

Blueprint for halving obesity: rapid review

What is the preventative effect of family and community based interventions on obesity?



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Summary table

Title	NICE guidance review: Effectiveness and cost effectiveness of lifestyle weight management services for children and young people
Author and year	Morgan et al. (2013) – Support Unit for Research Evidence (SURE), Cardiff University
Type of study	Review and meta-analysis
Outcome variable	zBMI
Treatment	Lifestyle interventions targeting whole families
Control	No exposure or treatment as usual (TAU)
Magnitude of effect (Adults)	n/a
Magnitude of effect (Children)	zBMI SMD was -0.22 (-0.33 to -0.10) $p=0.04$ post intervention ≥ 6 months follow up BMI/zBMI SMD was -0.01 (-0.11 to 0.08) $p=0.13$ NS

Rapid umbrella review

Background

Family based interventions for childhood obesity involve strategies that target the entire family unit to promote healthier lifestyles and prevent or manage obesity in children. These interventions recognise the significant influence of family dynamics, behaviours, and environments on a child's health. Typically, they include educational components to enhance nutritional knowledge, encourage physical activity, and promote healthy habits within the family. Family members often participate in collaborative goal setting, meal planning, and engaging in physical activities together. By fostering a supportive and health-conscious family environment, these interventions aim to create sustainable changes in dietary patterns, physical activity levels, and overall wellbeing for children, leveraging the collective influence of the family to address childhood obesity comprehensively.

Objective

To summarise the best available evidence of the effect of family/community based interventions on an appropriate metric of body weight.

Methods

We aimed to identify and synthesise reviews that included quantitative and/or qualitative research synthesis of the effectiveness of family/community based interventions on improving obesity-related outcomes.

Eligibility criteria

Types of review. To be eligible for inclusion, articles are required to use systematic review methodology (ie, use of systematic search and inclusion strategy to identify all available studies) and include quantitative data synthesis (ie, meta-analysis) of multiple studies.

If the search does not identify any studies where a meta-analysis has been conducted due to heterogeneity of outcomes of interest, we will include reviews

with narrative synthesis. We will not set inclusion criteria on the number or type of databases searched.

Participants. To be eligible for inclusion, articles are required to examine the effect of family/community based interventions on obesity-associated outcomes.

Intervention. Reviews must synthesise interventions that are clearly defined as family/community based interventions which involve some degree of family involvement or call on daily systems theory.

Comparator. No comparator.

Outcomes. To be eligible for inclusion, reviews must include either outcomes relating to obesity – either physical (eg, weight, BMI, % fat change) or behavioural outcome (including, but not limited to: eating behaviour, food diaries). Prioritised reviews will be those that synthesise studies where the outcome measure is weight and or calorie intake, however, if these are absent/inadequate we will consider reviews that focus only on consumption of healthy, prescribed foods. Reviews that only include measures of intentions/plans for future behaviour will be excluded due to evidence of the gap between intended and actual eating behaviour.

Information sources and article selection

The search strategy is designed to identify syntheses of research evidence such as systematic reviews between the year 2010 and the date of search. Initial keywords will be identified via a scoping review of relevant papers and reports as well as via MEDLINE using the MeSH function. A search will be performed in MEDLINE and the Cochrane Database of Systematic Reviews. We will search grey literature using Google and Google Scholar to identify relevant reports.

Screening

Due to the rapid nature of the reviews, a single reviewer will screen titles and abstracts and discuss any uncertainty with a second reviewer. For relevant titles/abstracts, the full text will be retrieved for full text review. We aim to identify one single review that provides the highest quality overview of evidence relating to our research question.

Assessment of methodological quality

If more than one suitable review is identified, we will use the JBI Critical Checklist for Systematic Reviews to make a choice on which single review to select. We will also consider the year of publication in our selection.

Data extraction

There will only be one article to extract for each Blueprint rapid review. We will use the JBI Data Extraction Form for Review for Systematic Reviews and Research Syntheses as a template to inform data extraction. Characteristics to be attached to the review report will include (but not be exclusive to):

- Review characteristics: author/year, objectives, participants (characteristics, total number), setting/context, interventions of interest, date range of included studies, detailed description of the included studies (number/type/country of origin), appraisal instrument and rating, type of review/method of analyses and outcomes.
- Results: findings of the review and comments.

