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Preventing obesity through school based approaches to improve nutrition

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Multicomponent and nutrition education interventions are promising, but school based interventions are only part of the solution

Obesity is one of the greatest threats to public health, contributing considerably to the global burden of non-communicable diseases[1] and causing 2.6 million deaths each year.[2] Preventing childhood obesity is a particular public health target, both to avert adult obesity and future health risks, and to reduce physical, social, and mental ill health in children and adolescents.[3 4] Despite both sides of the energy balance equation contributing to the development of obesity (diet (energy in) and physical activity (energy out)), changes to food systems and the resulting impact on dietary intake are widely accepted as the key driver of the large increases in obesity seen over the past 50 years.[5] Therefore, a logical approach to preventing childhood obesity is through interventions aiming to improve nutrition and reduce energy intake, and schools provide an opportune setting for their delivery. The scale of this public health issue has driven a substantial amount of research into school based interventions to prevent obesity and improve nutrition in the past 25 years. However, the evidence for the effectiveness of these approaches, both in preventing obesity and improving nutritional intake, is inconsistent and we still do not have a clear idea of what interventions to adopt.[6 7]

In a linked paper (doi:10.1136/bmjmed-2022-000346), Nury and colleagues[8] attempt to resolve this knowledge gap by classifying school based interventions to prevent obesity and improve nutrition into six different types, and then comparing them by using both pairwise and network meta-analysis approaches. The advantage of network meta-analyses is the ability to compare different intervention types with one another both directly and indirectly, and to rank them in terms of their effectiveness.[9] The researchers identified 51 relevant cluster randomised controlled trials, including 75 954 participants. Most of the interventions were classified into three of the six types: nutrition education and literacy, nutrition friendly school initiatives, and multicomponent interventions (which included components from at least two of the six intervention types). A range of outcomes were examined, including multiple measures of overweight or obesity and dietary intake.

The pairwise comparisons revealed similar findings to existing systematic reviews.[6 7] Overall, the interventions, compared with control, had little or no effect on measures of overweight and obesity, with the exception of the multicomponent interventions, which resulted in a reduction in overweight (but not obesity) incidence and prevalence. Regarding fruit and vegetable intake, the pairwise meta-analysis of all, interventions (compared with controls) showed moderate increases in consumption in the intervention groups. In their network meta-analysis, Nury and colleagues provide novel and more nuanced findings. However, the interpretation of these findings is challenging. The researchers reported potential superiority of nutrition education and literacy over multicomponent interventions in reducing standardised body mass index scores (z scores), but likely superiority of multicomponent interventions over nutrition friendly school initiatives in reducing body fat. A different picture was presented again when considering waist circumference, with nutrition friendly school initiatives, but not other intervention types, being potentially effective in reducing this measure of obesity. The network meta-analysis findings were a little more consistent regarding fruit and vegetable intake, with nutrition education and literacy and multicomponent interventions most likely to result in an increase in consumption.

Nury and colleagues used a comprehensive risk-of-bias assessment, and rated the certainty of their network meta-analysis estimates through use of the GRADE (grading of recommendations, assessment, development and evaluations) approach.[10] No included studies had a low overall risk of bias, and no comparisons within the network meta-analysis were graded as having more than a moderate certainty of evidence. In addition, very few trials directly compared different intervention types, which resulted in a reliance on indirect comparisons in the network meta-analysis and lower certainty of evidence. The length of follow-up was short for most included trials, with 31 only measuring outcomes post-intervention. These factors limited the interpretation of which interventions lead to sustained change in obesity related and dietary outcomes.

Despite these limitations, Nury and colleagues aimed to identify the best intervention by ranking intervention types. Nutrition education and literacy and multicomponent interventions seem to be the most promising, but what does this mean in real world terms for policy and practice? Nearly half of all included interventions were classified as multicomponent, which is a broad and mixed category, making it difficult to appreciate what an effective multicomponent intervention looks like. Nury and colleagues did not explicitly present the classifications of components within the multicomponent interventions, but almost all included some form of

nutrition education. This overlap presents a difficulty when comparing multicomponent with nutrition education and literacy intervention types.

The positive findings for nutrition education and literacy interventions also warrants further consideration. The categorisation used in this study included a variety of interventions, which, as well as instructional content, incorporated different techniques to influence behaviour change in children or families.[11] As the authors highlighted, one possible future approach to address this and better understand the intervention elements that work best would be to conduct a component network meta-analysis,[12] in which the effects of different intervention components could be compared.

Furthermore, with regards to complex interventions such as school based nutrition programmes, a "one size fits all" approach is unlikely to work, and different interventions might be needed in different contexts. Few of the included trials were from low or middle income countries, and so the findings might not apply to these settings. Also, as Nury and colleagues pointed out, the most effective interventions in different age groups, school settings (ie, primary *v* secondary), genders, and socioeconomic groups need to be further explored. The review did not cover the large body of evidence on school based interventions combining dietary and physical activity approaches to prevent obesity in children, and while energy intake might be the major contributor to the development of obesity, energy expenditure can play a part in the solution. A similar network meta-analysis approach could also provide new insights into the effectiveness of these combined interventions.

Nury and colleagues' paper undoubtedly adds to the existing evidence on school based nutrition approaches to prevent obesity. However, it also serves as a reminder that approaches focusing only through the school setting lead to marginal changes at best, and are unlikely on their own to provide the solution to the pressing public health problem of childhood obesity. To truly affect change, school based interventions need to be accompanied by intervention approaches targeting all environments within which children are situated, and by wider changes to the food system and at a societal level.

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