

## **Reduced physical activity and increased sedentary behaviour: The damage on young people during the COVID-19 pandemic**

### **Abstract**

Health childhood development is fostered through movement behaviours, including sufficient physical activity (Moore et al. 2020). This article reviews some of the recently published global studies that have examined the impact of COVID-19 on children's physical activity and sedentary behaviours, the majority of which have indicated that children's physical activity behaviours have lessened significantly during these times, while their sedentary behaviours have risen significantly. The authors then go on to make some suggestions of ways in which to encourage and foster physical activity for both children and their families, for example by showing people different ways of staying active, and offering other opportunities for physical activity, as well as ensuring the feeling of staying safe and protected.

### **Keywords**

Physical activity; Sedentary behaviour; Children; family; COVID-19

### **Key points**

Recent research has shown that COVID-19 has significantly impacted children's physical activity and sedentary behaviours.

This has the potential to impact associated levels of physical activity and sedentary behaviour long-term, therefore it is vital for us to encourage and foster physical activity in children.

The COM-B model of behaviour (Michie et al 2011) can be used to identify what needs to change in order for behavioural interventions to be effective.

One factor would be to include the whole family in suggestions for physical activity, helping families to come up with ways of making physical activity part of their daily routine, as well as showing people other ways of being physically active.

### **Reflective questions**

Is there anything you can do in your day-to-day discussions with young people that might impact the way they view physical activity more positively?

What methods could you use to help foster positivity towards physical activity in the families and young people you speak to?

Have a think about the COM-B model, and how particular behaviours you are trying to encourage, may fit into the model.

Healthy childhood development is fostered through sufficient physical activity (PA), limiting sedentary behaviours (SB), and adequate sleep; collectively known as movement behaviours (Moore et al. 2020). Stockwell et al. (2021) define PA as any bodily movement produced by skeletal muscle that results in energy expenditure, and can include exercising, walking, gardening and doing household chores. SB can be defined as any waking behaviour with an energy expenditure of  $\leq 1.5$  Metabolic Equivalents (METs) while in a sitting or reclining posture, including watching TV, video gaming and computer use (Stockwell et al., 2021).

Recent statistics show that in the UK, 9.7 % and 20.2% of children aged four-to-five years and 10-11 years respectively were classed as obese or severely obese in 2018/19 based on data from the National Child Measurement Programme (NCMP). Compared to 2009/10 NCMP data, this represents an overall increasing trend (National Child Measurement Programme, England 2018/19 School Year, 2019), and an escalating problem in our paediatric population. Obese children are at an increased risk of several physical and psychological comorbidities throughout the lifespan including during childhood where there is an increase in cardiometabolic risk, and chronic illness and premature death later in life (Kumar & Kelly, 2017; Sharma et al. 2019). Whilst the causes of childhood obesity can be multifaceted, one of the main elements that contribute to obesity is the long-term dysregulation of energy balance; an over-consumption of high-energy foods meaning often too high an high energy intake, along with an energy expenditure that is too low, based on spending too much time partaking in SB's and not enough PA. Whilst the UK government have set a target to cut childhood obesity by half by 2030, worryingly, rates are showing an overall increasing trend.

The coronavirus disease (COVID-19) pandemic has had far-reaching health, social, and economic implications worldwide (Pietrobelli et al. 2020). Since the start of the pandemic, many countries, including the UK, were put into lockdown, an inevitable method of prevention, to limit movement of the public. This meant that the public were banned from participating in unnecessary outdoor activities during COVID-19, encouraging people to stay at home and stay indoors as much as possible. Whilst these lockdowns aimed to limit the spread of COVID-19 and related deaths, these

lockdowns had the potential to impact associated levels of physical activity and sedentary behaviour long-term (Stockwell et al. 2021). Still today, social restrictions including remote learning and the closure of activities that children and young people would normally attend, such as dance classes or football sessions, have made it difficult for children and adolescents to engage in physical education, sports, or other forms of school-related or community-based organized physical activity.

Additionally, parental limitations due to working from home or loss of childcare may have created challenges in finding ways to keep their children physically active (Bates et al. 2020). A number of pieces of recent research have examined the extent that COVID-19 restrictions have had on children globally in particular, in terms of their PA and SB.

