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REVIEW PAPER

How COVID-19 quarantine might affect the sleep of children and adolescents?

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Abstract

Objectives: To describe the main aspects of altered sleep in children and adolescents in the quarantine of COVID-19. **Methods:** A narrative review of the current literature on the topic was carried out, based on the most recent national/international classification. **Results:** The literature on the subject is still scarce. The sudden changes in routines and transfers of classes to virtual models provided flexibility in school activities, impacting the circadian rhythm of children and adolescents and, consequently, sleep. As a result, the lack of a routine with pre-established schedules by parents, results in longer use of electronic devices, from games to the media. **Conclusions:** It is essential that pediatricians advise parents on the importance of establishing a routine of daytime and nighttime activities, which will have an impact on the quality of sleep of children and adolescents during this quarantine period.

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INTRODUCTION

In late December 2019, a series of pneumonia cases of unknown etiology affected the inhabitants of Wuhan, China[1]. In January 2020, they discovered that the cause was contamination by a new type of coronavirus, which was initially named 2019-nCoV, and later upgraded to SARS-CoV-2; therefore, the disease caused by infection with the new coronavirus was defined as COVID-19. Based on the rapid increase in the number of infections and the possibility of transmission among asymptomatic individuals, the World Health Organization (WHO) declared the COVID-19 outbreak a pandemic. On July 13, 2020, the WHO confirmed approximately 12 million cases, with more than 656,000 deaths, in 216 countries[2].

To try to control the COVID-19 pandemic, the governments of several countries used one of the oldest methods to control and reduce contagion, the quarantine. There are reports of the use of this measure since the 14th century, initially, in large nautical vessels, to control the crew, in which the contaminated individual had to wait 40 days to disembark[3]. Currently, to control the COVID-19 pandemic, the lockdown method was adopted, known as the total/partial closing of stores (except for essential goods, such as: markets, pharmacies, gas stations, among others)[4] and the restriction of non-essential activities. A recent study found that people who had been quarantined often reported it to be an unpleasant experience. Among the reasons for this are: separation from loved ones, loss of freedom of movement, uncertainty and fear in relation to the disease, which usually bring psychological consequences, such as mood changes and symptoms of anxiety[5].

It is important to understand that sleep is an essential biological process for life and for health in general, as it plays an important role in the regulation of brain functions and body physiology, such as metabolism and the functioning of the immune, hormonal and cardiovascular systems. Therefore, to have a healthy sleep, with adequate duration, good quality, time and regularity are needed, regardless of the life cycle[6].

Good sleep quality is essential for a child's development. Studies show that lack of sleep can compromise physical and mental health, in addition to interfering with growth and development[7,8]. On the other hand, in adolescence, changes in mood, inadequate quantity and quality of sleep, as well as irregular sleep patterns, are associated with daytime sleepiness, negative mood, increased chances of using stimulants, higher levels of risky behaviors and worsening in school performance[9].

Due to the quarantine imposed by COVID-19 and, with the closing of schools, there was a sudden change in the routine of adults, children and adolescents, an aspect that could contribute to the appearance of sleep disorders during this period. The study is a narrative review, which, from this perspective, aims to investigate how the COVID-19 quarantine could affect the sleep of children and adolescents.

Sleep Disorders and the COVID-19 Quarantine

Sleep disorders are frequent complaints in the medical office. Most of them can occur in both adults and children, what differs are their forms of presentation. Colic and sudden infant death syndrome (SIDS) are considered sleep disorders unique to children[10]. In general, the sleep disorders considered more common in children are parasomnias, nocturnal enuresis and behavioral insomnia[10,11]. These events can often be harmful to patients and their families, causing changes to the sleep-wake cycle and to the family's routines[11].

The emergence of sleep disorders in response to major stressful events, including natural disasters (such as fires, earthquakes, floods) or in times of war, are already widespread in the literature[4]. Although these events are generally localized, what makes them different from the coronavirus pandemic is that they have a worldwide reach. For people, this prolonged period of confinement and social distancing can generate stress, anxiety and significant concerns about health and insecurities regarding employment and financial security[4,12]. It is likely that such an important stressful event in life will impair sleep and circadian rhythms, at a time when healthy sleep is particularly important to adaptively deal with this crisis and uncertainty about the future[7,12].

