# REVIEW ARTICLES

## Adolescence in a pandemic: increased challenges?

### Adolescência em pandemia: desafios acrescidos?

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## ABSTRACT

**Background:** Adolescence is a period of significant biological, psychological and social changes. Characterized by constant emotional conflicts and cycles of disorganization-reorganization of the identity, it is a phase of enormous vulnerability to the circumstances of the surrounding environment that will influence the future of the emerging adult: identity development and certainty about oneself is closely related to better functioning in multiple domains. The COVID-19 pandemic and the social isolation adopted as a public health measure had a significant impact on the lives of adolescents: on routines, sleep, peer relationships, and school performance, adding challenges to the already complex quotidian.

**Objectives:** This review describes the pandemic's impact in adolescents' daily routines, sleep, screen use, academic life, physical activity, relationships, and behaviors assumed by adolescents in a family context.

**Methods:** The authors performed a literature narrative overview synthesizing the relevant findings from searches on Pubmed® and Google Scholar®

**Development/Conclusion:** Individual characteristics and family relationships are fundamental in the capability of adolescents to ~~deal~~ cope with the adversity imposed by the COVID-19 pandemic. The impact of restrictive measures in this population should be taken into account by political and public health authorities when instituting preventive measures of confinement and lockdown to mitigate social isolation and allow developing adaptive strategies during adolescence

**Keywords:** adolescente; covid-19; pandemics

## RESUMO

**Introdução:** A adolescência é um período de significativas mudanças biológicas, psicológicas e sociais. Pautada por constantes conflitos emocionais e ciclos de desorganização-reorganização da identidade, é uma fase de enorme vulnerabilidade às circunstâncias do meio envolvente, suscetível de condicionar o futuro do indivíduo. A pandemia de COVID-19 e a instituição do isolamento social enquanto medida de saúde pública tiveram grande impacto na vida dos adolescentes: nas rotinas, no sono, no relacionamento com os pares e no desempenho escolar, acrescentando desafios ao já complexo quotidiano.

**Objetivos:** O objetivo deste estudo é descrever o impacto da pandemia nas rotinas diárias, sono, uso de ecrãs, vida académica, atividade física, relações interpessoais e comportamentos assumidos pelo adolescente em contexto familiar.

**Métodos:** Os autores realizaram uma revisão narrativa da literatura sintetizando os achados relevantes de buscas no Pubmed® e no

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**Desenvolvimento/Conclusão:** As características individuais e as relações familiares são fundamentais na capacidade dos adolescentes de lidarem com as adversidades impostas pela pandemia do COVID-19. A análise do impacto das medidas restritivas permite que as autoridades políticas e de saúde pública as instituam mitigando o isolamento social ou desenvolvendo estratégias adaptativas para a população dessa faixa etária.

**Palavras-Chave:** adolescência; covid-19; pandemia

## BACKGROUND

In December 2019, in Wuhan (China), a new coronavirus (CoV) was found. It was responsible for a severe acute respiratory syndrome (SARS) later called - COVID-19 (coronavirus disease 2019). Initially restricted to that Asian country, on March 11, 2020, it was declared a pandemic by the World Health Organization (WHO).[1]

One of the primary measures of public health suggested by the WHO was social distancing that, in the first wave of the pandemic, went through the closure of schools, the conversion of in-person work into online work, and the closure of non-essential services, confining thousands of families to their homes.[1,2]

Adolescence is a critical period for the biopsychosocial-emotional development of the human being. During adolescence, the brain remains in formation, being able to change structurally and functionally when under intense and prolonged stimuli, conditioning the acquisition of emotional, social, cognitive, and behavioral skills. The neuronal plasticity of this age group allows them to adapt to different contexts. Adaptive capacity results from the interaction of external adversities with subsequent physiological changes and the individual's genetic predisposition.[3,4] However, adaptation is not necessarily a process of symbiotic adjustment of the individual to the situation in which he finds himself. Adaptive mechanisms can lead to emotional, behavioral, and social maladjustment, which will be more significant the more stressful are the stimulus triggers.[3] Shonkoff *et al*, and Garner *et al* advocate the existence of three types of stress:[5,6]

*1.positive stress*: of short duration and moderate intensity; when contextualized in a network of adults of stable reference;

