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## The impact of the COVID-19 pandemic and school closures on children and young people: A scoping review

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### Abstract

*The COVID-19 pandemic has resulted in widespread school closures and social distancing measures in several countries. This scoping review examines the impact of the COVID-19 pandemic and school closures on various aspects of children's lives, including physical activity, nutrition, screen time, and mental health. Various psychosocial databases were researched. The findings of this review highlight the adverse effects of school closures on children's physical activity levels, with a significant reduction in exercise reported. Additionally, there has been an increase in unhealthy eating habits and weight gain among children during the closures. Electronic devices and screen time have also seen a notable increase, raising concerns about the potential impact on children's well-being and physical health. This review emphasizes the adverse effects of school closures on children's mental health. Increased stress, anxiety, depression, and other psychological symptoms have been reported among children during the pandemic. Social isolation, disruption of daily routines, and the lack of social interaction with peers have contributed to these mental health challenges. The importance of providing psychological support to children and young people during school closures to mitigate the negative impact on their mental health was also highlighted throughout. Overall, this review underscores the multifaceted impact of the COVID-19 pandemic and school closures on children's physical and mental well-being. It highlights the need for interventions and strategies to promote physical activity, healthy nutrition, and mental health support for children during times of crisis.*

## 1. INTRODUCTION

The outbreak of coronavirus disease (COVID-19) has had a significant impact on the globe, with over 303 million reported cases and over 6.9 million reported deaths as of October 18, 2023 (World Health Organization, 2023). Most countries have enforced social distancing measures to reduce the spread of the infection. The most universally used methods included home isolation and school closures. In the United Kingdom, until November 9, 2023, the total number of cases has reached 24.7 million, while the deaths have risen to 230,947 (Our World in Data, 2023). In 2020, the United States implemented various measures, such as stay-at-home orders, social distancing, and mask requirements, at both population and individual levels to combat the spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus causing COVID-19. These measures significantly affected the daily routines of approximately 60 million children and adolescents enrolled in K-12 schools, mainly due to the closure of schools. (Mayra et al., 2023) The impact of the COVID-19 pandemic on schooling in the WHO European Region has been significant. During the 2020-2021 academic year, UNESCO's monitoring revealed that 44 out of 53 countries in the region closed their schools at the national level in April 2020, at the height of the pandemic.

School closures have seriously affected children and adolescents' education, development, and well-being. Apart from missing out on crucial social interactions that support their mental well-being, remote learning arrangements during school closures provided different educational outcomes than in-person schooling. This situation has further exacerbated social inequity, with socially disadvantaged children and those needing academic support falling behind within and between countries (World Health Organization, 2021).

Although many countries reopened their schools by the end of the summer 2020, rising infection rates in the autumn and winter months led to more stringent measures, including the closure of schools in some areas. However, research conducted in some Member States during the winter months of 2020 indicated that the incidence of SARS-CoV-2 among students was lower than in the general population. Furthermore, secondary infections within schools accounted for less than 1% of overall conditions (World Health Organization, 2021).

It is important to note that specific information on school closures in different countries within the WHO European Region beyond the mentioned time frame (2020-2021) would require accessing more recent data and reports from relevant authorities and organizations. In addition, by 20 March 2020, all schools in the UK had closed for all in-person teaching, except for children of key workers and children considered vulnerable. With children at home, teaching took place online. The emergence of a new variant of COVID-19 in December 2020 led to the cancellation of face-to-face teaching across England, Northern Ireland, Scotland, and Wales the following month (GOV.UK. Department for Education, 2021; UNESCO, 2020; World Health Organization, 2021).

According to UNESCO, education was affected in over 100 countries (UNESCO, 2020). A total of 831,021,742 primary and secondary students and 128,207,915 students stayed away from educational institutions. The United Nations Educational, Scientific, and Cultural Organization (2020) pointed out a potential inequality caused by the digital divide and distance learning practices. Similarly, school closures were thought to cause disruptions to the physical activity, social interaction, and mental health of children and young people (Wang et al., 2020).

