LETTER TO THE EDITOR

COVID-19: a one-way ticket to a global childhood obesity crisis?

Sarah Cuschieri 1 · Stephan Grech 2

Received: 5 June 2020 / Accepted: 29 October 2020 / Published online: 6 November 2020
© Springer Nature Switzerland AG 2020

Abstract

Obesity is a global epidemic based on three major pillars of (i) genetic (ii) behavioural and (iii) environmental determinants. The latter two pillars have been challenged during the course of the COVID-19 pandemic across all population age groups including children. The closure of schools resulted in decreased organised physical activity, increase in sedentary lifestyle and screen time with the possibility of stress-induced indulgence in high calorie dense and sugary foods, resulting in higher susceptibility to weight gain. The uncertainty faced by many Northern Hemisphere governments as the new scholastic year looms closer whether to open schools again or not further enhances the stress on the children and their family. Re-opening of schools is beneficial for children’s mental and physical health, and general wellbeing including the ‘combating’ of the childhood obesity epidemic. The family unit has also been challenged during this pandemic especially if the parent/s suffered redundancy. There have been attempts at seeing a silver lining as some families have embraced lockdowns as a means to strengthen their family bonds, increase homemade meals apart from the various virtual opportunities that were streamed on social media to encourage children to perform physical activity at home or in safe environments. However, curbing the viral spread while protecting population health will remain top priority until an effective COVID-19 vaccine is available. It is imperative to address other co-existing problems such as childhood obesity, which if uncontrolled may have a long-term profound health and economic consequence of higher eminence than the actual COVID-19 infection. The prevention and management of childhood obesity should be set as a priority at an individual, community and population level during this pandemic.

Keywords Childhood obesity · Coronavirus · Prevention · Population health

Introduction

Obesity is a global epidemic with an estimated 158 million children-adolescents (5 to 19 years) expected to be obese by the year 2020 [1]. Obesity is a complex heterogenous disease based on three major pillars: (i) genetic determinants (ii) behavioural determinants and (iii) environmental determinants [2]. During the unprecedented times of the COVID-19 pandemic, the latter two modifiable pillars may have potentially been affected [3]. Many governments across the world instituted a number of protective and containment measures including the closure of schools and lockdowns during the first wave of COVID-19 [4]. At the time of writing (September 2020), the Northern Hemisphere governments are being faced by a difficult decision whether to re-open schools for the new scholastic year or not [5]. The aim is to discuss the potential impact that the COVID-19 pandemic might have on the children and the associated risk of a global obesity crisis.

COVID-19 impact on childhood obesity

Effect on dietary habits

The 2019–2020 scholastic year was abruptly halted. Physical classroom learning was abolished, forcing children to stay at home and shift their learning to virtual means. Some countries went into complete lockdowns that restricted the family unit to their home, with only allowance to go out for essential
shopping and for restricted physical activity. This led to a number of families panic shopping and storing long shelf-life foods that are typically ultra-processed and calorie-dense in order to minimize their trips to the supermarket [6]. Lockdowns are stressful periods, even for children, with a potential impact on their behavioural attitude. As a consequence, stress-eating of readily available high calorie dense food and sugary beverages ensues [7]. Such actions enhanced the susceptibility to weight gain especially if the amount of daily physical activity was reduced due the restrictions implemented [8]. However, not every household under lockdown experienced such a change in behavioural attitude or food habits as some families considered these unprecedented times as the perfect opportunity to cook homemade food and opted to buy fresher food more than before [8]. Such a positive experience might have a long term effect on children’s food intake and preference for fruit and vegetables [9]. Of note, unfortunately a number of jobs were lost during the pandemic leading to financial constrains with a consequential change in grocery shopping to less expensive shelf-stable food. Such a socioeconomic change might have a negative effect on children’s dietary habits [10].

**Effect on physical activity**

Closures of schools resulted in the absence of organised physical activity sessions leading to a higher risk of prolonged sedentary periods and increased weight gain among children [11]. Children residing in urban areas and/or within small apartments are faced with greater challenges due to limited space or opportunities for physical activity and hence they are more susceptible to weight gain [6]. Furthermore, during the first wave of COVID-19, leisure centres including playgrounds were closed off, with an advocacy to stay at home [4]. Some countries, such as New Zealand, issued a guideline on “Play, active recreation and sport” depending on the local COVID-19 situation. This enabled families to identify which activity was permissible and safe to follow and which was not [12]. Other countries, such as the small European Island of Malta, broadcasted a daily physical activity programme on national television for children and adults alike, to follow while at home [4].