2.*tolerable stress*: such as losses by death, parental divorce, or catastrophe (natural or social). A positive relationship with the support network, with particular emphasis on parents, allows to limit the physiological response and prevents the maladaptation of brain function;

3- *toxic stress*: a stress of high intensity and longer duration, which, in the absence of a stable and cohesive relationship with reference adults, will result in stress-dependent pathology (psychological and systemic). This type of stress can disrupt brain circuits and critical regulatory systems shaping life even decades later, according to the Committee on Psychosocial Aspects of Child and Family Health of the American Academy of Pediatrics in 2012.[6]

In this line of reasoning, it is expected that the COVID-19 pandemic and the measures implemented had a non-negligible impact on the adolescent's well-being.[4]

The COVID-19 pandemic has led to a series of public health measures involving sudden and intense changes in everyone's lives. [4] The duration of confinement, especially longer than ten days, is understandably an important factor promoting post-traumatic stress symptoms. Fear of contracting the disease (self or close relatives), boredom, fear of scarcity, and the economic impact and stigma that come from confinement can have an effect for months or years.[7]

## OBJECTIVES

This brief non-systematized narrative review aims to describe the impact of the pandemic on critical sectors in the lives of adolescents, such as daily routines, sleep, screen use, academic life, physical activity, relationships, and violent behavior within the family.

## METHODS

Bibliographic search was carried out in the databases: Pubmed® and Google Scholar®, using the following MESH terms: 'adolescents', 'teenager'and 'COVID19'. The authors added specific research based on the first articles: 'daily living', 'sleep', 'screen time', 'academic life', 'school', 'physical activity, 'exercise', 'social interaction' and 'domestic violence'. Some articles were extracted from others articles's references.

The inclusion of articles attended on the following criteria: publication date between 2019 and 2022, Portuguese and English language, and age group - adolescents. Two reviewers analyzed all abstracts, assessing whether they were part of the inclusion criteria predefined above.

## RESULTS

The primary studies included are summarized in **Table 1**.

**Table 1 -** Summary of primary studies analyzed in the execution of this narrative literature review

| Authors | Year | Title | Objectives | Participants | Métodos | Results |
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| Rocha MFA *et al.*[8] | 2021 | O impacto da pandemia do covid-19 na saúde infanto-juvenil: um estudo transversal. | Analyze the impact of covid19 on children's health | 200 (32.5% adolescents) | Google Forms® survey through social media | Regarding the practice of physical activity, 63% of the responsibles reported that their children practiced exercises before the pandemic, however, of these, only 27.7% continued to practice any activity during this period. |
| Ren H *et al.*[9] | 2020 | The Protective Roles of Exercise and Maintenance of Daily Living Routines for Chinese Adolescents During the COVID-19 Quarantine Period | Identify protective factors that may buffer the association between the presence of COVI-19 cases in adolescents' communities and their postquarantine depressive symptoms | 1487 | Online survey applied to Zhengzhou city (China) public schools | Adolescents with low ($p < .001$) and mean ($p < .001$) levels of daily living routines during the quarantine reported more depressive symptoms if there had been COVID-19 cases in their communities. Adolescents who reported high levels of daily living routine did not report more depressive symptoms associated with community infection ($p = .06$). |
| Ramos Socarras *et al.*[10] | 2020 | COVID-19 and sleep patterns in adolescents and young adults | Investigate the impact of the COVID-19 pandemic related lockdown on sleep patterns and sleep quality in adolescents and young adults. | 498 | Online survey applied through email and social media | During the pandemic, participants ($p < 0.001$) went to bed later during the pandemic.<br>Adolescents aged 12–14 years old woke up later both on weekdays and weekends ($p < 0.001$) during the pandemic. On the other hand, changes in wake times were only noted during weekdays for the 15–17 and the 18–21 years old ($p < 0.001$).<br>An improved sleep quality during the pandemic was only significant in the 12–14 years old ($p = 0.01$) and the 15–17 years old ($p < 0.001$).<br>No significant changes in subjective sleep quality were reported in the 18–21year olds ($p = 0.022$).<br>During the pandemic, there was an improvement in daytime sleepiness in the 12–14 years old ($p = 0.002$), and the 15–17 years old ($p = 0.001$). No significant increase in sleep onset latency during the pandemic in the 12–14 years old ($p = 0.781$), the 15–17 years old ($p = 0.038$) and the 18–21 years old ($p = 0.008$). |

