

Clinical Review

The Impact of the COVID-19 Pandemic on the Physical and Mental Health of School-Aged Children

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Abstract

Description

The SARS-CoV-2 (COVID-19) pandemic caused a deleterious impact on global health. School-aged children were significantly impacted by the pandemic. These impacts may be attributed to the fact that this age group is at a vulnerable developmental stage and is susceptible to profound effects. We conducted a thorough literature review using PubMed, Medline, and Science Direct electronic database searches between 2020-2022. We retrieved 757 studies, 25 of which were included in our review. We considered the impact of the COVID-19 pandemic on the physical and mental health of school-aged children (5-18 years), and the results were analyzed and included in our narrative review. Reduced physical activity and low health-related quality of life were observed in school-aged children during the pandemic in comparison to pre-pandemic. Factors such as age, fears/stress, mood states, socio-economic status, pre-COVID sedentary time, and activity levels were attributed to reduced physical activity. Depression and anxiety were the most common symptoms noted. Absenteeism, substance abuse, sleep disorders, and eating disorders were also increased. The negative influence of increased screen time, restricted physical activity, and social isolation were also considered and discussed. The COVID-19 pandemic has acted as a physical, mental, and social contagion for children. Interventions to promote physical and mental health need to be initiated in homes, schools, communities, and countries.

Keywords

COVID-19; pandemics; pediatrics; psychological distress; psychological resilience; adolescent; child; psychological adaptation; mental health

Introduction

The SARS-CoV-2 (COVID-19) pandemic caused a pernicious impact on global health. All age groups of people were stricken by the pandemic in one form or another. The pandemic had a harmful effect on physical, social, and mental health in many ways¹ and few were spared from the deleterious outcomes of the pandemic. School-aged children were also significantly impacted during this period. The depths of these impacts may be attributed to the fact that this age group is at a vulnerable developmental stage causing profound effects. In addition, home isolation, restricted physical activities, limited social interaction, and financial recession made the situation worse for school-aged groups. Initially, schools were closed, and later,

online teaching methods were introduced to reduce the transmission of disease between children. These unanticipated changes in the teaching schedules and methodology, the fear of the disease, and the disease itself affected children substantially.¹⁻⁴ These changes brought about a negative influence on the physical activities of the children which in turn gradually impacted their mental and psycho-social health.⁵⁻⁷

In Persian Gulf countries with a high prevalence of overweight and obese school-aged children, the effects of the SARS-CoV-2 pandemic might have been even more detrimental.⁸⁻¹⁰ In the World Health Organization (WHO) report on obesity and overweight in 2018, more than

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340 million children (5-19 years) were noted to be overweight or obese in 2016.¹¹ The WHO also reported a more than 4-fold increase in childhood obesity from 1975 to 2016.¹¹ Given the alarmingly high prevalence of obesity in school-aged children and the reforms introduced during the COVID-19 pandemic, this review was conducted to understand the consequences of the pandemic in this cohort of the population. We believe that this review may aid in reflecting the need for changes to improve the overall health of school-aged children.

Study Design and Methodology

We completed a narrative review after a literature search using PubMed, Medline, and Science Direct electronic databases between 2020-2022. The terms “COVID-19 OR SARS-CoV-2 OR 2019-nCoV OR coronavirus” AND “school-aged children” AND “physical” AND “mental” AND “psychosocial” were used in the search. Modification of the search terms and the strategy was in accordance with the database used. The inclusion criteria of this review were as follows: (1) The articles were published between 2020-2022. (2) The articles were written in English. (3) The article type included clinical trials, observational studies, and narrative and systematic reviews on the impact of the COVID-19 pandemic on the physical, mental, and psychosocial health of school-aged children. (4) Studies on children between 5-18 years of age were included. (5) The articles available as free full texts were included. The exclusion criteria were (1) studies on students aged above or below the inclusion criteria, (2) articles were letters to the editors and commentaries, (3) duplicate articles, and (4) articles whose full text was not available. We retrieved 757 studies of which 156 were found relevant to the review question. After a quality check for reliability, validity, and applicability, 25 studies were included in the review. Specifically, we endeavored to examine the impact of the COVID-19 pandemic and associated stay at home on the physical and mental health of school-aged children.

