A novel modelling approach to assess obesity prevention at the population level: limitations and opportunities

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Obesity prevention and treatment interventions in childhood have become paramount due to an increase in the prevalence of childhood obesity worldwide[1,2] and its associated long-term health consequences.[3] However, many efforts have been made to find effective prevention and treatment programmes for obesity in children, which is encouraging. For example, in children aged 0–5 years, the Healthy Beginnings trial[4] and its related CHAT trial[5] used nurse-led home visits or telephone calls to support parents and their children aged 0–2 years or 2–3 years, which led to a statistically significant 0·29 kg/m² lower mean BMI of these children compared with children in the control group and 0·59 kg/m² lower mean BMI of these children compared with children from households with lower income. In children aged 6–18 years, an update to a Cochrane systematic review and meta-analysis found a small beneficial effect with a standard mean difference of –0·03 of school-based obesity prevention interventions on BMI.[6] These individual intervention programmes show some promising but very small effects on reducing the BMI of children. However, the effects of the systematic delivery or scale-up of these intervention programmes at the population level remain unknown. Thus, understanding the potential effects of obesity interventions on the prevalence of childhood obesity at the national population level is of great public health importance.

Simon J Russell and colleagues[7] conducted a timely modelling study that aimed to estimate the potential effect sizes (ie, decreases in obesity prevalence) of obesity prevention and treatment interventions in children aged 2–18 years at the national level in England. The modelling was based on data from the Health Survey of England and used estimates of effect sizes obtained from systematic reviews. Their findings showed that obesity interventions could contribute to a meaningful extent to reducing the prevalence of obesity in children and young people, should they be delivered systematically and at scale. The authors also found that the intervention programmes could contribute to addressing inequalities in childhood obesity, should their equal uptake be achieved across social, cultural, and economic groups. These findings are important in advocating for government investment in evidence-based interventions that can be scaled up at the national level, which could then reduce the overall prevalence of childhood obesity.

However, similar to other simulation models, their modelling was limited by applying various scenarios that might not be realistic. The baseline scenario was based on data collected between Jan 1, 2010, and Dec 31, 2019, and involved no preventive or treatment interventions. Imagining that children and young people had not been exposed to any kind of obesity-prevention intervention during an entire decade is difficult for readers to imagine. Furthermore, the intervention scenarios included high compliance and delivery according to the national guidelines, which is often not the case. Their modelling was also limited by the use of pooled estimates of effect sizes from systematic reviews predominantly including studies conducted in high-income countries, which were largely generated from trials of traditional approaches to obesity prevention and management services. Both of these limitations have the crucial issue of generalisability of findings to low-income countries and to widely applied digital health (ie, smartphone apps and social-media interventions). Furthermore, the validation of this new modelling technique warrants further exploration. Russell and colleagues' methods of modelling should be replicated or tested with data from low-income countries and updated estimates of effect sizes from digital health interventions. Moreover, the modelling could be improved by including the overweight status of children, as many interventions target children with both overweight and obesity. The cost-effectiveness of various interventions should also be considered in future modelling.

Despite these limitations, Russell and colleagues deserve credit for their efforts in pioneering a novel approach in estimating the potential effects of scaled-up obesity-prevention programmes at the population level. However, there is an equal need to explore how to scale up effective interventions and how to integrate evidence-based intervention strategies into

routine health services. To date, few childhood obesity interventions have been delivered and evaluated systematically and at scale in real-world conditions. Most research has focused on testing the effectiveness of childhood obesity interventions typically through randomised controlled trials with strict selection criteria of study participants and specific research conditions. To establish improved effects in public health research, effective childhood obesity interventions need to be delivered at scale and implemented broadly across populations.[8]

The modelling study by Russell and colleagues[7] can help inform public health researchers and practitioners not only on finding effective intervention programmes, but in considering the benefits of intervention programmes when scaled up at the national level as well. The study can also offer public health professionals and government officials an estimate how overall prevalence of childhood obesity could be reduced in England, and potentially other countries, through the successful scaling up of evidence-based intervention programmes.

I declare no competing interests.

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