Results

We selected a 2013 meta-analysis which formed part of a National Institute for Health and Care Excellence (NICE) [review](#) to assess the efficacy of weight management and lifestyle services for children and young people living with overweight and obesity. It comprised an evidence review which assessed the efficacy and cost effectiveness of lifestyle weight management services for children and young people under 18 years. This included a separate analysis of the impact of family and community based lifestyle interventions for overweight and obesity which addressed one of six separate review questions. A meta-analysis estimated the overall effectiveness of interventions directed at children and parents/carers or the whole family versus no or minimal control outcomes immediately post intervention.

What studies did the review include?

The main inclusion criteria for studies were: studies published 2000-2012, which included family member(s) directly in the intervention, recruited children under-18 years, and measured BMI pre- and post-intervention. In addition, randomised

controlled trials (RCTs) and economic evaluations published between 1990 and 1999 were identified using snowballing methods. UK intervention studies of any design were eligible, but non-UK studies were restricted to RCTs and quasi-RCTs with at least n=100 participants from countries similar to the UK – the USA, Canada, Western Europe, Australia and New Zealand.

What were the systematic review methods?

Systematic review methods were highly comprehensive. The search strategy was developed according to prior search strategies in relevant systematic reviews and 20 relevant primary research papers as determined by the reviewers. Its aim was to find evidence on lifestyle weight management services for children and young people, including effectiveness and 'barriers and facilitators' studies. This search was broad and not limited to community and family based interventions for children, although specific analyses based on intervention type were conducted on specific intervention approaches. The search strategy was developed for Ovid MEDLINE, with comprehensive searches also conducted in 22 databases and additional targeted website searches for grey literature and unpublished works. Hand searching for recent publications was conducted in journals with high numbers of papers fitting inclusion criteria, plus reference lists of included studies were also reviewed. NICE also issued a call for evidence from selected stakeholders.

Independent title and abstract screening was done by two reviewers with disagreement on inclusion/exclusion decisions resolved through discussion with a third reviewer. A similar approach was undertaken for full text screenings.

The GATE checklist for quantitative studies and economic evaluations were used for quality assessment (NICE, 2009). Initial study assessment was done by one reviewer and this was reviewed by a second. To ensure reliability, a fifth of papers were independently assessed by two reviewers, with discrepancies resolved through discussion. All studies were reviewed for internal and external validity. This was determined by the extent to which the study's findings could be extrapolated beyond the participants to a broader population from which they were drawn (eg, from one community setting in the US to all US communities), but not to other populations.

Statistical analysis: A random effects meta-analysis was conducted on BMI/zBMI scores using the DerSimonian and Laird method. A fixed effects inverse variance method was applied when I^2 values exceeded 50%. Where standardised scores and standard deviation (SD) were not explicitly reported, SD was inferred from the reported standard error (SE) of the mean. Alternatively, 95% confidence intervals (CIs) were calculated using the equations outlined in Chapter 9 of the Cochrane Handbook for Systematic Reviews of Interventions ([Deeks, Higgins and Altman, 2008](#)). Subsequently, means and SDs were utilised to compute standardised mean differences (SMDs) between groups for the meta-analysis. In instances where follow-up data omitted SD or SE values, the SD was estimated either from baseline values or from other studies with similar sample sizes and target populations. Heterogeneity was assessed using the I^2 statistic.

Publication bias was assessed by visually inspecting the funnel plot, followed by Begg's and Egger's tests, which were used for formal testing of the plot.

What did the review find?

This is a non-exhaustive summary of the review findings. Please see the [original article](#) for more detail. According to the narrative summary the authors reported there was robust evidence (18 papers of 17 studies) that whole family interventions directed at individual families or groups of families resulted in significant reductions in zBMI from baseline to follow up amongst children and adolescents living with overweight and obesity, where the comparisons were within-group. The included studies were nine moderate to high quality RCTs, two poor or moderate quality quasi-RCTs and six uncontrolled pre-to-post intervention studies.

Evidence for the effectiveness of whole family interventions when compared against no or minimal control outcomes was not as consistent. Two studies found there were significant reductions in zBMI in the intervention group compared to the controls, whereas four studies found either no reductions or any group differences were non-significant.

