Extended brief interventions for weight management and obesity prevention in children

Grey, Elisabeth; Griffin, Tania; Jolly, Kate; Pallan, Miranda; Parretti, Helen; Retzer, Ameeta; Gillison, Fiona

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REVIEW

Extended brief interventions for weight management and obesity prevention in children: A rapid evidence review

Elisabeth Grey [1,2] | Tania Griffin [2] | Kate Jolly [3] | Miranda Pallan [3] | Helen Parretti [4] | Ameeta Retzer [3] | Fiona Gillison [2]

[1]NIHR Applied Research Collaboration West, Bristol Medical School, University of Bristol, Bristol, UK

[2]Department for Health, University of Bath, Bath, UK

[3]Institute of Applied Health Research and NIHR Applied Research Collaboration West Midlands, University of Birmingham, Birmingham, UK

[4]Norwich Medical School, University of East Anglia, Norwich, UK

Correspondence
Elisabeth Grey, NIHR Applied Research Collaboration West, Bristol Medical School, University of Bristol, ARC West University of Bristol, 9th Floor Whitefriars, Lewins Mead, Bristol BS1 2NT, UK.
Email: e.b.grey@bristol.ac.uk

Funding information
Office for Health Improvement and Disparities (OHID), Department for Health and Social Care; National Institute for Health and Care Research (NIHR) Applied Research Centre (ARC) West Midlands

Summary

Uptake of child weight management (CWM) support is typically low, and services are not available in all areas. Extended brief interventions (EBIs) have been proposed as an affordable way to provide enhanced support, at a level between one-off brief advice and intensive CWM programs. This rapid systematic review sought to synthesize evidence on the efficacy of EBIs for weight management and obesity prevention in children (2–18 years). Embase and Web of Science were searched from January 2012 to January 2022. Nineteen studies, reporting on 17 separate EBIs, were included. The quality of studies was variable, and the EBIs were heterogeneous. The majority of EBIs ($n = 14$) were based on motivational interviewing. Five of the included studies reported significant improvements in parent or child determinants of health behavior change. However, robust measures of behavioral determinants were rarely used. No studies reported significant positive effects on child weight. No clear patterns in outcomes were identified. There is currently insufficient evidence for EBIs to be adopted as part of CWM services. To improve the evidence base, EBIs that are currently being implemented by local health services, should be evaluated to establish the most effective content, how it should be delivered, and by whom.

KEYWORDS

childhood obesity, extended brief interventions, overweight, rapid review

1 | INTRODUCTION

Childhood overweight and obesity is a global public health concern.[1,2] Obesity in children is associated with poorer psychosocial wellbeing[3] and increased risk of developing physical disorders, including musculoskeletal conditions,[4] cardiovascular risk factors[5] and respiratory conditions such as asthma.[6] Obesity in childhood tends to track into adulthood, bringing with it the associated risks of ill health[7] and stigmatization.[8] A pattern of increasing childhood obesity rates and widening disparities between socioeconomic groups has been identified in both high-income and low-middle-income countries.[9,10] For example, in

England, UK, almost a quarter of 10–11 year olds were found to have obesity in the academic year 2021/2022, which is an 6% increase since the national measurement program began in 2006/2007.[11,12] There is a stark disparity when comparing the 2021/2022 data for children living in the most and least deprived areas in England, with obesity rates of 31% in the most deprived and 14% in the least deprived areas.[12] This obesity gap between areas has widened dramatically since 2006/2007, with prevalence increasing by nearly 10% in the most deprived areas but remaining almost the same in the least deprived.[9] To help address the increasing childhood obesity rates and disparities, there have been calls for greater action at policy and local levels to enable families to

adopt healthy dietary and physical activity behaviors.[13–15] As the determinants of childhood obesity are diverse, it should be recognized that action to help families adopt healthy behaviors will need to take place across multiple levels (e.g., the built environment, social environment, and food availability and accessibility).[16,17]