Impact on Physical Health

Obesity remains the leading health issue in school-aged children worldwide.⁸ The magnitude of the problem is substantially worse in the Persian Gulf population.⁸⁻¹⁰ For instance,

in Qatar, nearly 50% of school-going children are either obese or overweight.⁹ Though the pathophysiology of obesity is multi-factorial, sedentary lifestyles and dietary habits are primarily implicated in causation. Amidst the pandemic, lifestyles and dietary habits were severely affected. With the lockdowns and school closures, the daily activity of kids was nearly reduced to zero. Online classes for long hours, worsened the situation further. Children were not just restricted to their homes but closely confined to their study zones at home. Their daily routine, which was typically followed during school days, no longer existed.

In a 2019 systematic review by Hamadi et al an alarming increase in the prevalence of obesity was observed in children. In their review, studies from three Persian Gulf countries, namely United Arab Emirates, Kuwait, and Saudi Arabia, were reviewed for the last 11 years. Unfortunately, they were unable to retrieve any studies from other Gulf countries including Qatar. The prevalence of obesity was reported between 5.2-50% varying with age and sex. A higher prevalence of obesity was noted in children above 11 years of age in comparison to younger age groups. Boys were noted to have a higher predisposition than girls.¹² With this background population of children in the Gulf region, there is a need to study the impact of the pandemic on the school age-group children in these countries.

Dunton et al evaluated the early effects of the COVID-19 pandemic on school-aged children and observed increased sedentary behavior and reduced physical activity. These authors expressed concern that if these issues were not addressed, they could lead to a long-term increased incidence of obesity, diabetes, and cardiovascular disease.⁴ Okuyama et al identified a significant decrease in the physical activity of children due to social isolation during the pandemic.¹ They also noted the ill effects of reduced physical activity on mental health and recommended physical activity for children to support their psychological health.¹ Schmidt et al noted a significant decrease in physical activity hours in a cohort of 1711 children between 4 and 17 years old, from 540 minutes a week pre-pandemic to 105 min a week during the pandemic. Screen time increased from 170 minutes a week to 450 minutes a week

during the pandemic.⁵ In another systematic review by Nobari et al, the authors reported similar findings on reduced physical activity and the negative impact of the pandemic on health-related quality of life.¹³ Low health-related quality of life (HRQoL) was observed during the pandemic (40.2% vs 15.3%) in comparison to pre-pandemic.¹³ In children between 11-17 years, low HRQoL was observed as compared to those less than 11 years.¹³ In another review, a decrease in physical activity of children and adolescents during the pandemic was observed in 57 out of 75 studies.¹⁴ In 4 studies an increase in physical activity was noted, while in others mixed observations or no changes were identified.¹⁴ The results of a survey reported by Xiang et al, revealed that 65.6% of children reported reduced physical activity during the pandemic.¹⁵ A significant increase in screen time was also reported which could have resulted in the decrease in physical activity.¹⁵ A similar impact on physical activity during the pandemic was noted by other authors as well.¹⁶⁻¹⁸ Factors such as age, fears/stress, mood states, socioeconomic status, pre-COVID-19 sedentary time and activity levels, contributed to the reduced physical activity.^{14,18} All the above studies signify a deleterious impact of the COVID-19 pandemic on the physical health of children.

The pandemic's impact on physical activity would be of greater importance for children with underlying overweight or obesity. The inclusion of healthy lifestyles, daily physical activities, and sports may help to reduce and overcome these effects gradually. It will not only reduce the burden of acute health-related issues but also help them become healthy adults in the future.

