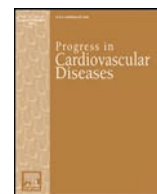




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Impact of COVID-19 pandemic on children and adolescents' lifestyle behavior larger than expected



To the Editor:

The ongoing coronavirus disease 2019 (COVID-19) spread is a public health emergency and global threat. Governments have ordered citizens to stay at home as an emergency measure and implemented school closures to prevent further spread of the infection. As of March 26, 2020, >150 million children and adolescents in 165 countries are affected by the closures.¹ Under such situations, physical and mental health problems are significant concerns. Particularly, children and adolescents' lifestyle behaviors, such as physical activity (PA) and sedentary behavior (SB) may have been drastically impacted due to the prolonged school closures and home confinement during the COVID-19 pandemic.

It is well-known that reduced PA and prolonged SB are linked to both negative physical and mental health outcomes,² such as loss of muscular and cardiorespiratory fitness, weight gain,³ psychosocial problems,⁴ and even poor academic achievements.⁵ Furthermore, evidence suggests that the negative impact may extend to adulthood.⁶ Nonetheless, >70% of 1.6 million adolescents failed to achieve sufficient PA globally in 2016.⁷ The current COVID-19 pandemic may further worsen this situation. Thus, a better understanding of the current situation of PA and SB during this pandemic among children and adolescents could help teachers, parents, and the Ministry of Education to urgently determine and implement effective policies and interventions for children and adolescents. However, till date, no study examined this issue. Therefore, we probed this aspect in detail during this critical time.

We conducted a natural experimental longitudinal study among children and adolescents (6–17 years) in five schools in Shanghai, China, randomly selected from five districts with a high population density. The first survey was conducted from 3 to 21 January 2020 (Public health emergency was activated in Shanghai since January 24, 2020) and the second survey from 13 to 23 March 2020 (during the pandemic). In total, 2427 children and adolescents participated in the two surveys. Moderate- and vigorous-intensity PA was measured based on Global Physical Activity Questionnaire (GPAQ) developed by the World Health Organization. PA was calculated as weekly minutes of moderate-intensity PA plus twice the reported minutes of vigorous-intensity PA and was defined as inactive (<30 min/day), insufficiently active (≥30, <60 min/day), and sufficiently active (≥60 min/day) according to the guidelines for children. We calculated total screen time, a major indicator of SB, by summing the screen time during leisure (watching TV/videos [DVD, video app, etc.], internet use [news, douban, etc.], computer/smartphone games and social platform use [QQ, WeChat, etc.]), school lessons, homework and reading/studying online or on a smartphone. Leisure-time screen time was further categorized as short (≤2 h/day) and long (>2 h/day). Analyses were conducted using SPSS version 25.

We analyzed data from 2426 children and adolescents (boys, 51.2%; girls, 48.8%) with valid data on PA and SB. Overall, the median time spent in PA decreased drastically, from 540 min/week (before the pandemic) to 105 min/week (during the pandemic), yielding 435 min reduction on average. Of note, during the pandemic, prevalence of physically inactive students extensively increased from 21.3% to 65.6%. Screen time considerably increased during the pandemic in total (+1730 min [or approximately 30 h] per week on average). Screen time during leisure was also prolonged, indicating that nearly a quarter of students engaged in long screen time for leisure.

These data revealed a substantial decrease in PA and increase in screen time during the COVID-19 pandemic. The new coronavirus is still spreading globally, which may have the lasting impact on PA patterns and sedentary time,⁸ posing severe challenges for children and adolescents as well. The reduced PA and prolonged SB may negatively impact children's and adolescents' physical and mental health, and in turn, such worsened health conditions would further reduce PA level and prolong SB. Such a vicious circle should thus be broken. Additionally, the evidence suggests that PA provides protection from viral infections, especially among vulnerable populations.⁹ Therefore, governments, schools, professionals for health and exercise, and parents need to be aware of the severe situation and implement more effective interventions for PA immediately to minimize the negative impact of the COVID-19 pandemic on children's and adolescents' health (Table 1).

Funding and ethics approval

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Table 1

Physical activity and sedentary time before and during the COVID-19 pandemic among children and adolescents in China.

Total (n = 2426)	Before the pandemic	During the pandemic	Absolute change	P value ^a
Physical activity (min/week)	540	105	−435	<0.001
Inactive ^b	21.3%	65.6%	+44.3%	<0.001
Insufficient physical activity	18.8%	16.7%	−2.1%	
Sufficient physical activity	60.0%	17.7%	−42.3%	
Total screen time (min/week)	610	2340	+1730	<0.001
Leisure screen time (min/week)	170	450	+280	<0.001
Short (≤2 h/day)	92.7%	69.1%	−23.6%	<0.001
Long (>2 h/day)	7.3%	30.9%	+23.6%	

Data are shown as median or percentages.

^a Calculated using Wilcoxon test or Chi-squared test.

^b Defined as <30 min/day, whereas ≥30 and <60 min/day for insufficient physical activity and ≥60 min/day for sufficient physical activity.

Declaration of competing interest

There is no conflict of interest of any authors with regard to this publication.

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