Early intervention to prompt behavior change has been advocated to address childhood obesity, with interventions involving parents and other family members particularly recommended for younger children.[2,18] In the UK, healthcare professionals are encouraged to identify children living with overweight and obesity and deliver brief interventions consisting of advice and signposting or referral to further support services.[19] Brief interventions are typically offered opportunistically, delivered orally, and may last anything from a few minutes to half an hour.[20] However, brief interventions have been shown to have limited impact on children's body mass index (BMI)[21] and uptake of the further support (i.e., more intensive child weight management [CWM] programs) signposted or referred to in brief interventions remains low.[22,23] To address this problem, extended brief interventions (EBIs) have been identified as a potential means of providing a higher level of support to families than a one-off brief intervention and to improve access to and uptake of CWM programs, where available.[24] EBIs have mostly been applied in the management of alcohol behavior problems, where this type of intervention seems to have originated.[25,26] An EBI has been defined as an intervention that is "similar in content to a brief intervention but usually lasts more than 30 minutes and consists of an individually-focused discussion. It can involve a single session or multiple brief sessions."[20] There are multiple points during childhood when a child and their family may have contact with healthcare or public health practitioners (such as school nurses), thus providing potential opportunities to identify children living with overweight/obesity and deliver EBIs to support behavioral change and weight management. However, there is currently limited guidance on the content and delivery of EBIs and little understanding of their effectiveness in addressing child weight and preventing childhood obesity.

The aim of this rapid review was to identify and summarize the evidence on EBIs for weight management and obesity prevention in children (2–18 years). In addition to data on effectiveness, we sought to identify information that could help us understand which types of EBI are most acceptable.

2 | METHODS

2.1 | Design

We conducted a rapid literature review working within a 3-month time period with the needs of health policy makers in mind. The review is reported here in general accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA[27]—checklist provided in Table S1), although some of the items are not applicable to this narrative synthesis, and the protocol is published on the PROSPERO database (reference: CRD42022303271). As there was no commonly agreed definition of EBIs, a working definition was developed by the

research team with reference to literature from other areas. We defined EBIs as consisting of a minimum total contact of 30 min (i.e., more than a brief intervention); taking place over one to five sessions (this maximum cut-off was chosen as the minimum number of sessions of more intensive "Tier 2" CWM services in the UK is six); delivered at an individual level (rather than in, say, a group setting) and involving at least one face-to-face or telephone/video call contact with the intervention provider.

2.2 | Search strategy

Searches for literature published between January 2012 and January 2022 were conducted on Web of Science and Embase Ovid databases using the search strategies shown in Table S2. The search terms were adapted from previous systematic reviews of interventions for the prevention or treatment of obesity in children[18,28] and were refined through initial scoping searches.

A grey literature search was also undertaken, sending requests for evidence to all local authority CWM teams in England ($n = 150$) in late January 2022, with reminder emails sent in February. However, of the five responses received, no eligible data were obtained. The results reported here therefore only relate to published research.

2.3 | Inclusion and exclusion criteria

2.3.1 | Study designs and settings

Studies or service evaluations of an intervention meeting the definition for an EBI of weight management and obesity prevention in children and adolescents, and reports relevant outcomes, were included. All study designs that involved primary data collection were included. Protocol papers, opinion pieces, theory papers, and conference proceedings (where only an abstract is available) were also excluded.

This review was restricted to studies undertaken in high-income countries (using the current World Bank classification of high-income- and low-middle-income countries[29]) as the focus of the review was primarily to inform UK services.

2.3.2 | Participants/population

Inclusion: Parents/primary caregivers and children aged 2–18 years, where the child has been identified as living with overweight/obesity or as being at higher risk of developing obesity (e.g., living in a locality of high deprivation and child obesity prevalence), who are receiving CWM or obesity prevention EBIs.

Exclusion: Patients receiving treatment for another health condition where a standard approach for weight management is inappropriate or not feasible (e.g., receiving in-patient care).

2.3.3 | Intervention

Interventions meeting the definition of an EBI and targeted at children and/or parents/primary caregivers of children, aged 2–18 years, with

the aim of promoting parent/caregiver/child acceptance and action towards the child's weight management. No specification was made for the disciplinary background of the person delivering the EBI.

