

eISSN: 2452-5812  
<http://jmh.pucv.cl/>

Received: 29/07/2020  
 Accepted: 06/08/2020  
 Online-first: 08/08/2020  
 Published: 01/01/2021

## Editorial

### The impact of COVID-19 quarantine on youth: from physical inactivity to pediatric depreobesity

Impacto de la cuarentena por COVID-19 en jóvenes: de la inactividad física a la depreobesidad pediátrica

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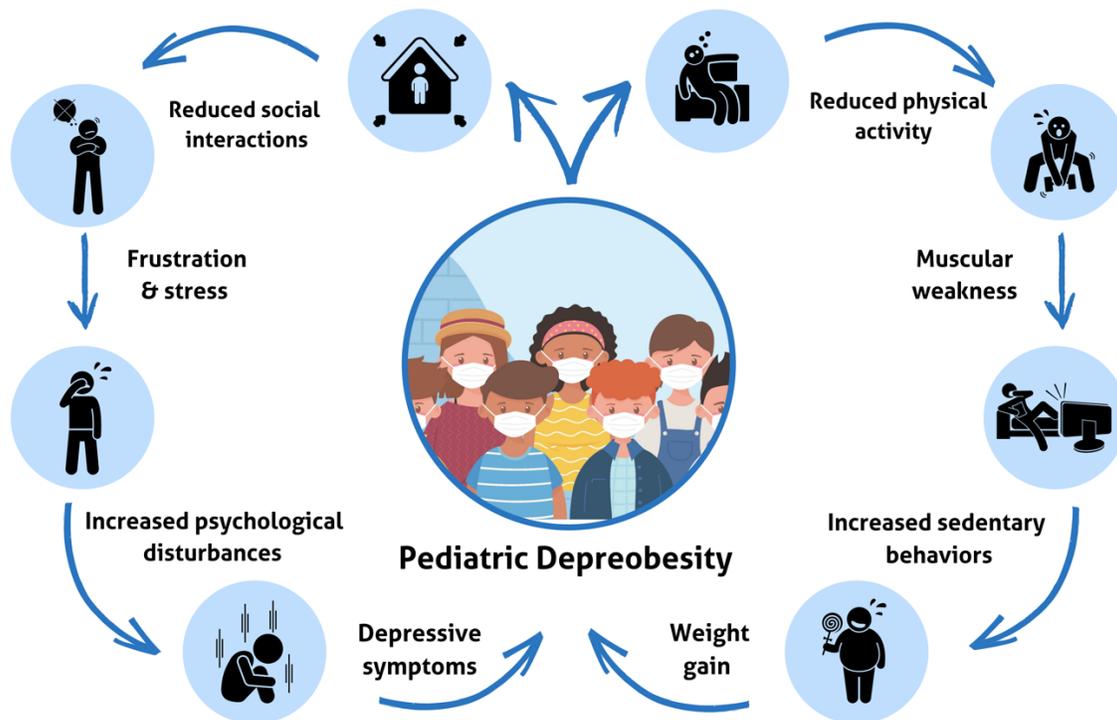
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## Key Points

- Scarce literature has described the impact of COVID-19 on youth levels of moderate to vigorous physical activity.
- Physical inactivity and social distancing could lead to physical and psychosocial problems increasing the risk of obesity and depression.
- Regular moderate to vigorous physical activity plays an essential role to limit or prevent the negative consequences of prolonged quarantine periods on pediatric depreobesity.

While nationwide quarantine has proven to be effective in containing the coronavirus disease (COVID-19) spread, the far-reaching detrimental effects of restrictive stay at home measures on youth between 6-18 years of age are yet to be known. The coronavirus pandemic has impacted youth’s physical activity levels and opportunities for outdoor play, physical education classes and participation in sports. Recent studies have highlighted the health risks of prolonged lock-downs across adult populations<sup>1,2</sup>. However, scarce literature has described the impact of COVID-19 on levels of moderate to vigorous physical activity (MVPA) in children and adolescents.

Disturbingly only 2 in 10 youth worldwide accumulate the recommended 60 min of MVPA daily<sup>3</sup>. COVID-19 lockdown may have worsened the levels of youth physical inactivity and the consequent associated comorbidities. The multi-faceted consequences of abruptly increasing physical inactivity, sedentary behaviours, and overeating due to quarantine will start to emerge. Social distancing could lead to frustration, social isolation, physiological disturbances, and other mental health concerns correlated with an increased risk of depression<sup>4</sup>. The combined effects of a stressful environment and a physically inactive lifestyle in youth act as a feedback loop that increases adverse lifestyle behaviors (e.g., poor sleep hygiene, increased screen time, and high energy food intake) that drive troubling health outcomes. This malignant combination of physical and psychosocial behaviors could lead to unhealthy weight gain and mental health deterioration, which has been coined as “depreobesity”<sup>5</sup>. Youth are not immune to this vicious cycle. The prognosis of COVID-19 on the psychosocial health status as well as physical well-being in youth can no longer be ignored<sup>6</sup>. Figure 1 illustrates the depreobesity feedback loop consequent to homestay on youth.



**Figure 1.** The pediatric depreobesity loop.

In order to limit or prevent the negative consequences of prolonged quarantine periods on pediatric depreobesity, regular MVPA plays an essential role. MVPA can be an enjoyable and cost-free strategy to prevent pediatric depreobesity during periods of confinement caused by COVID-19. However, if the current situation continues to worsen and more lockdown periods occur, the current global recommendations for youth physical activity (i.e.,  $\geq 60$  minutes of MVPA daily) should be reviewed and updated, due to the substantial increase in their physical inactivity. Of note, higher levels of muscular fitness lead to improvements in motor confidence and competence, which could further contribute to increased motivation to participate in MVPA<sup>7</sup>. Accumulating evidence highlights the importance of integrating both health and skill-related components of physical fitness to improve the physical and psychological wellbeing of youth<sup>4,8</sup>. In the specific case of obese youth, integrative interventions that improve strength and power could act as a primary positive driver in the depreobesity feedback loop, preserving the health of the young<sup>9</sup>. Since the performance of neuromuscular tasks has shown to be better in obese children than in their non-obese counterparts, this could lead to positive experiences and improved performance, thereby increasing adherence to MVPA<sup>4,7</sup>. The global recommendations for youth resistance training have been established (e.g., 2-3 days/week; 20-30 minutes including a variety of exercises performed throughout the full range of motion without undue fatigue. It is reasonable to begin resistance training with 1-2 sets of 8 to 12 repetitions using a low intensity ( $\leq 60\%$  of one repetition maximum) as proper technique is developed. More details about youth resistance training regimens and benefits can be found in a recent clinical report<sup>10</sup>.

Youth are a vulnerable population at risk for the negative effects of the COVID-19 quarantine whereby physical inactivity, low muscle strength, obesity, social isolation and poor mental health status



could lead to pediatric depreobesity. We promote concerted efforts to encourage all girls and boys to regular participation in MVPA, including strength-building activities during the quarantine to prevent the health consequences of pediatric depreobesity<sup>10</sup>. Healthy lifestyle interventions designed to activate inactive youth, as well as international awareness of the complex interactions between physical activity and mental health among youth, are urgently warranted. We present the concept of pediatric depreobesity to open the scientific debate and welcome future research on this novel construct.

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### **Authorship contributions**

ICH-M conceived the idea. ICH-M and EV-G wrote the manuscript. TR-R created the figure and TR-R and ADF made critical revisions. All authors read and approved the final version of the manuscript.

### **Declaration of conflict of interest**

The authors declare no conflict of interest.



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