Mental health problems have a significant impact on people's lives. It is well-documented that both chronic and acute mental health problems can negatively impact a person's health resulting in several psychological and physiological problems (Bibbey et al., 2013; Djuric et al., 2008; Tsoukalis-Haikalis et al., 2021). A recent systematic mapping review showed that higher in specific populations during the COVID-19 pandemic (Tsoukalis-Chaikalis et al., 2021). This supported a strong relationship between the COVID-19 pandemic, the inevitable protection measures, and threatening psychosocial problems. The most commonly reported problems were symptoms of loneliness, depression, anxiety, stress, post-traumatic stress disorder (PTSD) related issues, and insomnia (Tsoukalis-Chaikalis et al., 2021).

Restrictions on movement can have significant psychological effects. A systematic review of 24 studies examined the psychological impact of pandemic-related quarantine on hospital staff, parents, children, and the general population (Brooks et al., 2020). The authors found that people who had to quarantine were at higher risk

of developing symptoms and disorders of acute and post-traumatic stress. Similarly, the prevalence of general psychological symptoms, including emotional disorders, depression, stress, low mood, irritability, and insomnia caused by anxiety, were higher in this population (Brooks et al., 2020).

Serious concerns have been raised regarding the mental health of children and young people during the pandemic-related quarantine and school closures (Golberstein et al., 2020; Wang et al., 2020; Tsoukalis-Chaikalis et al., 2021). There is still an ongoing debate about whether the benefits of mandatory measures outweigh their psychological costs (Viner et al., 2020). According to COVID-19-related data from Chinese scholars (Xie et al., 2020; Tang & Ying, 2020) reported depressive symptoms. It is essential to understand the public's perspectives, beliefs, and understanding of the COVID-19 pandemic before we investigate how this impacts children's and young people's mental and physical health. Unsurprisingly, children and young people confined to their homes due to the school closures seemed to hold different perspectives and beliefs about the impact of home quarantine on people's mental health (Tang et al., 2021).

Considering the above concerns, the current review aims to synthesise and critically evaluate the literature on the psychological, physical health, and educational effects of school closures during the COVID-19 pandemic.

## 2. METHOD

### Research Questions:

1. What are the academic outcomes of children and young people affected by COVID-19-related school closures?
2. How has the mental health and well-being of children and young people been influenced by school closures during the pandemic?
3. What are the social and economic impacts on families and communities due to school closures and the pandemic's effect on children and young people?
4. Are there disparities in the impact of COVID-19 and school closures on children from different socioeconomic backgrounds?

### Inclusion and Exclusion Criteria:

#### Inclusion Criteria

- Studies published from January 2020 to the present.
  - Peer-reviewed quantitative and qualitative (or mixed-methods) studies written in English.
  - Studies conducted on children and young people (aged 3-18 years) worldwide.
- Research focused on the impact of the COVID-19 pandemic and school closures on education, mental health, social dynamics, and economic aspects.

#### Exclusion Criteria

- Studies not directly focusing on the impact of the COVID-19 pandemic on children and young people or recruited adult samples.
- Studies that do not involve primary empirical research (e.g., reviews) or were not subject to peer review (e.g., unpublished manuscripts or service evaluations, theses, book chapters, conference presentations, websites, or blogs).
- Not available in English or as a full-text.

#### Search and Selection

1. An extensive search was conducted in databases: PubMed, Scopus, PsycINFO, and Google Scholar using keywords like "COVID-19," "school closures," "children," "impact," "education," "mental health," and "social effects."
2. Initial screening of titles and abstracts was performed to exclude irrelevant studies, focusing on the research questions and inclusion criteria.
3. A full-text review was carried out for the remaining studies, ensuring alignment with the research objectives.

#### Data Extraction

- For each selected study, relevant data were extracted, including the publication date, study design, participant demographics, key findings related to the impact on education, mental health, social dynamics, and economic aspects, and any disparities observed.
- Information on the research methods, sample sizes, data collection, and statistical techniques used were documented.

- Any limitations and potential biases in the studies were also noted for a comprehensive analysis.

### 3. RESULTS AND DISCUSSION

#### 3.1 School closure, physical activity, and nutrition

In our initial search, a comprehensive review of literature conducted from January 2020 to the present yielded a total of 2598 studies. These studies align with our predetermined inclusion criteria, which specified a focus on peer-reviewed quantitative and qualitative (or mixed-methods) research written in English. Additionally, the studies were required to be centered on children and young people aged 3-18 years, with a global scope. The research had to specifically address the impact of the COVID-19 pandemic and associated school closures on various aspects, including education, mental health, social dynamics, and economic considerations.