The following intervention types were excluded: interventions delivered in group or community format; interventions where there is no direct contact between a health practitioner and parent/caregiver or child (e.g., interventions delivered via a website with no in-person or telephone/video call contact).

2.3.4 | Comparator

Comparison groups could include usual care or another intervention. Studies that did not involve a comparison group were also included.

2.3.5 | Main outcomes

Initial scoping searches suggested there was relatively little published evidence in this field, and so we took an inclusive approach, taking outcomes relating to the delivery, uptake, and impact of EBIs. Studies were included if they provided any of the following outcomes: uptake of EBIs (i.e., initial contact in the EBI); retention of families within EBIs (i.e., number of families that receive a complete EBI); rate of onward referral and uptake of onward referral to more intensive CWM services and other interventions/services; change in children's BMI/BMI z-scores/other measure of obesity, self-esteem, quality of life, health behaviors, and wellbeing indicators; change in parental determinants of family behavior change (e.g., confidence to make changes); any reported barriers or facilitators to participant engagement (either with the intervention or with the promoted cognitive/behavior change) or delivery of the EBIs, or unintended outcomes.

2.4 | Quality appraisal

The following quality assessment tools were used to assess the risk of bias for each report, appropriate to the type of study:

- Randomized controlled or controlled clinical trials: revised Cochrane Risk of Bias (RoB2) tool,[30]
- Observational/cross-sectional survey study: CEBM Critical Appraisal of a Cross-Sectional Study (Survey) tool,[31]
- Qualitative study: CASP Qualitative Checklist.[32]

2.5 | Data extraction and synthesis

Retrieved reports were imported to Covidence software[33] for screening and data extraction. Duplicates were identified by the software and checked and deleted by E. G. A Single screening by title and abstract was conducted by all authors and a research assistant (R. H.). For calibration, a subsample of 100 reports was first

screened independently by E. G., R. H., and T. G., and the inclusions and exclusions were discussed with all authors. Full-text screening was conducted by E. G. Data extraction and quality assessment were conducted independently by two researchers (E. G. and A. R. or R. H.). As well as extracting data for the above outcomes, we also extracted information on study characteristics, including behavior change techniques (BCTs) included in EBIs (conducted by E. G. and F. G.), outcome measurements used, and professional background and training of staff delivering EBIs. A narrative synthesis of findings was conducted.

3 | RESULTS

From 18,545 reports identified from searching the two databases, 19 reports were included in the review (Figure 1).

3.1 | Overview of included studies

A range of research designs were used in the included studies: 10 randomized controlled trials and 1 quasi-experimental trial; 4 pre–post trials without comparison groups; 2 qualitative interview studies; and 2 service evaluations. After combining studies reporting on the same set of participants, 17 EBIs were included. All but three[34–36] of these tested motivational interviewing (MI) as part or all of the intervention. In one of the non-MI interventions,[34] the EBI was itself the control group against which a more comprehensive intervention was compared, and as such focused on the provision of information to parents about health behaviors and weight management. Table S3 provides a summary of key information on the studies that focused on family outcomes of EBIs; Table S4 provides a summary of the studies that focused on provider outcomes.