Dunton, Do and Wang (2020) carried out research examining the effects of the COVID-19 pandemic on PA and SB in U.S. children. They found that on average, children engaged in about 90 min of school-related sitting and over 8 hours of leisure-related sitting a day. Parents of older children (ages 9-13) vs. younger children (ages 5-8) perceived greater decreases in PA and greater increases in SB from the pre- to early-COVID-19 periods. The authors concluded that short-term changes in PA and SB in reaction to COVID-19 may become permanently entrenched, leading to increased risk of obesity, diabetes, and cardiovascular disease in children. Given the increasing time since lockdown measures were introduced, the potential problems routed in SB and low levels of PA are likely to be exacerbated.

Moore et al. (2020) carried out an online survey of Canadian parents (n = 1472) of children (5-11 years) or youth (12-17 years) (54% girls) that assessed immediate changes in child movement and play behaviours during the COVID-19 outbreak. Behaviours included PA and play, SB, and sleep. They found that only 4.8% (2.8% girls, 6.5% boys) of children and 0.6% (0.8% girls, 0.5% boys) of youth were meeting combined movement behaviour guidelines during COVID-19 restrictions. Children and youth had lower PA levels, less outside time, higher SB (including leisure screen time), and more sleep during the outbreak. Parental encouragement and support, parental engagement in PA, and family dog ownership were positively associated with healthy movement behaviours. Therefore this

research demonstrates that family engagement could indeed lessen the negative effects of the pandemic restrictions by encouraging more PA and less SB within the family unit.

Pietrobelli et al. (2020) carried out a study looking at 41 children and adolescents with obesity, participating in a longitudinal observational study located in Verona, Italy. Lifestyle information including diet, activity, and sleep behaviours was collected at baseline and three weeks into Italy's national lockdown. There were no changes in reported fruit and vegetable intake during the lockdown, but they did find that potato chip, red meat, and sugary drink intakes increased significantly. In terms of PA and SB, they found that the time the participants spent in sports activities decreased significantly, and sleep time and screen time both increased significantly. Thus, this dysregulation in energy expenditure is what could have far-reaching consequences for long-term health in these children.

Xiang et al. (2020) conducted a natural experimental longitudinal study among 2427 children and adolescents (6–17 years) in five schools in Shanghai, China. The first survey was conducted from 3 to 21 January 2020 (the public health emergency was activated in Shanghai from January 24, 2020) and the second survey from 13 to 23 March 2020 (during the pandemic). They found that overall, the average amount of time spent in PA decreased drastically, from 540 min/week (before the pandemic) to 105 min/week (during the pandemic). They also found that the prevalence of physically inactive students increased significantly, from 21.3% to 65.6%. Screen time considerably increased during the pandemic in total (up by 1730 min, or approximately 30 hours per week, on average). This suggests that during the pandemic these children were not meeting the current global physical activity guidelines set by the World Health Organization (WHO) which states that children and youth accumulate at least 60 minutes of moderate-to-vigorous physical activity each day to achieve health benefits (WHO, 2010).

Between April and June 2020, McCormack, Baker, Peterson and Ghoneim (2020) surveyed 345 parents of at least one school-aged child (80.5% aged 5 to 11 years and 54.9% male) in Calgary,

Canada. They found that during this period, most children increased television watching, computing or gaming, and use of screen-based devices. They also found that half of children decreased playing at the park and in public spaces. This increase in SB is likely at the expense of there currently being less opportunity to partake in PA due to a lack of extracurricular sports activities in schools, and shutdown of organised sports and public sports facilities. These are just a sample of global studies that have recently examined the impact of the COVID-19 pandemic on young peoples' PA and SB, as well as their dietary intake, but the results are concerning. All of the research points to the fact the pandemic is having a negative impact on their lifestyles, which as already mentioned, could have far-reaching consequences.

So what should we do next? Given the numerous physical and psychological benefits of increased physical activity and decreased sedentary behaviour, public health strategies should include the creation and implementation of interventions that promote safe physical activity and reduce sedentary behaviour should other lockdowns occur. (Stockwell et al. 2021)

The COM-B model of behaviour (see Figure 1) is widely used to identify what needs to change in order for a behavioural intervention to be effective (Michie et al. 2011). The COM-B model suggests that in order for a behaviour to occur, the person concerned must have the capability, and opportunity to engage in the behaviour, and is motivated to enact that behaviour. Capability relates to the individual's psychological and physical capacity to engage in the activity concerned such as having the knowledge and skills to perform the behaviour, in this case a particular PA. Motivation relates to all those brain processes that energise and direct behaviour, not just goals and conscious decision-making. In this case, how motivated the child is to partake in PA. Opportunity relates to the factors that are beyond the individual that make the behaviour possible. For example, the space to exercise or the equipment needed for a particular PA. There is the potential for each component of the model to influence another; for example opportunity can influence motivation; if there is a lack of access to an open space such as a garden, then this could reduce motivation to want to play football and partake in PA.