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| Albrecht *et al*.[11] | 2022 | Association Between Homeschooling and Adolescent Sleep Duration and Health During COVID-19 Pandemic High School Closures. | Investigate associations between adolescents' sleep and health-related characteristic during COVID-19 pandemic school closures | 8972 | Online survey applied to Zurich (Switzerland) public schools | On scheduled days: the lockdown sample slept significantly longer than the control sample and woke up 90 minutes later than the control sample (both p < .001). Bedtimes for the lockdown sample were 15 minutes later than for the control sample, leading to an increase in sleep period of 75 minutes during the lockdown (p < .001). On free days, sleep behavior of the 2 samples was comparable. |
| Schmidt *et al*.[14] | 2020 | Physical activity and screen time of children and adolescents before and during the COVID-19 lockdown in Germany: a natural experiment | Investigate how sports activity, physical activity besides sports and recreational screen time in children and adolescents in Germany changed during the COVID-19 lockdown | 1711 | Data German Motorik-Modul (MoMo) cohort study | The study from Spain found an increase in ST 198 (13–16-year-olds) minutes per day during COVID-19 confinement. The Chinese study shows an increase in daily recreational ST among 6- to 7-year-olds of 64.3 min and an increase in daily total ST to 334.3 min. |
| Xiang *et al*.[15] | 2020 | Impact of COVID-19 pandemic on children and adolescents' lifestyle behavior larger than expected. | To investigate the status of physical activity and sedentary behavior during pandemic among children and adolescents | 2427 | Longitudinal school-based survey study from five schools in Shanghai (China) | The median time spent in physical activity drastically, from 540 min/week (before the pandemic) to 105 min/ week (during the pandemic), yielding 435 min reduction on average (p < .001). Of note, during the pandemic, prevalence of physically inactive students extensively increased 65.6%. |
| Langmeyer, A *et al*.[16] | 2020 | Childhood in Times of Corona. First Results on the Changed Everyday Life and the Well-Being of Children | To analyze children' daily lives during the first wave of the corona pandemic and the associated initial and contact restrictions | 12627 | Online survey applied through social media (Germany) | Three-quarters of teens used television, streaming services or YouTube more often. Two-thirds played more games on their computer, tablet or smartphone (68%). More than half of preschool-age children spent more time playing computer games (53%), a good third (36%) were more concerned about the Internet. |

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| Maiya S. *et al.*[17] | 2021 | Longitudinal Changes in Adolescents' School Bonding During the COVID-19 Pandemic: Individual, Parenting, and Family Correlates. | Investigate whether adolescents' school bonding changed from before to during the COVID-19 pandemic, and whether individual, parenting, and family-level correlates were associated with longitudinal changes in school bonding | 2046 (2 adolescents and 1 parent from 682 families) | Data collected as a part of the ongoing longitudinal study "Parent, Adolescent, and Sibling Study" | There were negative associations with adolescents' stress ($p < .001$) and pandemic-related financial need ($p < .001$). In contrast, there were positive associations with adolescents' coping ($p < .001$) and parental involvement ($p < .001$). There also were significant positive associations with parent education ($p < .001$) and household income ($p < .001$). The change in school bonding was not significantly associated with parents' essential worker status or adolescents' age. |
| Guthold R. *et al.*[20] | 2019 | Global trends in insufficient physical activity among adolescents: A pooled analysis of 298 population-based surveys with 1·6 million participants | To estimate the prevalence of insufficient physical activity in school-going adolescents for individual countries, for four World Bank income groups, nine regions, and globally for the years 2001–16 | 1.6 million | Cross-sectional school-based surveys from from 146 countries | Globally, in 2016, 81·0% (95% uncertainty interval 77·8–87·7) of students aged 11–17 years were insufficiently physically active (77·6% of boys and 84·7% of girls). |
| Zhou *et al.*[23] | 2022 | Changes in Physical Fitness during COVID-19 Pandemic Lockdown among Adolescents: A Longitudinal Study | To explore the characteristics of changes in physical fitness indicators and the relationship between its' variations before and after the COVID-19 pandemic lockdown in adolescents | 308 | Longitudinal study at a junior high school in Fujian (China) | In girls: only body height and weight increased significantly after the lockdown (p <0.001). The performance of the 50-m sprint and the 800-m run decreased significantly (p <0.001) after the lockdown. In boys: body height and weight, and body mass index all increased significantly after the lockdown (p <0.001). The performance of vital capacity, sit and reach, and pull-ups in follow-up of boys were significantly better than that at baseline (p <0.001). While the performance of the 50-m sprint and the 1000-m run declined significantly (p <0.001) after the lockdown in boys. |