The majority of EBIs ($n = 11$) were conducted in the United States,[34,37–46] four in Europe,[35,36,47–50] and the remaining EBI in New Zealand.[51,52] The total number of families included in the studies that reported child and/or parent outcomes was 2438, and the range in the number of families per study was 20 to 637. Of the 10 trials reporting participant ethnicity data, 4 had a majority of White participants,[34,46,49–52] 3 trials had a majority of Black participants,[38,42,45] and 2 trials had mostly Latino[40] and Asian[41] participants (all trials with majority of participants who were not White took place in the United States). Five trials reported parental educational attainment; for all of these, the majority of participants had completed secondary, but not tertiary, education.[38,39,43,49–52] Seven trials reported clear socioeconomic status (SES) information, with five of these having mixed status samples,[34,38,39,46,51,52] one having a majority low SES sample[43] and one having a mostly high SES sample.[36] Three EBIs focused on children of preschool age (2–4 years),[41,43,45] five on primary school-age children (4–11 years),[37,39,40,49–52] two on secondary school-age children (11–18 years),[38,48] five on primary and secondary school-age children (i.e., 4–18 years),[34–36,46,47] and two included all ages (2–18 years).[42,44]
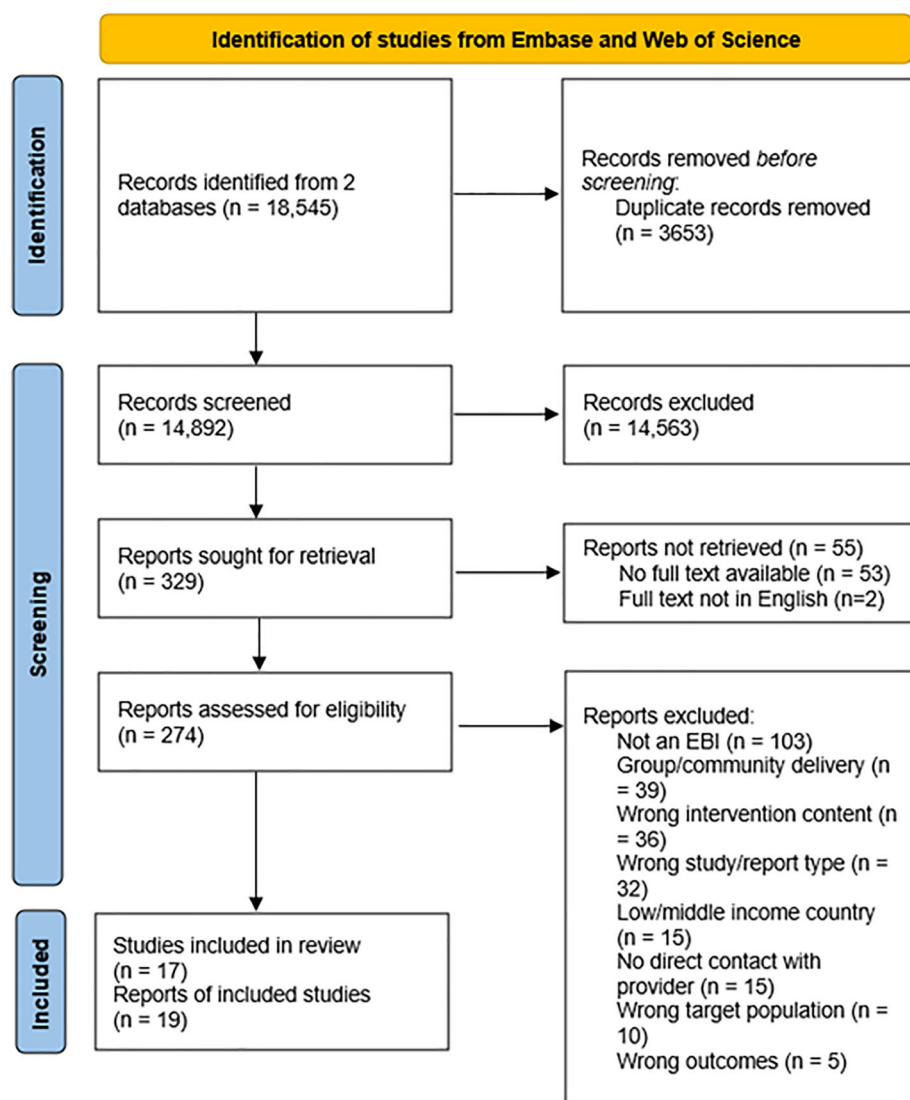
FIGURE 1 PRISMA flow diagram[27] of retrieval, screening, and extraction process.