Impact on Mental Health

Mental health plays a pivotal role in children's overall health and well-being. It includes the mental, behavioral, and emotional aspects of health, which are indispensable for a healthy child. Positive mental health not only can influence a child's response to stress but also be accountable for decision-making situations and coping with life changes. However, the behavioral aspects of health are often ignored by parents. This may be due to ignorance, cultural taboos, fear of social isolation, and the inability to access effective care.¹⁹ Despite several attempts by WHO to address mental health, it

remains a concealed challenge. A WHO report on children's mental health from 2016-2019, identified a high prevalence of mental disorders in children between 3 to 17 years in the United States of America. The most common issues reported in this age group were anxiety, behavior problems, depression, and attention-deficit/hyperactivity disorder (ADHD).²⁰ The COVID-19 pandemic made these matters worse. For example, studies revealed an exponential increase in the level of anxiety, behavioral disorders, sleep disturbances, loss of appetite, and depression.² Meherali et al, in a 2021 systematic review, reported that changes in the mental health of children during the pandemic have impacted other issues such as absenteeism, substance abuse, and school interruptions and have led to post-traumatic stress symptoms.² Researchers identified depression, stress, and anxiety as the most prevalent symptoms in children during the pandemic.^{3,6,14} Significant increases in sleep disorders, eating disorders, and other behavioral disorders were reported by others.^{6,7} The impact of the pandemic was acute but may induce long-term implications for these children. Meade et al reported that the mental issues were age-dependent.⁶ For example, in students between 7 and 13 years, anxiety and depression were the most common symptoms. Prevalence of anxiety and depressive symptoms ranged between 1.8% to 23.8% and 2.2% to 11.78% respectively in this age group.⁶ These children had an increase in behavioral issues, difficulty in academics, and social isolation.⁶

On the other hand, adolescents, had attention issues, impulsivity, and poor isolation in addition to anxiety and depression. In this group, a higher prevalence of anxiety (range from 10.4% to 29.27%) and depression (range from 17.3% to 22.28%) was noted. An increase in visits to the emergency department, requiring a psychiatry consult was also reported.⁶ This older group of children had an increase in aggression and oppositionality.²¹ Zhou et al noted enhanced mental health issues in females (53.5% vs 46.5%), children in rural areas (61.6% Vs 38.4%), and those in higher grades (7.8% vs 27.6%) in comparison to males, children living in an urban area, and those in lower grades respectively.²²

Collectively, a significant impact on mental health was observed, leading some authors to

study the factors that enhanced or reduced the impact on mental health during the pandemic. Depression and anxiety were lower in children, according to projections of the trends of the COVID-19 pandemic.²¹ However, preventive and control strategies helped lower depression and anxiety in children.²¹ Social isolation due to the closure of schools and lockdowns was considered one of the major contributors to the impact on the mental health of children.⁶ A profound impact was noted for children who were isolated at home and had working parents.²³ These children were reported to be unhappy at home, which had a significant impact on their mental health.²³ Lack of physical activity was reported as a contributing factor by many authors.^{1,2,24} Mittal et al observed the negative impact of sedentary habits on the mental health of children.²⁴ Additionally, the negative influence of increased screen time was noted by Jiao et al and Duan et al.^{25,26} In children using smartphones, the frequency of depressive disorder was 41.45% in comparison to 16.5% for non-users.²⁶ Internet addiction was 61.0% in those with depressive disorders versus 19.8% for other children.²⁶ Adverse outcomes were also noted if a relative or friend had COVID-19 and if their studies or graduation was affected.²⁶

Camerini et al studied the effects of the COVID-19 pandemic on mental health and evaluated the screen time and green time (physical activity) of children.²⁷ They noted that increased physical activity and social interactions had a positive impact on mental health. An increase in screen time was noted with an increase in the age of children.²⁷ For instance, the average screen time for adolescents was 4.3 hours while for children between 5 and 9 years, it was 1.3 hours. Camerini et al noted a negative impact of screen time on mental health which worsened over time (proportional to the months of exposure). They also reported a positive association between screen and green time and body mass index.²⁷ Adverse impacts of screen time on sleep disturbances, behavioral issues, and reduced performance in academics were observed by Paulich et al.²⁸ Furthermore, an increased prevalence of anxiety disorders, depression, conduct disorders, attention-deficit/hyperactivity disorder, and other attention disorders was noted as an impact of screen

time in this study.²⁸ In a systematic review, a positive association was observed by the authors between screen time and depressive symptoms, poor quality of diet, low quality of life, and higher calorie consumption.²⁹ Overall, a negative influence of screen time was noted by these studies not only on physical activities but also on the mental health of children.

