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COVID-19, childhood obesity and NAFLD: Colliding pandemics

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The COVID-19 pandemic drastically affected the lives of children and young people worldwide in 2020 and 2021. Public health measures to reduce community transmission of SARS-CoV-2 included unprecedented school closures and stay-at-home orders. In the UK, national lockdown measures in March 2020 closed nurseries, primary and secondary schools, as well as universities, for most students through the remainder of the school year. Primary and secondary schools were again closed in the UK from January to early March in 2021. Alongside these school closures were varying levels of restrictions on outdoor recreation, social gatherings and economic activities. Although the role of social inequalities in exacerbating the negative impacts of lockdown on the health and wellbeing of children was evident after the first wave of COVID-19,[1] stark new data highlight the effects of the pandemic and socioeconomic deprivation on childhood obesity rates.[2,3]

Prior to COVID-19, obesity was recognised as a global pandemic and one of the largest threats to public health in many countries. The number of children and adolescents (aged 5-19 years) living with obesity worldwide increased more than tenfold from 11 to 124 million between 1975 and 2016. No longer exclusive to high-income countries, increasing prevalence of overweight and obesity have been observed in many low- to middle- income countries since 2000. These data are concerning, because numerous studies have shown that paediatric obesity strongly predicts adult obesity and increased risk of mortality from cardiometabolic disease, including non-alcoholic fatty liver disease (NAFLD).[4] Now reports from multiple countries suggest further increases in childhood obesity, linked closely to socioeconomic status during the pandemic.[2,3]

Some of the most alarming data come from England where, since 2006, a comprehensive National Child Measurement Program (NCMP) has measured the height and weight of children when they start (reception, aged 4 to 5) and finish (year 6, aged 10 to 11) primary school. Pre-covid, childhood obesity prevalence in England was already a major concern. Although obesity prevalence in children starting school had remained stable from the school years' 2006/07 to 2019/20, at approximately 10%, the percentage of final year students living with obesity had steadily climbed from 17.5 to 21%. In contrast, the NCMP data from 2020/21 suggest sharp increases in obesity prevalence to an overall 14.4% in reception, and 25.5% in final year students. Moreover, the data illustrate a substantial widening in the deprivation gap, suggesting these increases have largely occurred in children attending schools in the most deprived areas. Obesity prevalence was over twice as high for children living in the most deprived areas than for children living in the least deprived areas in both year groups (7.8 vs 20.3% in reception; 14.3% vs. 33.8% in year 6). In the USA, similar socioeconomic disparities in obesity in children (ages 2-17) have increased during the pandemic.[3]

Nearly one in three children (31%) in the UK are currently living in poverty, which is inextricably linked to poor nutrition and obesity.[5] The relationship between poverty and childhood obesity is multi-faceted, with stress in early life compounded by adverse food environments. Chronic stress exposure (including poverty, food insecurity, parental, and family stress) during childhood alters both biological and behavioural pathways that increase obesity risk.[6] Risk is

further increased by obesogenic food environments in the most deprived communities, which have the highest density of fast-food outlets and least access to green and physical activity spaces. Healthy food is expensive, and the poorest neighbourhoods are often food deserts with poor public transport and an absence of high-quality supermarkets, severely limiting community access to affordable fresh fruit and vegetables.

Although COVID-19 inflicted multiple stressors on many families, job losses were disproportionately experienced in already vulnerable communities. School closures were particularly detrimental for children living in poverty, for whom school provides access to healthy food, physical activity, health and social care, as well as social networks and familiar routines.[7] Similarly, although stay-at-home orders and restrictions on outdoor recreation increased sedentary and screen time for all, children living in densely populated urban areas with no access to green space were particularly impacted. Maintaining healthy behaviours requires high personal agency, time, and cognitive, psychological, and material resources that vulnerable families struggled with pre-pandemic.[5] Since parental stress and mental illness, along with disruptions to social environments during childhood, are associated with weight gain and obesity in children,[7] it is sadly no surprise that this confluence of COVID-19 related stressors has increased childhood obesity prevalence.

Hepatologists should be very concerned about these data. An estimated 34% of children living with obesity have NAFLD.[4] Although genetic risk influences NAFLD pathogenesis, disease progression is linked closely to obesity, and diet and lifestyle are critical determinants.[8] A population-based study (with data that predated COVID-19) that assessed 4,021 24-year-olds by transient elastography with FibroScan, showed that 21% of UK young adults had steatosis.[9] Concerningly 10% of participants had evidence of severe steatosis and 2.7% had evidence of liver fibrosis. Although progression to end-stage liver disease is generally on the order of decades, these data alarmingly suggest that without lifestyle intervention, there will be a substantial burden of liver disease in 50-year-olds in the very near future. The EASL-*Lancet* Liver Commission has very recently proposed a fundamental shift from the management of end-stage liver disease to health promotion, prevention and early treatment of liver disease.[10] The Commission's call for population-level interventions (including policy measures aimed at reducing social inequities and improving the food environment) might seem radical to hepatologists, but is a welcome and timely recognition of long-fought for public health recommendations. The driving question for all of us must be: if these trends in childhood obesity are allowed to continue unchecked, what will the morbidity and life expectancy costs be?

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