Following this initial identification phase, a meticulous screening process was employed, applying the exclusion criteria detailed in the previous chapter. A total of 48 studies were subsequently excluded from our review. These exclusions were based on the following criteria: studies that did not directly focus on the impact of the COVID-19 pandemic on children and young people or involved adult samples, studies lacking primary empirical research (e.g., reviews) or those not subjected to peer review (e.g., unpublished manuscripts, service evaluations, theses, book chapters, conference presentations, websites, or blogs), and studies not available in English or lacking full-text accessibility.

The refined selection of studies meeting our inclusion criteria, as presented above, constitutes the foundation of our systematic review, ensuring a focused and rigorous examination of the literature pertaining to the effects of the COVID-19 pandemic on children and young people globally.

According to Ten Velde and colleagues (2021), children were found to be less physically active during the closure of schools. This survey-based study showed that 62% of the students (N = 2426) reported a reduction in their time for physical activities. A similar claim has been supported by studies with children in the United States (e.g., Tulchin-Francis et al., 2021). The premature restrictions during the COVID-19 pandemic included the closure of schools in the United States, leading to the cessation of physical activity.

As a result, a recent review of 1310 studies reported a 12% reduction in students' physical activity (Tulchin-Francis et al., 2021). Interestingly, primary school children appeared to be less affected than high school students by reduced physical activity. However, the authors highlighted the urgent need for more physical exercise in children, regardless of age (Tulchin-Francis et al., 2021). Similarly, the research of Araújo and colleagues (2021) indicated an increased risk of nutritional and physical problems in children due to the closure of schools.

In Japan, one study found that 14.4 – 15.4% of children complained about gaining weight following the school closure (Takaku et al., 2021). Similarly, studies from India, Spain, and Italy also observed an increase in overall consumption levels, especially in unhealthy food, and a reduction in the consumption of fruits and vegetables (López-Bueno et al., 2020; Roy et al., 2020; Segre et al., 2021). According to Pietrobelli et al. (2020), there was an increase in the number of meals consumed following the school closure (from 4.2 to 5.3) in a sample of children in Verona, Italy, with a marked increase in consumption of crisps and sugary drinks.

During the COVID-19 pandemic, physical activity (PA) significantly declined across all age groups, both in males and females and in most countries. Martínez-de-Quel et al.'s research indicate that insufficient PA's negative impact is more pronounced among previously physically active individuals. Furthermore, decreased physical activity during the pandemic has been linked to adverse effects on mental health (Werneck et al., 2021; Wunsch et al., 2022).

Given the well-documented positive effects of PA, governments must prioritise and facilitate physical activity and exercise while adhering to current safety and hygiene regulations. For instance, the position paper by the Association for Aerosol Research (Jensen, 2020) suggests that the risk of infection from aerosol particles during non-contact outdoor sports activities is minimal. Evidence from the study by Wilson et al. supports the notion that engaging in active exercise during a pandemic can enhance physical and mental well-being. The intervention group in their study showed significant improvements in PA levels, sleep quality and quantity, fruit and vegetable intake, and mental health. In contrast, the control group experienced a decrease in PA variables, although not statistically significant (Wunsch et al., 2022).

Another approach to leverage sports opportunities during restrictions and curfews is to transition these activities to the digital realm. Parker et al. discovered that users of digital platforms were more likely to adhere to PA guidelines than non-users during the pandemic. Additionally, there are numerous recommendations available on how to maintain a satisfactory workout routine even at home (Hammami et al., 2022; Hoseini, 2020; Khatri et al., 2021; Parker et al., 2021; Wunsch et al., 2022)