3.2 | Quality of studies

The quality of the included studies was mixed with the majority providing low-quality evidence. This was mostly due to insufficient reporting of study processes such as blinding of participants and study personnel. Seven of the 18 studies had a high risk of bias,[37,40–42,44–46] seven had a moderate risk,[34,36,38,43,47,49,50] and five had a low risk[35,39,48,51,52] (see Tables S3 and S4). Common factors raising the risk of bias in many of the studies included having insufficient sample sizes for adequate statistical power in the analyses and using nonvalidated outcome measures.

3.3 | Intervention delivery

Interventions differed in relation to whether they were delivered to parents alone ($n = 8$),[37,39–41,43,45,49–52] parents and children together ($n = 7$),[34–36,42,44,46,47] or adolescents alone ($n = 2$).[38,48] When delivered to parents, the focus was on changes to the parent's own

behavior, which related to changing the family diet and activity levels whereas interventions to children or the family as a group tended to be about the health behaviors of the individual child.

Six of the EBIs were delivered in a single session,[35,37,41,42,44,51,52] three involved two sessions ranging from 3 to 10 weeks apart,[38,39,45] and the remaining seven EBIs were delivered in three[34,40,43,46–50] or five[36] sessions over 10 weeks to 12 months.

3.4 | Providers

The majority of EBIs were delivered by registered healthcare professionals, including general practitioners (GPs), pediatricians, dietitians, psychologists and nurses, in either a clinical ($n = 10$)[34,36,37,41,42,44–46,49,50,53] or school setting ($n = 2$).[47,48] The remaining EBIs were delivered by researchers or lay counselors in home or research settings ($n = 5$).[38–40,43,51,52] All but two studies[34,35] reported that providers received specific training in delivery of the EBI. Duration of training ranged from 1 h[44] to 80 h.[48] Descriptions of training were

not detailed but often consisted of in-person workshops, sometimes supplemented by self-directed learning from manuals or online educational materials.

3.5 | Behavior change content

The BCTs included in EBIs were not always clearly reported. The most commonly occurring BCTs in the 17 included EBIs were the following: social support ($n = 15$); information on health consequences ($n = 10$); goal setting ($n = 8$); action planning ($n = 8$); problem solving ($n = 7$); instruction ($n = 5$); feedback on behavior ($n = 4$); restructuring the environment ($n = 2$); identification of role models ($n = 2$); and self-monitoring ($n = 2$). In line with the leading UK taxonomy of behavior change,[54] we coded MI as a form of "social support," reflecting that MI is a style of delivery of behavioral support. Within standard MI, specific techniques including goal setting and review, problem solving, and action planning may all be commonly used, but as MI is client-led, they do not form part of the protocol. Additionally, in adhering to the principles of MI, practitioners avoid trying to change a client's behavior through didactic means, but they can and do provide advice (instruction) and information if requested by the client or after seeking their permission.[55] Therefore, it can be difficult to report with certainty which BCTs were routinely included in MI-based interventions. However, in 13 of the 14 MI-based EBIs, specific BCTs were stipulated in addition to MI, such as goal setting or action planning ($n = 10$), problem solving ($n = 6$), information about health consequences ($n = 9$), instruction/information on what constitutes a healthy diet/sufficient physical activity ($n = 4$), and feedback on a child's behavior at baseline ($n = 3$). One study included additional components of identifying role models, reshaping a child's environment, and promoting self-monitoring.[43] Only one study[47] did not list BCTs in addition to MI within the intervention description. Six studies[34,37,40,43,46,49,50] included manuals for families to engage in further educational, goal setting and review activities at home to supplement in-person sessions; details of the information included in the manuals were generally not clear and could have included additional BCTs (e.g., guidance on self-monitoring, action planning, information, and instruction).

3.6 | Comparison groups

Eight studies compared EBIs with usual or "best practice" care.[36,42,46,48–52] Of the three remaining studies with comparator groups, one compared the EBI with provision of general healthy eating and exercise information,[38] one involved a complex intervention and investigated whether the addition of an EBI affected outcomes,[39] and one compared an EBI against a complex group-based intervention delivered over 10 weekly sessions.[34] Eight studies did not involve a comparator[35,37,40,41,43–45,47] and report the feasibility and/or processes of change of the interventions.

