



# The effectiveness of health professional-delivered interventions during the first 1,000 days to prevent overweight/obesity in children: A systematic review

Marita Hennessy<sup>1</sup>, Dr Caroline Heary<sup>2</sup>, Dr Rachel Laws<sup>3</sup>, Luke Van Rhoon<sup>1</sup>, Elaine Toomey<sup>1</sup>, Hazel Wolstenholme<sup>2</sup>, Prof Molly Byrne<sup>1</sup>

<sup>1</sup>Health Behaviour Change Research Group, School of Psychology, National University of Ireland Galway. <sup>2</sup>School of Psychology, National University of Ireland Galway. <sup>3</sup>Institute for Physical Activity and Nutrition, Deakin University, Australia

## We found some evidence for the effectiveness of health professional-delivered interventions during the first 1000 days

Of the 46 interventions identified, only four interventions were effective on a primary (adiposity/weight) and secondary (behavioural) outcome measure. Twenty-two were effective on a behavioural outcome only. Several methodological limitations were noted, impacting on efforts to establish the active ingredients of interventions

### Why is this issue important?

Childhood obesity is a global public health challenge. Early prevention, particularly during the first 1,000 days (i.e. the period from conception to a child's second birthday), is advocated

Maternal pre-pregnancy body mass index  $\geq 25$ , smoking during pregnancy, high infant birth weight, and rapid weight gain are identified risk factors. Breastfeeding and the appropriate timing of introduction of solid foods (usually between 4 and 6 months, definitions vary by study) are moderately protective factors

Health professionals have a role to play in obesity prevention efforts, partly due to the many routine contacts they have with parents during this time

### What do we already know?

Systematic reviews of early life obesity prevention interventions show mixed results: limited impact on child weight and/or anthropometric outcomes but positive impacts on weight-related outcomes, e.g. infant feeding, activity levels, and sleep

Reviews have not investigated interventions specifically delivered by health professionals

Multi-target interventions (i.e. addressing nutrition, physical activity, sedentary behaviour, behaviour change, and parenting) are recommended to prevent obesity in children, and interventions are complex, involving multiple components. We do not know, however, what the most important target behaviours are, or the most important intervention components to determine effectiveness. Such information could assist in the testing and scale-up of interventions

### What did we do?

We synthesized the evidence for the effectiveness of obesity prevention interventions delivered by health professionals during the first 1,000 days. We also explored what behaviour change theories and/or techniques were associated with more effective intervention outcomes

Eleven electronic databases and three trial registers were searched from inception to 04 April 2019. The primary outcome of interest in this review was any type of child adiposity/weight outcome measure



### A note on behaviour change theory & techniques

Interventions based on theory are more likely to be effective. The use of theory enables us to hypothesize and test how our interventions actually work, specifying the proposed causal mechanisms and the key intervention components or "behaviour change techniques" (BCTs)

BCTs are considered the "active ingredients" of behaviour change interventions—that is, they are observable, replicable, and irreducible components of an intervention designed to modify the processes that regulate behaviour

# Characteristics of interventions (N=46)

<b>Target behaviours</b>	Multiple behaviours (infant only): e.g. infant feeding/nutrition/physical activity/sedentary behaviour/sleep (n=13; 28%); infant feeding (i.e. focused on formula feeding/breastfeeding/introduction to solids; breastfeeding and introduction to solids) (n=10; 22%); maternal diet/physical activity/gestational weight gain (GWG) (n=9; 20%); infant feeding: breastfeeding only (n=8; 17%)
<b>Time period</b>	Antenatal only (n=7; 15%); Birth to 2 years only (n=26; 57%); Antenatal and birth to 2 years (n=13; 28%).
<b>Focus</b>	Half (n=23; 50%) specifically designed with a focus on childhood obesity prevention
<b>Duration</b>	Highly varied: ranged from 10-15 minutes to 2.5 years. The majority ranged in duration from more than 3 to 6 months or less (n=14; 30%) and more than 6 to 12 months or less (n=13; 28%)
<b>Delivery location</b>	Majority delivered in health centre/clinic/hospital (n=23; 50%), with almost one in four delivered in homes (n=11; 24%)
<b>Delivery agents</b>	25 (54%) were delivered by a single health care professional type; these included general/research nurses (n=10; 26%), dietitians or nutritionists (n=6; 13%), public health nurses or maternal and child health nurses (n=4; 9%), lactation consultants (n=2; 4%), midwife (n=1; 2%), paediatrician (n=1; 2%), and psychologist (n=1; 2%)
<b>Mode(s) of delivery</b>	Majority delivered in individual, face-to-face sessions (n = 24; 52%) or individual, face-to-face and group, face-to-face sessions (n = 11; 24%). Only one intervention was delivered without a face-to-face element

## Intervention effectiveness and active ingredients

**Effectiveness**

Only 4 (9%) were effective, based on our definition (i.e. significant impact on weight AND behavioural outcome(s)), at the end of intervention delivery or within 12 months of follow-up of the intervention endpoint for this review (i.e. child aged 2 years, plus a maximum of 12 months follow-up)

6 interventions showed positive impacts on child adiposity / weight outcomes only

22 trials had positive impacts on behavioural outcome measures only

**Use of theory**

20/46 interventions (43%) explicitly mentioned a theory or model of behaviour. 15 different theories were identified: Responsive Parenting was the most frequently cited (n=7), followed by Social Cognitive Theory (n=6), Social Learning Theory (n=3), and the Precede Proceed Model (n=3)

The majority of effective interventions (3/4), as defined by our review criteria, were theory-based (i.e. explicitly stated that they were underpinned by a specific theory / theories)

**Behaviour change techniques**

The following BCTs were most frequently associated with effective interventions as defined by our review criteria:

- Problem solving
- Review behaviour goal(s)
- Feedback on behaviour
- Feedback on outcome(s) of behaviour
- Social support (unspecified)
- Instruction on how to perform a behaviour
- Demonstration of the behaviour
- Information about health consequences

## Recommendations

1. **RESEARCH:** While there is now a sizeable research base in this area, several gaps remain. The **optimal interventions—timing, content, dose, mode of delivery, theory, and active ingredients—have yet to be established**
2. **PRACTICE:** Lack of adiposity/weight impacts notwithstanding, it is important not to overlook the **positive impacts on behavioural outcomes** from these interventions as these will potentially lead to positive weight outcomes over longer time periods, as behaviours track into later childhood. We identified **several BCTs that were associated with intervention effectiveness**. There is some evidence, however flawed, that these BCTs should be incorporated into obesity prevention interventions delivered by health professionals during the first 1000 days

**Further information**

Hennessy, M, Heary, C, Laws, R, et al. The effectiveness of health professional-delivered interventions during the first 1000 days to prevent overweight/obesity in children: A systematic review. Obesity Reviews. 2019; 20(12):1691-1707. <https://doi.org/10.1111/obr.12924>