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| Campione-Barr *et al.*[24] | 2021 | Adolescent Adjustment During COVID-19: The Role of Close Relationships and COVID-19-related Stress | To examine the associations between adolescents' perceptions of positive and negative relationship qualities across four important close relationship partners on adolescent adjustment during the pandemic (controlling for pre-pandemic adjustment), and to examine the moderating role of COVID-related stress on this association | 170 (originally part of two larger studies of adolescents Campione-Barr et al., 2019 and Rote et al., 2021) | Online surveys via Qualtrics® platform | Positivity relationships with mothers was associated with lower depressive symptoms during COVID-19. Positive relationships with best friends and siblings were significantly associated with greater problem behavior when COVID-19-related stress was relatively high (>0.2 SD for best friends, >1.3 SD for siblings. |
| Rogers *et al.*[25] | 2020 | Adolescents' Perceived Socio-Emotional Impact of COVID-19 and Implications for Mental Health: Results From a U.S.-Based Mixed-Methods Study | Evaluate adolescents' perceptions of how their social and emotional lives had changed during COVID-19; and associations between these perceived changes and their mental health | 407 | Project AHEAD: Longitudinal study survey-based before (October 2019) and during (April 2020) the COVID-19 pandemic (USA) | Adolescents who had conflicts in friend's support during COVID-19 reported higher depressive symptoms ($p < .05$). Adolescents who had decrease in time with friends during COVID-19 reported higher levels of loneliness ($p < .001$). They spent more time with their families and reported a slight decrease in family conflict ($p < 0.01$). |
| Daniunaite *et al.*[26] | 2021 | Adolescents amid the COVID-19 pandemic: a prospective study of psychological functioning. | To identify potential changes in adolescent psychosocial functioning from pre-pandemic to peri-pandemic assessment, and to identify specific patterns of change | 331 | Longitudinal study Stress and Resilience in Adolescence (STAR-A) survey-based in seven general schools from different regions across Lithuania | Almost one in ten adolescents (9.7%) reported a large increase in prosocial behavior ($p = 0.014$) and a large decrease in problems between peer ($p < 0.001$). |

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| Ribeiro *et al.*[30] | 2022 | The Different Contexts of Domestic Violence Before and During the COVID-19 Pandemic: A Portuguese Overview, Victims & Offenders | To compare the prevalence of domestic violence contexts between a pandemic and a non-pandemic year | 12576 | Data collection from a digital platform - a Service Management Platform - maintained by the Portuguese Association for Victim Support (APAV) | The requests for help from children/adolescents (2019: 43.8%; 2020: 56.3%). In general, the children and adolescents were living with their parents at the time of the request for help (2019: 91.5%; 2020: 93.3%). Most requests for help revealed that the persons accused of aggression were the victims' parents (2019:82.6%; 2020: 81.7%). An increase of 57.3% of psychological and physical violence was registered in 2020 (n = 236) comparing to 2019 (n = 150). |
| Royo Isach *et al.*[31] | 2021 | Parental perceptions of increased child-to-parent violence of Spanish adolescents during covid-19 lockdown | To assess the prevalence of different violent behavior in teenagers against parents in pre, during and after lockdown period, and to value differences in the conduct between pre and during lockdown and between pre and post lockdown. | 1927 | Online surveys (Spain) | Bad responses: 30,1% (pre) 58,3% (peri) 53,3% (post-lockdown);<br>Insults: 3,8%(pre), 11.9% (peri), 9.7% (post-lockdown), both comparison between pre/during lockdown and pre/post lockdown (p <0,001).<br>Physical violence: 0,6% (pre), 0.9% (peri), 0.5% (post-lockdown), comparison between pre/during lockdown p = 0.134 and pre/post lockdown (p = 1,00).<br>Violent behavior from adolescents: those with no occupation comparison between pre/during lockdown p <0,001 and pre/post lockdown p = 0,007; those who work comparison between pre/during lockdown p = 1.00 and pre/post lockdown p = 1,00. |

## DEVELOPMENT

During the period of quarantine, many areas of the adolescent's life have changed, as described below.