**COVID-19 and screen time**

Prior to the COVID-19 pandemic it was reported that online platforms were extensively used by the young generation to communicate with others, to play video games and to access social media [13]. The pandemic brought with it a higher screen time for children as schools shifted to virtual learning. Although this was beneficial for educational purposes and social communication between children, their friends and their educators while social distancing, the increase in screen time can further exacerbate sedentary habits as well as increase the risks for anxiety, depression and inattention [14]. Indeed, it was reported that screen time increased by approximately five hours per day when compared to the pre-COVID-19 period [7]. A link has been established between increased body mass index (BMI) and body fat percentage as screen time increased [15]. Furthermore, screen time is also associated with increase in snacking and a consequent increase in weight [16]. It is imperative therefore to establish a balance between screen time and active time. This is a challenge during these unprecedented times. However virtual platforms have been used by some schools to organise physical activity classes for children to easily follow at home [4]. Such initiatives should continue and be more readily implemented during these COVID-19 times.

**Effect of closure of schools on obesity rate**

Pre-COVID-19 studies reported that children had higher tendencies to experience weight gain during the summer holidays. Such weight gain is difficult to shed and actually accumulates from one summer to another [17, 18]. Hence, if one considers the COVID-19 lockdown period as an ‘early onset-summer holiday’, it could be anticipated that the childhood obesity rate will rise proportionately to the number of months the schools remain closed. Indeed, in the US it was hypothesised that should schools remain closed till December 2020, an upsurge of 1.27 million new obesity cases among children will be recorded [19].

**COVID-19 impact on environmental determinates of obesity**

Irrelevant whether living under the COVID-19 pandemic or not, the family environment has an important impact on every child’s behavioural characteristics [20]. If the family follows a sedentary lifestyle, it is almost inevitable that the child will follow such a habit. It is also important to remember that the foetal environment plays an important role in the unborn child’s life course. Indeed, the presence of obesity during pregnancy has been linked with childhood obesity as well as diabetes and cardiovascular disease [21]. At the onset of the COVID-19 pandemic, pregnant women were considered as forming part of the vulnerable group and were even mandated to stay at home by some governments [4, 22]. However, as part of the containment measures to curb the viral spread, most of the routine hospital visits were temporarily cancelled or postponed including the antenatal routine check-ups [4]. Hence, this put extra pressure and stress on the pregnant women as they needed to pay extra attention to their health while maintaining a good weight during these unprecedented times. Such stress might have led to pregnant women to indulge in
easily accessible food while following a sedentary lifestyle with potential weight gain and deterrent effects on the unborn child. As restrictions were slowly lifted, pregnant women had to make the difficult decision whether accessing antenatal care was more important that the risk of exposure to COVID-19, further increasing stress upon the pregnant women [23]. It is important to note that remote antenatal care was available in some places [23].

Not all COVID-19 pandemic related measures brought about nasty outcomes as these unprecedented times may have brought families closer together. Parents that shifted to telework had more time with their children. Needless to say, these faced new challenges in trying to balance taking care of their children, home-schooling them while at the same time tele-working. Nonetheless stronger family bonds are expected to have been developed as more family events under one roof had to be catered for.

**Imminent and post-COVID recommendations**

As Summer 2020 comes to an end, countries are faced with a number of challenges as the new scholastic year approaches. Children’s education, social and emotional skills are hanging by a thread following the abrupt termination of physical learning. It is adamant that children are re-introduced to an educational routine and facilitate physical activity [24]. This will not only be beneficial for their behavioural health but also forms part of the ‘fight’ against childhood obesity. However, safety measures and threshold indicators for the identification of local COVID-19 risk transmission within schools is crucial [5].

Curbing the viral spread while protecting population health will remain a top priority until an effective COVID-19 vaccine is available. However, it is imperative to address other co-existing problems such as childhood obesity, which if uncontrolled may have a long-term profound health and economic consequence of higher eminence than the actual COVID-19 infection [10]. Healthcare and educational systems should engage in an adequate supporting and managing system to deal with childhood obesity. Educating the parents on food availability, convenience and how to choose food wisely even if on a budget, is an issue that needs to be tackled. Advocacy for physical activity while maintaining social distancing is a must. Special attention should also be given to pregnant women with obesity to protect and prevent obesity developing within the life course of the unborn child. The prevention and management of childhood obesity should therefore be set as a priority at an individual, community and population levels during this pandemic.

**Authors’ contributions** Both authors SC and SG gave equal contributions in the literature review, writing and reviewing of the article.

**Funding** This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Data availability** This is a review, so article is based on the referenced material and author’s expertise.