### 3.2 School Closure and Use of Electronic Devices

Research has also shown a notable increase in screen time and the use of electronic devices in children following the closure of schools (Ten Velde et al., 2021). This is concerning if we think children's and young people's lifestyles can significantly impact individuals' well-being and physical health (nutritional diseases or obesity). The authors indicated that screen time increased by 105 minutes a weekday and 130 minutes on weekends during the school lockdown (Ten Velde et al., 2021). Similar findings were reported by an Iranian study which investigated a sample of 20,697 students (average age 13.76) and found that the use of devices and screen time was significantly increased (mobile and computer games by 30.1% and TV watching by 13.8%) which in turn had an impact on student's mental health (Ranjbar et al., 2021). The authors also concluded that the lockdown in general, and especially the school closure, have affected many aspects of students' lifestyles, including increased screen time. Other studies across the globe have shown increased contact with screens and devices for children; however, the authors did not separate whether it was fun/entertainment or online learning (Ranjbar et al., 2021). A Spanish study found that average daily screen time increased by 2.9 hours per day (an increase of 245%), with the most significant increases among adolescents (López-Bueno et al., 2020), while an Indian study estimated an average screen time of 5.1 hours during the lockdown days, 70% higher than previous national data (Roy S et al., 2020).

Increases in social media use were reported in some studies (Ellis et al., 2020; Widnall et al., 2020). A Canadian study observed that 77.2% of older adolescents used social media for longer than 3 hours per day, doubling compared to 31.9% before the lockdown (Ellis et al., 2020). Similarly, a UK study also highlighted an increase in the high

use of social media on weekdays ( $\geq 3$  hours per day) among girls (Widnall et al., 2020). However, there was no increase in social media use for boys. There were also no differences for the weekends (Widnall et al., 2020).

Finally, evidence from multiple sources indicates that children of primary school age experienced the most significant rise in both overall and leisure screen time throughout the COVID-19 pandemic (Oswald et al.; Peddie et al.; Szwarcwald et al.; Suka et al.; Trott et al., 2022; Wunsch et al.; Xiao et al.).

### 3.3 School Closure and Mental Health

The lack of activity for children during the school lockdown was thought to be associated with higher stress levels for both children and parents (Tulchin-Francis et al., 2021). Ranjbar and colleagues (2021) stressed that students' sleep problems and excessive screen use also had a negative impact on their mental health. A mapping study, "The impact of COVID-19 lockdown on child and adolescent mental health" (Panchal et al., 2021), indicated that the COVID-19 lockdown may have caused psychological discomfort and stress in children and young people. Hence, offering psychological support to children and young people during school closures is important. To achieve this, an emphasis should be placed on developing health guidelines and national health strategies to support and minimise the negative impact of COVID-19 containment on children and young people's mental health (Panchal et al., 2021).

A mapping study by Araújo and colleagues (2021) investigating the consequences of the lockdown and school closures on children's mental health pointed out that the COVID-19 pandemic has impacted several other factors that may also increase the risk of developing mental health problems in children. Given the suspension of activities in the classroom, social isolation measures, and the cessation or reduction of physical activities, there has been a considerable increase in parental anxiety, dietary risks, and exposure of children to toxic stress, especially in families with multilevel problems (Araújo et al., 2021).

Tang and colleagues (2021) reported that school closures due to the COVID-19 pandemic have affected 87% of students worldwide physically, socially, and mentally. The three most

commonly reported symptoms were anxiety (24.9%), depression (19.7%), and stress (15.2%). Although the participants were generally satisfied with their lives, only 21.4% reported feeling more satisfied after the school closure (Tang et al., 2021). The authors further explored the parent-child conversations about COVID-19 during school closures and quarantine. These parent-child conversations were associated with psychopathological symptoms and a motivation to live. Among participants who did not realise any benefit from home quarantine, those who had discussions with their parents about COVID-19 described experiencing less depression, anxiety, and stress (Tang et al., 2021).

The public health measures taken to manage the COVID-19 pandemic were questioned over the past two years. Some studies have shown that these restrictive practices and social isolation may negatively affect children's mental health, which in turn may persist in adulthood (Larsen et al., 2021). The authors stressed that home isolation, school closures, stress, perceived uncertainty from children, use of screen devices, the lack of a social environment of friends, and the fear of catching the virus during the COVID-19 outbreak were associated with emotional, physical, cognitive, psychological difficulties and anxiety for children. Among these COVID-19 factors, anxiety and uncertainty were the more robust predictors of future difficulties. Furthermore, children were found to have fewer emotional reactions and effusion during the school closure and lockdown than before the pandemic, indicating the need for further research on children's reactions (Larsen et al., 2021).