Evidence from the literature reviews provided substantial support for the importance of family on children's movement behaviours and highlighted the importance of inclusion of the entire family system as a source of influence and promotion of healthy child and youth movement behaviours (Rhodes et al. 2020). Relating to the COM-B model described above, motivation is an important factor which can enable a particular behaviour. It is therefore important to focus our efforts on also including the entire family, and trying to find ways to encourage and motivate family members to work together, and partake in physical activities, both indoors and outdoors, rather than just sticking to more sedentary behaviours, such as watching television indoors.

Parental anxiety can also have an impact on children's PA and SB. McCormick et al. (2020) also found that children of more anxious parents had fewer visits to the park and were more likely to spend more than two hours a day on computing or gaming compared with children of less anxious parents. It is therefore important when we are thinking of strategies to increase young peoples' PA, to consider family members, and how to make people feel comfortable, and give them that feeling of capability, for example coming up with 'safe' ways to be physically active and providing the knowledge for how to keep safe outdoor such as maintaining social distance.

Rundle et al. (2020) point out that while increases in sedentary activity affect all children, they are likely to have the largest impact on children living in more urban areas, who do not have access to safe, accessible outdoor spaces where they can maintain social distancing. For these children, then lack the opportunity for exercising outdoors which will be detrimental for the behaviour to take place. While parks and playgrounds remain open in much of the UK, Rundle et al. (2020) suggest that there is widespread appreciation that it is not possible to keep the playgrounds clean and children will have difficulty maintaining social distance, leading to urban families sometimes electing not to use these spaces, exacerbating the disparity between those who can/cannot remain physically active outdoors. Therefore it is also important to show people other ways of staying active, to offer other opportunities for PA, as well as ensuring the feeling of staying safe and protected.

Lambrese (2020) suggests that it is important to respond to the uncertainty of COVID by developing some routine and structure in the child's day, and suggested that fostering a sense of predictability at home can go a long way in helping children cope with an uncertain world. He suggests that while it is important to set aside time each school day for children to complete schoolwork, it is also vital to take appropriate breaks, and plan activities for the child or family to do during these breaks such as doing physical activity, and going outside.

McCormick et al. (2020) found that in the period of April and June 2020, children's physical activity at home either increased (48.8%) or remained unchanged (32.9%). The cancellation of youth sports and activity classes have inspired programs, coaches, independent fitness professionals, and other entities to offer online streaming services with live or recorded sports/activity classes for youth using platforms such as Zoom, YouTube, Instagram, and proprietary mobile applications (Dunton et al. 2020). This has led to there still being the capability and opportunity for children to remain active albeit in potentially different way to before the pandemic. This is one way of encouraging people and enabling them to be physically active at home by providing different opportunities, and it is important to advertise these well to families so that they are aware of different options of being capable and enjoying PA at home.

## **Conclusion**

Research has shown that the COVID-19 pandemic has had an enormous impact on young peoples' physical activity and sedentary behaviours globally, with a decrease in overall physical activity, and an increase in sedentary behaviours. It is vitally important for our children to be physically active, and to try and put a stop to a new, more sedentary lifestyle being something that young people continue even once lockdown has ended. It is also important that the issue of decreased physical activity be addressed due to the length of time children and young people are enduring this pandemic and its lockdown measures, but also because we know the dangerous impact of a more sedentary lifestyle and a decrease in PA can have on our long-term physical and psychological



health. There are a number of ways the authors suggest might help. We should consider how behavioural intervention should ensure that children have the capability, opportunity and motivation to carry out the behaviour of PA. A major factor being to include the whole family in suggestions for physical activity, helping families to come up with ways of making physical activity part of their daily routine, as well as showing people other ways of being physically active, as well as going outside, using online platforms such as dance and high-intensity exercise classes for children on YouTube.

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**Figure 1 The COM-B model of behaviour**