Conclusion

The COVID-19 pandemic has not only affected the populations worldwide due to the morbidity and mortality associated with the disease but has also acted as a physical, mental, and social contagion. School-aged children being at a vulnerable developmental stage have endured the worst consequences. The fear of the disease, agony due to the loss of loved ones, and economic and social restrictions caused irreparable damage to their developing minds and bodies. These changes may have an unpredictable influence on their future life. There is a need to address these issues worldwide with possible initiatives to reduce the impact of the pandemic in this age group. Interventions to promote physical and mental health need to be initiated in homes, schools, communities, and countries. School surveys and future studies may aid in understanding the depth of the situation and aid in planning interventions.

Conflicts of Interest

The authors declare they have no conflicts of interest.

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References

1. Okuyama J, Seto S, Fukuda Y, et al. Mental health and physical activity among children and adolescents during the COVID-19 pandemic. *Tohoku J Exp Med*. 2021;253(3):203-215. doi:10.1620/tjem.253.203
2. Meherali S, Punjani N, Louie-Poon S, et al. Mental health of children and adolescents amidst COVID-19 and past pandemics: a rapid systematic review. *Int J Environ Res Public Health*. 2021;18(7):3432. Published 2021 Mar 26. doi:10.3390/ijerph18073432

3. Tang S, Xiang M, Cheung T, Xiang YT. Mental health and its correlates among children and adolescents during COVID-19 school closure: the importance of parent-child discussion. *J Affect Disord.* 2021;279:353-360. doi:10.1016/j.jad.2020.10.016
4. Dunton GF, Do B, Wang SD. Early effects of the COVID-19 pandemic on physical activity and sedentary behavior in children living in the U.S. *BMC Public Health.* 2020;20(1):1351. Published 2020 Sep 4. doi:10.1186/s12889-020-09429-3
5. Schmidt SCE, Anedda B, Burchartz A, et al. Physical activity and screen time of children and adolescents before and during the COVID-19 lockdown in Germany: a natural experiment. *Sci Rep.* 2020;10(1):21780. doi:10.1038/s41598-020-78438-4
6. Meade J. Mental health effects of the COVID-19 pandemic on children and adolescents: a review of the current research. *Pediatr Clin North Am.* 2021;68(5):945-959. doi:10.1016/j.pcl.2021.05.003
7. López-Bueno R, López-Sánchez GF, Casajús JA, Calatayud J, Tully MA, Smith L. Potential health-related behaviors for pre-school and school-aged children during COVID-19 lockdown: a narrative review. *Prev Med.* 2021;143:106349. doi:10.1016/j.yjmed.2020.106349
8. Most obese countries. World Population Review. Accessed September 8, 2021. <http://worldpopulationreview.com/countries/most-obese-countries>
9. Al-Thani M, Al-Thani A, Alyafei S, et al. The prevalence and characteristics of overweight and obesity among students in Qatar. *Public Health.* 2018;160:143-149. doi:10.1016/j.puhe.2018.03.020
10. Farrag NS, Cheskin LJ, Farag MK. A systematic review of childhood obesity in the Middle East and North Africa (MENA) region: prevalence and risk factors meta-analysis. *Adv Pediatr Res.* 2017;4:8. doi:10.12715/apr.2017.4.8
11. World Health Organization (WHO). Obesity and overweight. World Health Organization. Accessed September 8, 2021. <https://www.who.int/en/news-room/fact-sheets/detail/obesity-and-overweight>
12. Al Hammadi H, Reilly J. Prevalence of obesity among school-age children and adolescents in the Gulf cooperation council (GCC) states: a systematic review. *BMC Obes.* 2019;6:3. doi:10.1186/s40608-018-0221-5
13. Nobari H, Fashi M, Eskandari A, Villafaina S, Murillo-García Á, Pérez-Gómez J. Effect of COVID-19 on health-related quality of life in adolescents and children: a systematic review. *Int J Environ Res Public Health.* 2021;18(9):4563. doi:10.3390/ijerph18094563