### *Daily Routines and Sleep*

The closure of non-essential services made family schedules more flexible, especially meal times, time to wake up and fall asleep. Social and physical distancing measures have also disrupted many regular aspects of life, like extracurricular activities, including sport and physical activity.[8] Ren H *et al*. in 2020, performed a survey to 1487 adolescents from public schools to assess their daily routines.[9] They found that those who maintained their routine habits presented fewer depressive symptoms than adolescents who kept a less established routine. Thus, the authors concluded that daily routine maintenance protected adolescents from feelings of insecurity, frustration, and hopelessness.[9]

Regarding sleep, Ramos Socarras *et al*, in 2020, conducted an online survey among Canadian adolescents and young adults.[10] The results showed that during weekdays, adolescents delayed bedtime and waking up, increasing overall sleep time ($p < 0.001$). Adolescents reported an improvement not only in daytime sleepiness ($p = 0.001$) but also on sleep quality ($p = 0.001$).[10] Similar findings were described among high school students in Zurich (Switzerland) by Albrecht *et al*.[11] Both study groups agree that school closures allowed students to adjust their sleep schedule to the adolescent's characteristic late sleep phase minimizing in some way the negative impacts of the pandemic.[10,11]

Despite the improvement in several aspects of sleep, many adolescents complained of difficulty falling asleep (compared to the pre-pandemic period), with onset latencies around 40 minutes (p 0.08-0.781).[10] This fact may be explained by changes in sunlight exposure, physical inactivity, and sleep hygiene.[10-12]

### *Screens*

COVID-19 is the first pandemic of the digital age.[13] With the lockdown imposed, many daily life activities – school and extracurricular activities – were carried out through the computer and smartphones screens. Even socialization with peers, so relevant for the development of adolescents, migrated to the internet, attempting to restore some normality.[3,13] Schmidt *et al*. showed an increase in screen time between 198 and 334,3 minutes per day (CI 95%) during the lockdown.[14] Xiang *et al*. refers to an increase of the total screen time of 30 hours per week, in average ($p < 0.001$), during the pandemic.[15]

The most significant increase in screen time occurred among teenagers (72%) (*versus* a 38% increase in preschoolers), with recreational use of the internet and gaming being expressive among this last population.[16]

Digital media allow adolescents to constantly connect with their peers. This fact often leads to detailed exhibition of the teenager and self-attenuating of the boundary between the public and the private. Excessive exposure, when prolonged in time, increases vulnerability to digital violence.[13] Access to the digital world without parental control has also led to the massive consumption of (reliable or fake) information about the pandemic, causing anxiety and eventually depression. This effect is more expressive when the adolescent has a previous mental health condition.[13]

In vulnerable adolescents, excessive internet use can also trigger addictive behaviors such as cybersex and net gaming addiction and expose adolescents to cybercrime, promiscuity, and sexual abuse.[4,13]

However, when used in moderation and closely supervised, digital platforms can mitigate feelings of loneliness.[4,13]

### *Academic Life*

School is a significant part of a teenager's life. In an academic context, cognition matures, and personal and social identities develop.[3] With the advent of COVID-19, classes, began to take place, initially in an online regime and later in a hybrid regime (conditioned by the evolution of the pandemic).