**Compliance with ethical standards**

**Conflict of interest** None to declare.

**Ethics approval** Not applicable.

**Code availability** not applicable.

**References**

1. World Obesity Federation. Global Atlas on Childhood Obesity [Internet]. London; 2019. Available from: https://www.worldobesity.org/nlsegmentation/global-atlas-on-childhood-obesity. Accessed 3 Sept 2020.

2. González-Muniesa P, Martín-González M-A, Hu FB, Després J-P, Matsuzawa Y, Loos RJF, et al. Obesity. Nat Rev Dis Prim [Internet]. Nature Publishing Group; 2017 [cited 2020 May 27];3:17034. Available from: http://www.nature.com/articles/nrdp201734. Accessed 3 Sept 2020.

3. World Health Organization (WHO). WHO Director-General’s opening remarks at the media briefing on COVID-19 - 11 March 2020 [Internet]. 2020 [cited 2020 Apr 15]. Available from: https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19%2011-march-2020. Accessed 3 Sept 2020.

4. Cuschieri S. COVID-19 panic, solidarity and equity—the Malta exemplary experience. J Public Health (Bangkok) [Internet]. Springer; 2020 [cited 2020 Jun 3];1-6. Available from: http://link.springer.com/10.1007/s10389-020-01308-w. Accessed 3 Sept 2020.

5. Centers for Disease Control and Prevention. COVID-19 - School Reopening: Indicators to Inform Decision Making [CDC [Internet]. Centers Dis. Control Prev. 2020 [cited 2020 Sep 19]. Available from: https://www.cdc.gov/coronavirus/2019-ncov/community/schools-childcare/indicators.html. Accessed 3 Sept 2020.

6. Rundle, AG., Park, Y., Herbstman, JB., Kinsey, EW., Wang Y. COVID-19-Related School Closings and Risk of Weight Gain Among Children. Obesity (Silver Spring) [Internet]. Obesity (Silver Spring); 2020 [cited 2020 May 28];28. Available from: https://pubmed.ncbi.nlm.nih.gov/32227671/. Accessed 3 Sept 2020.

7. Pietrobelli A, Pecoraro L, Ferruzzi A, Heo M, Faith M, Zoller T, et al. Effects of COVID-19 Lockdown on Lifestyle Behaviors in Children with Obesity Living in Verona, Italy: A Longitudinal Study. Obesity [Internet]. John Wiley & Sons, Ltd; 2020 [cited 2020 May 28];obz.22861. Available from: https://onlinelibrary.wiley.com/doi/abs/10.1002/oby.22861. Accessed 3 Sept 2020.

8. Ribeiro KD da S, Garcia LRS, Dametto JF dos S, Assunção DGF, Maciel BLL. COVID-19 and Nutrition: The Need for Initiatives to Promote Healthy Eating and Prevent Obesity in Childhood. Child Obes [Internet]. Mary Ann Liebert, Inc., publishers 140 Huguenot Street, 3rd Floor New Rochelle, NY 10801 USA; 2020 [cited 2020 Sep 19];16:235–7. Available from: https://www.liebertpub.com/doi/10.1089/chi.2020.0121. Accessed 3 Sept 2020.

9. Asigbee FM, Davis JN, Markowitz AK, Landry MJ, Vandyousefi S, Ghaddar R, et al. The Association Between Child Cooking

9. Asigbee FM, Davis JN, Markowitz AK, Landry MJ, Vandyousefi S, Ghaddar R, et al. The Association Between Child Cooking
Involvement in Food Preparation and Fruit and Vegetable Intake in a Hispanic Youth Population. Curr Dev Nutr [Internet]. Curr Dev Nutr; 2020 [cited 2020 Sep 19];4:nzaa028. Available from: http://www.ncbi.nlm.nih.gov/pubmed/32258989. Accessed 3 Sept 2020.

10. Nicola M, Alsafi Z, Sohrabi S, Kerwan A, Al-Jabir A, Iosifidis C, et al. The socio-economic implications of the coronavirus pandemic (COVID-19): A review. Int J Surg [Internet]. Elsevier; 2020 [cited 2020 May 28];78:185–93. Available from: http://www.ncbi.nlm.nih.gov/pubmed/32305533. Accessed 3 Sept 2020.

11. Guan H, Okely AD, Aguilar-Farias N, Del Pozo Cruz B, Draper CE, El Hamdouchi A, et al. Promoting healthy movement behaviours among children during the COVID-19 pandemic. Lancet Child Adolesc Heal [Internet]. Elsevier; 2020 [cited 2020 May 28];4:416–8. Available from: http://www.ncbi.nlm.nih.gov/pubmed/32458805. Accessed 3 Sept 2020.