Meta-analysis results

Baseline to directly post intervention: The meta-analysis which included eight studies found the overall effectiveness of interventions directed at children and parents/carers or the whole family versus no or minimal control outcomes immediately post intervention was a significant reduction in BMI SMD of -0.22 (-0.33 to -0.10).

Sustainability of effects: Eleven RCTs provided data on longer term follow up. A meta-analysis of the effects from these studies found that overall effectiveness of interventions directed at children and parents/carers or whole family versus no or minimal control outcomes at ≥ 6 months was a non-significant reduction in BMI SMD of -0.01 (-0.11 to 0.08).

Conclusion

The effect sizes for the impact on zBMI of family based interventions at the end of the intervention period are fairly consistent with the earlier meta-analysis from [Berge and Everts \(2011\)](#) which found that for studies comparing one or more treatment groups to a control (n=10), the average effect size for changes in zBMI was -0.36, ranging from -0.05 to -0.73.

The NICE review uses high quality methods and is highly comprehensive. However whilst promising, the finding that effect sizes are substantially reduced at post intervention follow ups after six months indicated effects are not sustained. Both reviews are more than 10 years old so more contemporary approaches may have been missed, however our consultation with the Blueprint Expert Advisory Group (EAG) indicated more recent evidence is not available.

Consultation with Expert Advisory Group (EAG) on prevention interventions

The NICE and Berge and Everts reviews provide evidence on the impact of family based interventions targeted exclusively for children and adolescents already living with obesity. The reported effect sizes are not applicable to whole family or community based approaches for obesity prevention in under 18s. Our search

strategy did not return studies that would allow us to answer this question. Following consultation with our EAG, we identified the best available evidence as a [Landgren et al. \(2020\)](#) systematic review and narrative synthesis of RCTs of family based interventions to prevent obesity in 2-6 year old children, irrespective of body weight category. This is a non-exhaustive summary of the methodology and findings. Please see the [original article](#) for more detail missing here.

What studies did the review include?

RCTs of preventive lifestyle interventions, targeting parents and/or their children irrespective of child obesity or weight status according to BMI percentile or zBMI-score cut offs. Eligible RCTs only tested interventions in children aged 2-6 years.

Primary outcomes were changes in BMI (kg/m²) and body weight (kg) from baseline to follow up.

What were the systematic review methods?

PRISMA Guidelines for Systematic Reviews were followed. Researchers conducted a comprehensive search of several databases Medline, PsycInfo, Family Study Abstracts, Embase, and CINAHL for studies published between 2010 and February 2016, with an updated search conducted in 2019. Three of the four reviewers independently screened titles and abstracts of the 2016 searches and a single reviewer screened the 2019 searches and selected texts for full screening. Any conflicts were discussed and resolved amongst all reviewers. A single reviewer completed full text screenings and discussed selection with other reviewers. Data extraction was done by a single reviewer but reviewed by other authors.

Bias assessment

Study bias was assessed against six categories with each study rated as high, low or unclear bias. Criteria were randomisations, concealment of study intervention allocation, blinding, and follow-up attrition, selective outcome reporting, and other sources of bias.

Narrative synthesis

Heterogeneity in interventions, study outcome measures, and participant characteristics meant meta-analysis was not possible. Instead, a narrative discussion was conducted.

What did the review find?

Twelve studies met the inclusion criteria, although 20.5% of the participants were from a single trial ([Smith et al., 2015](#)). Of these 12 studies, half did not observe a significant effect of the intervention on BMI or body weight. Notably, two of these trials included active control interventions targeting obesity.

Four studies reported significant benefits on BMI and/or body weight. One study highlighted particularly strong effects among participants with obesity or overweight at baseline ([Barkin et al., 2012](#)). Three of the studies implemented multi-component interventions delivered across 7-12 group sessions targeting various behaviours, while one intervention involved three sessions of tailored support for participating families. Most of these four studies were susceptible to bias, with only one trial reported to have a low risk of bias, while the remainder were assessed as having an unclear risk of bias.

The authors concluded that the evidence was inconclusive regarding the effectiveness of family based interventions for obesity prevention in 2-6 year olds.

Due to the inconclusive findings and the widespread risk of bias in many included studies, along with the observation that children with overweight and obesity were more likely to benefit from the intervention, there are no reliable effect sizes available to represent the effectiveness of family based interventions targeting the prevention of overweight and obesity in children of normal weight or those at risk of overweight and obesity.