Maiya S. *et al* performed a longitudinal study where they intended to evaluate the school bond before and during the pandemic.[17] They found that, despite the normative decrease in the school bond, typical of this population, specific factors of the pandemic may also have aggravated this unbonding. The closure of schools can function as an anxiety trigger and a negative coping factor. Additionally, perceived stress can negatively interfere with involvement in school tasks ($p < 0.001$). Adolescents with more coping resources were more successful in school bonding ($p < 0.001$). Parental involvement also served as a factor that favored the greater academic involvement of the adolescent ($p < 0.001$).[17]

Favorable family economic status and higher parental education were also associated with greater school bonding ($p < 0.001$): better access to academic, audio-visual, and internet resources, parental confidence in technology. On the other hand, the challenges of a low economic status and parents' goal of maintenance of income were predictors of less participation in the schooling process.[11,17]

Thus, there may be an increase in learning asymmetry in favor of children from higher-income families versus children from lower-income families.[4]

School closure also limited the offer of other services: food - free or at a reduced cost on which many children and young people depend; social protection – teleworking parents who supervise less adequately their children, which promotes risky behavior and the consumption of illicit substances, and the under-identification of cases of domestic violence and abuse; and the decrease in structured (through physical

education classes) and unstructured (in breaks) physical activity.[4,18]

***Physical Activity***

In December 2020, WHO updated its 2010 guidelines for physical activity. For the age group between 5 and 17 years, it is recommended an average of 60 minutes per day of physical activity, predominantly aerobic, moderate to vigorous intensity. Recommendations include vigorous aerobic exercise and muscle-strengthening at least three days a week.[19]

Even before pandemic, there has been strong evidence of the decline in the practice of physical activity among adolescents (80% of 1.6 million adolescents aged 11 to 17 years old), in several countries. [20] This decline was accentuated during the confinement: due to school closure, suspension of activities and sports facilities, and the absence of routines that provided a healthy and active lifestyle.[21,22] Xiang *et al*., 2020, conducted a longitudinal study among children and adolescents between 6 and 17 years (N = 2427) in Shanghai (China). They found that the pandemic was responsible for reducing physical activity by an average of 435min/week (from 540min/week before the pandemic to 105min/week during the pandemic, $p < 0.001$). They also describe that the prevalence of physically inactive students increased from 21,3% to 65,6% ($p < 0.001$).[15]

The role of parental education was different according to the context: in Europe, higher parental education increased physical activity practice, while in South America, greater parental academic differentiation impaired children's physical activity. Cultural differences and the availability of spare time may explain these findings. However, more studies are needed, in different cultural contexts, to characterize and validate this phenomenon.[22]

The socioeconomic level also proved to be preponderant in sports practice: adolescents from higher socioeconomic strata were more physically active.[22]

Surprisingly, Zhou *et al* in their longitudinal study (N= 308), have shown that not all physical indicators were negatively affected.[23] They found that vital capacity and flexibility were significantly higher when compared to pre-pandemic time ($p < 0.001$). On the contrary, adolescents' aerobics capacity and explosive strength decreased significantly after confinement. They suggest that only exercises like stretching, and resistance explain can be performed at home (but no physiological explanation is advanced).[23]

***Relationships***

Adolescence is the stage of life in which individual moves towards independence, decreasing time spent with the family and increasing the time spent with their peers.[3] This complex phase gains additional stress during the period of COVID-19, when the limitation of social contact confines the teenager to their household.

Campione-Barr *et al* performed a longitudinal study (n=170) in Missouri and Florida, aiming to observe the relationship of adolescents with their parents, siblings, and best friends in the pandemic context.[24] They concluded that relationships between parents and adolescents follow the expected direction regarding adaptation - that is, positive relationships allow good adaptation, and negative relationships condition a precarious adaptation.[24] Rogers *et al* refers to an increased family connection and a decrease in conflicts, in most of the cases ($p < 0.01$).[25] However, a significant minority reported increased conflicted behavior and decreased support between members of the same household.[25]

They also found that a good relationship with the mother figure was protective against depressive symptoms ($p < 0.001$), and the same type of relationship with the father figure was protective against problematic behavior ($p < 0.001$). On the other hand, a negative parental relationship was associated with an increase of problematic behavior, but only a problematic relationship with the mother seemed to condition the greater expression of depression symptoms ($p < 0.001$). Concerning relationships with siblings and best friends, the authors attest that this kind of relations were more vulnerable to the stress imposed by COVID-19. The authors believe that these findings may be explained by amount of time siblings were imposed to spend together and, as far as best friend´s bonds are concerned, by the switch from presential to exclusive online communication.[24] It was also found that adolescents, despite interacting electronically with their friends, noticed a lack of emotional bonding and support ($p < 0.01$).