In Italy, school closures were also thought to have caused significant lifestyle changes and psychological problems in students, regardless of their age and gender, including students living in regions with lower incidence and prevalence of COVID-19 (Esposito et al., 2021). Despite the differences between the students in different age and socioeconomic groups, it was observed that the most psychologically affected population by the school closures were the older children and adolescents (Esposito et al., 2021). Negative emotions, such as sadness and depression, were among the results; there was a higher rate among women (84%) than men (68.2%) and in the 14–19 age group than the age group 11–13 years old (79.2% vs. 70.2%). It was hypothesised that the lack of the school community was among the most significant predictors of emotional distress, followed by knowing that a close friend or family

member have diagnosed with COVID-19. Overall, the authors recognised the imperative need to maintain and continue school activities despite the restrictive measures against the spread of the pandemic to improve students' well-being (Esposito et al., 2021).

A UK-based study pointed out that 53.3% of girls and 44.0% of boys aged 13-18 reported symptoms of anxiety and trauma, which were above the typical population threshold, with 47.4% of girls and 59.6% of boys reporting anxiety. Similarly, 19.4% of girls and 21.9% of boys reported depression symptoms (Levita et al., 2020). A corresponding survey of adolescents in the South West of England further described increased anxiety and depression scores in children with fewer social relationships with their families and peers (Widnall et al., 2020).

A series of extensive cross-sectional investigations estimated that the anxiety prevalence ranged from 10-19% during the national lockdowns (Chen et al., 2020; Qi et al., 2020; Zheng et al., 2020; Zhou et al., 2020). The prevalence of depressive symptoms also ranged from 6.3-39% in studies (Duan et al., 2020; Zheng et al., 2020; Zhou et al., 2020; Zhou et al., 2020). Some studies reported higher rates of anxiety and depression in certain cities that were exposed to longer and more restrictive lockdowns, such as Wuhan (Chen et al., 2020; Xie et al., 2020).

Similar findings were observed in large cross-sectional studies from other countries. Symptoms of depression were reported in 28% of Canadian young people (Ellis et al., 2020) and 26.5% of Bangladeshi children (Yeasmi et al., 2020). Anxiety symptoms ranged from 19.4-21.8% of Brazilian children (Garcia de Avila et al., 2020). One Canadian study exploring suicidal ideation showed that 17.5% of 16-18-year-old individuals reported having suicidal ideation, compared to 6% before the pandemic (Ellis et al., 2020). A large Scottish study on children 2-7 years old found that 47% of parents reported a deterioration in their child's behaviour, and 45% of the parents reported a deterioration in their child's mood (Watson et al., 2020). The prevalence of emotional and behavioural problems was twice as high as expected in children 4-7 years old, with 37% of the children reporting marginal or high scores for emotional difficulties, 43% scored highly for conduct problems, and 41% scored highly for hyperactivity or carelessness (Watson et al., 2020).

A UK national study examined children and young people's psychological and functional changes within one month during the first lockdown (Pearcey et al., 2020). Not surprisingly, emotional, behavioural, and anxiety/careless behaviours significantly increased within the first month of the lockdown (Pearcey et al., 2020). The same study showed a significant increase in anxiety and carelessness and reduced emotional difficulties and reactions according to parents of children aged 11-16. However, young people reported no change in their emotional difficulties (Pearcey et al., 2020).

### 3.4 School Closure and Sleep

As discussed, the lockdown as a whole and especially the school closure has significantly impacted many domains and lifestyles of the students. As expected, these changes in students' lifestyles have further impacted their duration and patterns of sleep (Ranjbar et al., 2021). In a large sample of 20,697 Iranian students (average age 13.76), it was observed that more than half of the students reported significant changes in their sleep patterns, with 53.5% reporting getting more than 12 hours of sleep throughout the day. This, in turn, has impacted students' mental health (Ranjbar et al., 2021). Similar changes in sleep duration were also highlighted in other studies (e.g., Lim et al., 2021). Due to the temporary closure of schools, sleep duration was significantly increased. However, no other significant changes occurred (Lim et al., 2021).

Pre-COVID-19, children's daily smartphone and tablet use was associated with longer sleep onset latency and decreased sleep duration (Chindamo et al., 2019). Increased screen time from childhood to adolescence was linked to sleep disturbances, which indirectly predicted mental health issues associated with screen time (Parent et al., 2016). The current systematic review yielded similar results, revealing that children aged 3–16 engaging in non-academic screen time (Lim et al., 2021) and adolescents spend most of their day on screen-related activities (Bruni et al., 2021) experienced a decrease in sleep duration during the pandemic (Drumheller et al., 2022).