Regarding the impact of the COVID-19 quarantine on sleep and psychological symptoms, a study carried out in China, in a large sample of adults, showed the acute impact of the pandemic on sleep and psychological symptoms[13]. The main findings of the study, as expected, revealed very high rates of clinically significant insomnia, acute stress, anxiety and depression. Respondents were classified into four groups according to their level of exposure and hazard by the COVID-19 infection. Insomnia and psychological symptoms were more severe among participants at the epicenter - Hubei province - and among those who suffered a greater degree of hazard, that is, health professionals working on the front lines.

The emergence of sleep disorders, such as comorbid psychiatric disorders, in response to stressful life events, has been reported in adults, children and adolescents[14]. The prolonged measures of confinement and social isolation during COVID-19 bring about new dimensions to this crisis, which may explain the increased incidence of sleep problems. There are records of decreased physical and mental well-being, resulting from the exceptional situation resulting from the pandemic and which could be associated with decreased sleep quality and duration[14].

Furthermore, quarantine, with the lockdown method, produced changes to the daily routines of the world population. The abrupt change in work regimes, during quarantine, for adults or at school, for children and adolescents, disturbs the daily habits, which normally serve as regulators of sleep-wake rhythms. Simple daily tasks, usually performed at fixed times, such as waking up in the morning, going to work, eating meals, and maintaining social and leisure activities, were all interrupted or modified by the pandemic.

About frontline professionals, a study in Wuhan, China found that one-third of the medical staff experienced symptoms of insomnia during the initial outbreak of COVID-19[15]. It is important to emphasize that sleep restriction or deprivation is repeatedly associated with negative health consequences, in relation to mental well-being and performance, in all aspects of life cycles (childhood, adolescence, adulthood and old age)[16].

The sleep of children and adolescents during the quarantine

During the pandemic, primary and secondary schools and universities were closed to prevent further spread of the new coronavirus[4]. Studies have shown that children are less susceptible to contagion and worsening of COVID-19; this could be related to the fact that children do not attend the same spaces as adults, such as, for example, the fish market in Wuhan, the epicenter of the pandemic, having perhaps less exposure, or a more efficient immune response[12,17]. Even with this evidence, authorities decided to include schools among the services to be closed during the quarantine, considering that children could be a vector of contagion for their families and classmates.

With the abrupt change of routine, schools had to adapt to the virtual classroom model, a great challenge for those who were used to the traditional classroom model. As a result, some schools have adopted the method of recorded lessons in which children can watch the same lesson repeatedly, as well as watch them at different times. These flexible hours, that is, the non-establishment of a daily study routine could cause, in the long term, sleep disorders in children and adolescents[18].

Lack of a school routine

In order to maintain a good sleep routine, it is necessary to have correct times for sleeping and waking up. The school routine contributes to a sleep routine, as it forces children and adolescents to always wake up at the same time and encourages them to sleep earlier. However, the current scenario, facing the COVID-19 pandemic, has completely changed this school routine, with children studying at home, through the internet and, often, with a more flexible study schedule[18,19].

With the lack of a school routine there is a break in the structure of the days and weeks of these children and adolescents. Thus, there is no distinction between the hours for activities, and concurrently, there are no changes from working days to weekends, the days and weeks are unstructured. The tendency, when staying at home for a long time, without school hours, is for children and adolescents to sleep and wake up late[18,20].

Furthermore, the school also keeps students active during the day, both mentally and physically. Being active during the day allows children and teenagers to be more relaxed and calm at night, contributing to a better night's sleep. When staying at home and having movement restrictions, both in the school environment and outside, with a reduction in trips to parks and squares, there is a tendency to increase passive activities, watching or observing, without the significant expenditure of physical and intellectual energy[19,21].

Another aspect to be noted is that, during the quarantine period, the number of reports on domestic violence increased. In this case, families exposed to domestic violence would also have increased levels of stress, in addition to the lack of school routine forcing children to stay with their families full time, being more exposed to abuse, fights and tensions between and with caregivers. It has been shown that exposure to violence can cause anxiety and depression disorders, which negatively contribute to sleep quality[22].

Increased use of electronic devices

With remote learning - a strategy that schools have established to deal with this pandemic moment[18] - children are studying at home through tablets and computers; thus, there is an effective increase in screen time[21]. It is well established in the literature that the use of electronic devices before bedtime delays the circadian rhythm[19].