In pre-pandemic time, about 10% of adolescents (Daniunaite *et al*) reported a high level of peer conflict – namely, school bullying. [25] During isolation, it was observed a significant decrease in peer conflict and an increment of prosocial behavior ($p < 0.001$). This finding revealed that social distancing was positive for the reduction of stress in this kind of social relations.[26]

***Family Violence***

Family violence is defined by the existence of abusive or violent behavior among members of the same household (parents, parents and children, and siblings).[26] Studies from around the world observe generalized rising of reports of domestic violence.[27] Health, economic and social costs related to mandatory confinement accounted for increased reports of neglect, child abuse, and domestic violence during the first year of pandemic lockdown.[4,28]

There is a minimal insight into how the pandemic has influenced teens' exposition to domestic violence. Most studies on the subject are geographically limited or do not detail the characteristics of the violence experienced.[29]

Violence against children and adolescents in the context of domestic violence in Portugal was explained by Ribeiro *et al* using data from the Portuguese Association for Victim Support (APAV).[30] In 2020

(compared to the previous year), APAV showed a 28,6% increase in contacts targeting the pediatric population. Requests for help during confinement arrived predominantly by telephone (81,9%) and online (14%). When scrutinizing the characteristics of domestic violence, it was found that most of the aggressors were the parents or the stepparents of the victim. The perpetrated aggression was exclusively psychological in 39,2% of the reports, both physical and psychological in 45,1%, exclusively physical in 9,8% of the cases and combined (such as physical, psychological and sexual types together) in 5,9% of the cases.[30]

Royo Isach *et al* performed a retrospective study through online surveys (N= 1927 Spanish adolescents) where they evaluated the parental perception of violence (verbal or physical), from adolescents towards the parental figure.[31] The violent behavior was evaluated regarding the pre, peri, and post-confinement periods. The authors noted a significant increase in verbal violence during confinement, which remained high in the month following the end of this public health measure ($p < 0.001$). Comparison of physical violence against parents pre and during confinement ($p = 0.134$) and between pre/post lockdown ($p = 1,000$) had no statistical significance. Adolescents with no academic occupation or work were the ones with the higher levels of violence. On the contrary, adolescents' workers had a low prevalence of violent behavior ($p < 0.001$). They also mention male gender and low family socioeconomic status as risk factors for psychopathology and violent behavior. Likewise, they point out the high prevalence of minor violent behavior as possible indicator of emotional malaise in intra-family relationships, boosted by pandemic stress. However, they highlight the little information available on the aggressions to quantify the pre- and post-confinement differences.[31]

## CONCLUSIONS

Adolescence is, by definition, a period of complex human development, to which the COVID-19 pandemic poses increased challenges.

This study has many limitations: (1) the selection bias and the non-reproducibility of the results - both caused by the non-systematization of the bibliographic research; (2) few studies were considered; (3) studies were performed in diverse populations; and (4) the evaluation bias by the authors' subjective qualitative analysis. However, synthesizing results regarding the impact of the pandemic on socially critical sectors in the life of adolescents constitutes a strength of this review.

Overall, this review suggested that: regarding daily care, it was found that a well-established daily routine triggered fewer feelings of depression, anxiety and insecurity. The confinement also allowed a total increase in sleep time, with a better adjustment to the sleep phases of this age group. However, the difficulty in falling asleep increased, probably due to changes in the circadian rhythm, less exposure to natural light and decreased physical activity.

Excessive screen time has become a major problem, with more exposure to social media and an increase in addictive behaviors. There was also an increase in the discrepancy in learning, privileging children from higher-income families versus children from lower-income families.

Adolescents' aerobics capacity decreased significantly after confinement although stretching and resistance exercises have improved probably because they could be performed at home. In terms of violent behavior there was an increase in complaints, with psychological violence being the most prevalent, compared to physical violence.

In our research, the importance of individual characteristics and family relationships becomes evident in the adolescent's ability to deal with the adversity imposed by this context.

The analysis of the impact of restrictive measures on the daily life of adolescents allows political and public health authorities to institute them more appropriately and to plan strategies to mitigate social isolation and interventions for the development of adaptive strategies in this population.

## AUTHORSHIP

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Received for publication: 04.08.2022
Accepted in revised form: 19.09.2022