However, Liu et al. found that children experienced fewer sleep disturbances compared to their 2018 sample, although screen usage was not examined in the 2018 study. Although the impacts cannot be directly compared, it is important to acknowledge that children's screen

use positively predicted sleep disturbances during the COVID-19 pandemic (Liu et al., 2021). Additionally, Kumar et al. questioned whether changes in sleep variables during the pandemic were related to screen-based technology use or other factors. The reported new or worsening sleep problems were more recent but also occurred in individuals who reported daily screen time exceeding 3 hours before the pandemic (Drumheller et al., 2022; Kumar et al., 2021).

### 3.5 School Closure and Education

A body of literature has investigated the impact of school closure on education and teaching. Engzell et al. (2021) recognised a significant loss in the quality and quantity of learning. For instance, children were thought to meet only 20% of the expected learning and classroom criteria during the school closure. Such losses were up to 60% greater among students from homes with a lower education level, indicating the pandemic's effects on children and families from different socioeconomic backgrounds (Engzell et al., 2021). The authors concluded that students showed little or no progress during e-learning, and even more significant losses were recorded in countries with lower infrastructure than the average or countries with reported longer school closures (Engzell et al., 2021).

In addition, another study (Goldstein, 2020) proved that a result of school closure is even losing a whole academic year. The same study concludes that if school closure continues. Logically if the closing school situation continues, there will be a learning disparity between those who can be taught in a class and those who cannot. (Goldstein, 2020).

## 4. CONCLUSION AND FUTURE DIRECTIONS

The COVID-19 crisis is global, multi-layered, and concerns society regardless of class and socioeconomic status. It affects every individual on the planet multifacetedly, even with invisible consequences and consequences. An increasing body of research shows that COVID-19 remains a significant health concern and impacts people's nutrition, social life, mental health, and education about the closure of children's educational environments.

Research shows that physical activity decreased during the school closure due to the COVID-19 pandemic (Ten Velde et al., 2021), while more physical and nutritional problems have arisen (Araújo et al., 2021; Tulchin-Francis et al., 2021). This resulted from a marked decrease in the consumption of fruits and vegetables and a simultaneous increase in unhealthy food (López-Bueno et al., 2020; Pietrobelli et al., 2020), while studies have found that children and young people have gained more than 10% of weight (Takaku et al., 2021). Similarly, several studies highlighted the increase in the use of electronic devices, screentime, and social media among students (e.g., Ellis et al., 2020; López-Bueno et al., 2020; Ranjbar et al., 2021; Ten Velde et al., 2021; Widnall et al., 2020).

Children and young people were thought to be at higher risk of experiencing acute mental health problems, including anxiety, stress, and depressive symptoms during the school closure, irrespective of their nationality or socioeconomic background (Esposito et al., 2021; Levita et al., 2020; Tang et al., 2021). Unsurprisingly, suicidal ideation (Ellis et al., 2020) and conduct or hyperactivity problems (Watson et al., 2020) also increased school closures and lockdowns. Children's mental health has impacted their sleep patterns and increased sleep duration in young people (Lim et al., 2021; Ranjbar et al., 2021).

Another key concern for children and young people was the impact of school closure on their education and learning, resulting in many students missing a lot of teaching and classes (Goldstein, 2020). Despite the school's efforts to implement an effective e-learning system and move the teaching online, it was noted a marked gap in the knowledge and quality of the teaching that young people received, which varied among different countries and socioeconomic statuses (Engzell et al., 2021). This raises significant concerns about power, equality, and accessibility in education. It is hypothesised that the financial situation of the individuals and their country of origin can play a decisive role in dealing with various health or non-health problems. Hence, it is important for future studies to investigate further the influence of socioeconomic factors on people's perceptions and coping during pandemics such as COVID-19.

To conclude, although we have some understanding of the short-term consequences of the COVID-19 pandemic and school closures on children and young people's mental and physical health and education, more research needs to be

done to capture the long-term effects of these measures.

**Conflicts of Interest:** The authors declare no conflicts of interest.

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