Another reason that also explains the increase in the use of electronics are the social networks. These end up being more used by teenagers, who are unable to have personal contact with their friends and other social groups to which they belong, it is noteworthy that at this stage of their lives they have a high need for interpersonal contact. Therefore, with the increase in the use of electronics and the lack of physical activities and personal contact with friends, consequently, there is longer screen time and the use of social networks, which can affect bedtime, sleep quality and regularity of sleep patterns[23].

The use of electronics before bed negatively affects sleep, as it stimulates and alters physiological processes. Furthermore, the use of electronic devices suppresses the release of melatonin, which is a sleep-inducing hormone[19]. As a result, adolescents who make heavy use of social media before bedtime have poorer sleep quality, as well as higher levels of anxiety or depression.[22,23]

The Importance of a Sleep Routine

A good quality sleep of appropriate duration is essential for the physical and mental health of individuals. When sleep is impaired, there can be cognitive and behavioral problems, as well as impairments in memory and attention. Furthermore, in children, lack of sleep can compromise development and growth[24] and cause a greater risk of obesity and overweight[25]. Thus, it is appropriate to organize and establish a sleep hygiene for children and adolescents[26].

To facilitate the occurrence of adequate sleep, there are several recommendations; some for the general population, others for each age group. At all ages, it is essential to have a sleep routine, with regular times to sleep and wake up, with relaxing pre-sleep routines[11,25]. It is also important that you

sleep in a quiet, dark, ventilated environment with a pleasant temperature. Other than that, before going to sleep, the proper use of electronic equipment that produce light should be restricted, such as: televisions, tablets and cell phones[22], with the recommendation to avoid using a screen one hour before bedtime[21]. Physical activities should be prescribed, as they have benefits for sleep, in addition to their positive impact on health in general, however, although important, they should not be performed close to bedtime[22].

Furthermore, it is predictable that, with the COVID-19 pandemic scenario, a potential emergence or worsening of sleep problems during and after the pandemic is high. Adolescents with preexisting mental disorders and neurodevelopmental conditions may be more vulnerable to sleep disorders during this period[23].

Therefore, sleep is essential for the health of children and adolescents; in this perspective, the National Sleep Foundation[25], in 2015, brought together a group of experts from different areas of sleep, such as anatomy, pediatrics, neurology, gerontology, among others, and updated the recommendations for appropriate sleep durations for different age groups, as shown in table 1:

Finally, it is always important to be aware, in adults or children, if they have problems sleeping that are persistent and affect routine or behavior; in these situations, the help of a pediatrician should be indicated.

What about Resident Doctors?

During the pandemic, resident physicians and other healthcare professionals have been physically and psychologically affected by the new social demand for isolation, as well as hospital care, especially those who remained in the front line, in the fight against COVID-19[15,27-29]. Thus, front-line professionals have a higher prevalence of risk for anxiety, insomnia and general psychological problems[28]. It is essential to develop actions to minimize the impacts of the COVID-19 pandemic and prevent these professionals from falling ill[27].

CONCLUSIONS

With the available data, it is possible to conclude that the quarantine by COVID-19 led to a sudden change in the daily lives of children and adolescents, arising from the lack of in-person classes and the increased use of electronic devices. Therefore, the importance of the pediatrician's role in guiding parents is highlighted, regarding the establishment of a routine of daytime and nighttime activities, as this will have repercussions on the quality of sleep.

Table 1. Appropriate sleep duration for different age groups.

Age	Recommended	Acceptable	Not recommended
0 to 3 months	14h to 17h	11h to 13h 18h to 19h	Less than 11h More than 19h
4 to 11 months	12h to 15h	10h to 11h 16h to 18h	Less than 10h More than 18h
1 to 2 years	11h to 14h	9h to 10h 15h to 16h	Less than 9h More than 16h
3 to 5 years	10h to 13h	8h to 9h 14h	Less than 8h More than 14h
6 to 13 years	9h to 11h	7h to 8h 12h	Less than 7h More than 12h
14 to 17 years	8h to 10h	7h 11h	Less than 7h More than 11h
18 to 25 years	7h to 9h	6h 10h	Less than 6h More than 10h
26 to 64 years	7h to 9h	6h 10h	Less than 6h More than 10h
More than 65 years	7h to 8h	5h to 6h 9h	Less than 5h More than 9h

Translated and adapted from Hirshkowitz M et al[25].

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