

Letter to the Editor

Don't lose sight of the forest for the trees: recognising the benefits as well as the limitations of implementation research

We write to thank Hannon *et al.* for their interest⁽¹⁾ in our recent paper that reported pre-post programme changes in anthropometric outcomes for the upscaled community programme Parenting, Eating and Activity for Child Health (PEACH) QLD⁽²⁾. Their letter identified several weaknesses in the study design including a lack of control group and the possibility of a regression to the mean (RTM) effect arising due to selection bias. Whilst we acknowledge there are indeed limitations to this and other implementation research study designs, we nevertheless feel that our findings are important and here provide further details of our data to strengthen the basis of our conclusions.

Hannon *et al.* suggested that our changes in BMI_z can be exclusively explained by RTM which may arise wherever there are random fluctuations in biological variables and where there is error associated with their measurement⁽³⁾. We accordingly took appropriate steps to maximise the accuracy of the pre- and post-programme anthropometric measurements, including protocols to minimise within- and between-subject measurement error⁽⁴⁾ and we also excluded biologically implausible BMI *z*-scores⁽⁵⁾. This will not however have prevented the inclusion of some overweight children that were assessed towards the high point of their natural weight variation and therefore the potential for to RTM effect, in which more extreme population values have greater potential to regress towards the mean when measured again⁽⁶⁾.

In our published paper, our population included only children above a healthy weight pre-programme and did not explore changes in BMI_z by level of overweight. We have, however, previously reported changes made during PEACH QLD that included healthy weight children as part of a universal approach to child healthy lifestyle promotion⁽⁷⁾. In the present study, the BMI_z change in healthy weight children with paired pre-post programme data (*n* 58) was -0.02 (from 0.32 to 0.31). This was in comparison to pre-post programme BMI_z changes for children that were classified⁽⁸⁾ as overweight (-0.13), obese (-0.10), or morbidly obese (-0.11) at pre-programme. This absence of any trend towards greater reductions in BMI_z with increasing severity of overweight by definition alone reduces the likelihood of any RTM effect being present. In addition, we also measured improvements in important behavioural variables, namely parenting self-efficacy, and child diet and activity behaviours that we *a priori* hypothesised would mediate reductions in BMI_z. Taken together, we believe these data strengthen the plausibility for a true effect of the intervention rather than one that arose purely as a statistical artefact. We cannot, however, also rule out the possibility that the observed changes may have also arisen from other factors given the lack

of a control group (e.g. the Hawthorne effect⁽⁹⁾ or confounding from other unmeasured exposures).

The evaluation questions in PEACH QLD were taken from the Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM) framework⁽¹⁰⁾ for which indicators of programme effectiveness included changes in child anthropometric outcomes, and parent-reported child diet, physical activity, and sedentary behaviours⁽⁴⁾. Whilst this pre-post design limits the interpretability of our data, we also hope this discourse will benefit others working in translation and implementation science to appreciate the potential limitations in evaluating uncontrolled, large-scale studies of community public health programmes implemented in real-world settings. The PEACH QLD study, however, still remains a valuable example of implementation research and immense value and knowledge are gained from describing pre-post outcomes following large-scale community delivery. Further research is needed to identify effective and scalable solutions for child obesity and it is clear that balancing research attention on both health and implementation outcomes is the key progressing the universal availability of childhood obesity management services for families.

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