the demand for these services has increased, and the field needs competent providers to sustain a workforce to meet this need. Fortunately, the pivot to telemedicine now introduces a new opportunity for trainees to observe and participate in sleep-related care. Leveraging technology for didactics and teaching also provides new and exciting opportunities for this generation of trainees.³⁶

Future Research Considerations

Pediatric sleep researchers rapidly mobilized to study the impact of the pandemic on sleep through a variety of cross-sectional and retrospective designs.⁴⁰ Longitudinal data are more limited, and implementing interventional or experimental studies has been difficult due to numerous barriers. Ongoing gaps in the literature include how the COVID-19 virus itself affects childhood sleep, both in the short-term and in relation to “long-COVID,” as well as the effect of the pandemic on children with premorbid primary sleep disorders.⁴⁰ Studying the efficacy of telemedicine sleep services continues to be important as the virtual format remains a primary delivery mode.

SUMMARY

In sum, the COVID-19 pandemic significantly affected childhood sleep. Early confinement periods led to more challenging bedtime routines

and a decrease in child sleep quality. Decreased outdoor time, daylight exposure, and physical activity levels, and huge increases in screen time have likely further contributed to these disruptions. Although some of these sleep problems may have stabilized once the initial lockdown periods abated, other sleep-related challenges have persisted as the pandemic continues. The mental health crisis remains a substantial threat to positive sleep outcomes as raising anxiety and depression rates overwhelm today’s youth. Tied to this, parental mental health, which is related to child sleep quality, is being significantly taxed.

To support ongoing sleep issues among youth, sleep medicine practices have had to adapt and evolve during the COVID-19 pandemic. An urgent shutdown of nonessential sleep services led to a quick and robust growth of telemedicine. Although most in-person sleep studies, PFT laboratories, and surgical procedures have resumed with additional safety precautions in place, telemedicine will likely remain a primary delivery modality for sleep services given the many benefits. Adaptations for sleep medicine training and research in the face of pandemic challenges should also be considered.

CLINICS CARE POINTS

- During the initial lockdown period of the pandemic, children experienced increased sleep disturbances including later bedtimes, decreased number and duration of naps, more difficulty initiating and maintaining sleep, and more frequent parasomnias
- Decreased outdoor time and daylight exposure along with increased sedentary behavior during the pandemic have contributed to childhood sleep problems
- The transition to virtual learning and general increases in screen use contributed to sleep disturbances among adolescents
- Significant increases in anxiety, depression, and other mental health symptoms during the pandemic are linked to sleep difficulties
- Pediatric sleep centers were faced with an abrupt halt to in-person services such as sleep studies, PFT laboratories, and surgical procedures
- Telemedicine has effectively been implemented to offer many sleep services remotely

DECLARATION OF INTERESTS

The author has nothing to disclose.

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