14. Rossi L, Behme N, Breuer C. Physical activity of children and adolescents during the COVID-19 pandemic: a scoping review. *Int J Environ Res Public Health.* 2021;18(21):11440. doi:10.3390/ijerph182111440
15. Xiang M, Zhang Z, Kuwahara K. Impact of COVID-19 pandemic on children and adolescents' lifestyle behavior larger than expected. *Prog Cardiovasc Dis.* 2020;63(4):531-532. doi:10.1016/j.pcad.2020.04.013
16. Suarez-Lopez JR, Cairns MR, Sripada K, et al. COVID-19 and children's health in the United States: consideration of physical and social environments during the pandemic. *Environ Res.* 2021;197:111160. doi:10.1016/j.envres.2021.111160
17. Tabacof L, Tosto-Mancuso J, Wood J, et al. Post-acute COVID-19 syndrome negatively impacts physical function, cognitive function, health-related quality of life, and participation. *Am J Phys Med Rehabil.* 2022;101(1):48-52. doi:10.1097/PHM.0000000000001910
18. Patrick SW, Henkhaus LE, Zickafoose JS, et al. Well-being of parents and children during the COVID-19 pandemic: a national survey. *Pediatrics.* 2020;146(4):e2020016824. doi:10.1542/peds.2020-016824.
19. Oliveira TDO, Costa DS, Alvim-Soares A, et al. Children's behavioral problems, screen time, and sleep problems' association with negative and positive parenting strategies during the COVID-19 outbreak in Brazil. *Child Abuse Negl.* 2022;130(Pt 1):105345. doi:10.1016/j.chiabu.2021.105345
20. Data and Statistics on Children's Mental Health. Centers for Disease Control and Prevention; 2022. <https://www.cdc.gov/childrensmentalhealth/data.html>
21. Hawke LD, Barbic SP, Voineskos A, et al. Impacts of COVID-19 on youth mental health, substance use, and well-being: a rapid survey of clinical and community samples. Répercussions de la COVID-19 sur la santé mentale, l'utilisation de substances et le bien-être des adolescents : un sondage rapide d'échantillons cliniques et communautaires. *Can J Psychiatry.* 2020;65(10):701-709. doi:10.1177/0706743720940562
22. Zhou SJ, Zhang LG, Wang LL, et al. Prevalence and socio-demographic correlates of psychological health problems in Chinese adolescents during the outbreak of COVID-19. *Eur Child Adolesc Psychiatry.* 2020;29(6):749-758. doi:10.1007/s00787-020-01541-4
23. Yeasmin S, Banik R, Hossain S, et al. Impact of COVID-19 pandemic on the mental health of children in Bangladesh: a cross-sectional study. *Child Youth Serv Rev.* 2020;117:105277. doi:10.1016/j.chilyouth.2020.105277
24. Mittal VA, Firth J, Kimhy D. Combating the dangers of sedentary activity on child and adolescent mental health during the time of COVID-19. *J Am Acad Child Adolesc Psychiatry.* 2020;59(11):1197-1198. doi:10.1016/j.jaac.2020.08.003
25. Jiao WY, Wang LN, Liu J, et al. Behavioral and emotional disorders in children during the COVID-19 epidemic. *J Pediatr.* 2020;221:264-266.e1. doi:10.1016/j.jpeds.2020.03.013

26. Duan L, Shao X, Wang Y, et al. An investigation of mental health status of children and adolescents in China during the outbreak of COVID-19. *J Affect Disord.* 2020;275:112-118. doi:10.1016/j.jad.2020.06.029
27. Camerini AL, Albanese E, Marciano L; Corona Immunitas Research Group. The impact of screen time and green time on mental health in children and adolescents during the COVID-19 pandemic. *Comput Hum Behav Rep.* 2022;7:100204. doi:10.1016/j.chbr.2022.100204
28. Paulich KN, Ross JM, Lessem JM, Hewitt JK. Screen time and early adolescent mental health, academic, and social outcomes in 9- and 10-year old children: utilizing the Adolescent Brain Cognitive DevelopmentSM (ABCD) study. *PLoS One.* 2021;16(9):e0256591. doi:10.1371/journal.pone.0256591
29. Wang Y, Liu J, Compher C, Kral TVE. Associations between dietary intake, diet quality and depressive symptoms in youth: a systematic review of observational studies. *Health Promot Perspect.* 2022;12(3):249-265. doi:10.34172/hpp.2022.32