12. Sport New Zealand IHI Aotearoa. Guidance for physical activity at COVID-19 alert level 3 | Sport New Zealand - IHI Aotearoa [Internet]. Sport New Zal. IHI Aotearoa. 2020 [cited 2020 Sep 22]. Available from: https://sportnz.org.nz/about/news-and-media/media-centre/guidance-for-physical-activity-at-covid-19-alert-level-3/. Accessed 3 Sept 2020.

13. Inchley, J, Currie, D, Budisavljevic, S, Torsheim, T, Jåstad A, Cosma A et al. Spotlight on adolescent health and well-being. Findings from the 2017/2018 Health Behaviour in School-aged Children (HBSC) survey in Europe and Canada. International report. Volume 1. Key findings. Copenhagen; 2020.

14. Nagata JM, Abdel Magid HS, Pettee Gabriel K. Screen Time for Children and Adolescents During the Coronavirus Disease 2019 Pandemic. Obesity [Internet]. John Wiley & Sons, Ltd; 2020 [cited 2020 Sep 19];28:1582–3. Available from: https://onlinelibrary.wiley.com/doi/abs/10.1002/oby.22917. Accessed 3 Sept 2020.

15. Tripathi M, Mishra SK. Screen time and adiposity among children and adolescents: a systematic review. J Public Health (Bangkok) [Internet]. Springer; 2020 [cited 2020 May 28];28:227–44. Available from: http://link.springer.com/10.1007/s10389-019-01043-x. Accessed 3 Sept 2020.

16. Marsh S, Ni Mhurchu C, Maddison R. The non-advertising effects of screen-based sedentary activities on acute eating behaviours in children, adolescents, and young adults. A systematic review. Appetite [Internet]. Appetite; 2013 [cited 2020 May 28];71:259–73. Available from: http://www.ncbi.nlm.nih.gov/pubmed/24001394. Accessed 3 Sept 2020.

17. Franckle R, Adler R, Davison K. Accelerated weight gain among children during summer versus school year and related racial/ethnic disparities: A systematic review. Prev Chronic Dis [Internet]. Prev Chronic Dis; 2014 [cited 2020 May 28];11. Available from: https://pubmed.ncbi.nlm.nih.gov/24921899/. Accessed 3 Sept 2020.

18. von Hippel PT, Workman J. From Kindergarten Through Second Grade, U.S. Children’s Obesity Prevalence Grows Only During Summer Vacations. Obesity (Silver Spring) [Internet]. Obesity (Silver Spring); 2016 [cited 2020 May 28];24:2296–300. Available from: http://www.ncbi.nlm.nih.gov/pubmed/27804271. Accessed 3 Sept 2020.

19. An R. Projecting the impact of COVID-19 pandemic on childhood obesity in the U.S.: A microsimulation model. J Sport Heal Sci [Internet]. Elsevier; 2020 [cited 2020 May 28]; Available from: https://www.sciencedirect.com/science/article/pii/S209525462030065X. Accessed 3 Sept 2020.

20. Jogdand SS, Naik J. Study of family factors in association with behavior problems amongst children of 6–18 years age group. Int J Appl basic Med Res [Internet]. Wolters Kluwer – Medknow Publications; 2014 [cited 2020 Sep 22];4:86–9. Available from: http://www.ncbi.nlm.nih.gov/pubmed/25143882. Accessed 3 Sept 2020.

21. Leddy MA, Power ML, Schulkin J. The impact of maternal obesity on maternal and fetal health. Rev Obstet Gynecol [Internet]. MedReviews, LLC; 2008 [cited 2020 May 28];1:170–8. Available from: http://www.ncbi.nlm.nih.gov/pubmed/19173021. Accessed 3 Sept 2020.

22. Centers for Disease Control and Prevention. Others At Risk for COVID-19 | CDC [Internet]. Centers Dis. Control Prev. 2020 May 28]. Available from: https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/other-at-risk-populations.html. Accessed 3 Sept 2020.

23. Esegbona-Adeigbe S. Impact of COVID-19 on antenatal care provision. Eur J Midwifery [Internet]. E.U. European Publishing; 2020 [cited 2020 Sep 22]. Available from: https://www.eurj-midwifery.org/article/10.1016/j.ejm.2020.06.004. Accessed 3 Sept 2020.

24. Unicef. Framework for reopening schools [Internet]. 2020. Available from: https://www.unicef.org/sites/default/files/2020-06/Framework-for-reopening-schools-2020.pdf. Accessed 3 Sept 2020.

Publisher’s note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.