3.7 | Effect of EBIs on outcomes

A summary of the child and parent outcomes of the included EBIs is provided in Table 1. The most commonly reported outcomes were parental determinants of behavior change (e.g., parent self-efficacy or motivation; $n = 5$ EBIs). Child BMI, zBMI, or BMI percentile outcomes were reported in six studies, all of which involved objective BMI assessment. Changes in child dietary and/or physical activity behaviors (i.e., child determinants of BMI change) were reported in six studies: Five of these used parent-reported measures of behavior, and one used child-reported measures and activity monitor data.[36] Child quality of life outcomes were reported in four studies, all of which used the Pediatric Quality of Life Inventory (PedsQL) v.4[53] questionnaire, either parent- or child-report versions.[34,36,42,48] Parent or child experiences of interventions were reported in five studies.[35,36,45,46,50] Eleven studies collected follow-up outcome measures from 2 weeks to 2 years post-intervention.[34,37–39,41,43,46,48–50,52] The remainder of studies collected outcome measures immediately after the intervention ended.

3.8 | Child outcomes

3.8.1 | Weight

Of the six studies reporting BMI outcomes, no EBIs led to significant improvements; three studies reported nonsignificant improvements,[36,38,46] and three studies reported no change[34,43] or no significant difference between intervention and comparator groups at 2-year follow-up.[50]

3.8.2 | Health behaviors

Two studies assessed and found significant improvements in children's intake of fruit and vegetables and time spent in active play[43,46]; both of these EBIs involved three MI-based sessions delivered via telephone over 5 or 6 months, respectively. Two further EBIs, one involving three MI sessions (delivered in-person, over 12 months) and one involving an initial dietitian consultation followed by four email/telephone sessions, led to improvement in child dietary and physical activity behaviors but not to a significantly greater degree than the improvement found in the usual care control condition (i.e., no contact beyond the usual child health check).[36,49] Two studies found no improvement in child diet and physical activity behaviors following two sessions or a single session of MI, respectively.[38,51]

3.8.3 | Quality of life

Three studies assessed changes in children's quality of life. One study found significant improvement from three sessions of MI (delivered over 9 months) on adolescents' self-reported quality of

TABLE 1 Overview of EBIs and child and parent outcomes.

Study	Target child age group	Delivered to?	MI-based?	BMI	Child physical activity/dietary behaviors	Child QoL	Parent determinants of family behavior change
Chomitz 2019[41]	Preschool	Parent	Y				Nonsignificant improvement
Dulin Keita 2014[43]	Preschool	Parent	Y	No change	Significant improvement		Significant improvement
Schlottmann 2019[45]	Preschool	Parent	Y				Significant improvement
Barlow 2018[37]	Primary	Parent	Y				
Bean 2019[39]	Primary	Parent	Y				
Berkel 2021[40]	Primary	Parent	Y				Significant improvement
Dawson 2014a,[51] 2014b[52]	Primary	Parent	Y		No change		Significant improvement
Van Grieken 2013[50] 2014[49]	Primary	Parent	Y	No change	Nonsignificant improvement		
Bean 2018[38]	Secondary	Child	Y	Nonsignificant improvement	No change		
Freira 2019[48]	Secondary	Child	Y			Significant improvement	
Bonde 2014[47]	Primary + secondary	Parent + child	Y				
Kinnear 2020	Primary + secondary	Parent + child	N	Nonsignificant improvement	Nonsignificant improvement	Nonsignificant improvement	
Steele 2012[34]	Primary + secondary	Parent + child	N	No change		Comparator improvement, no change EBI	
Tucker 2013[46]	Primary + secondary	Parent + child	Y	Nonsignificant improvement	Significant improvement		
Visram 2013[35]	Primary + secondary	Parent + child	N				
Coleman 2021[42]	All	Parent + child	Y			Nonsignificant improvement	
Sajn 2020[44]	All	Parent + child	Y				

Note: Blank cells indicate that no measurements were taken (studies with all blank cells in this table reported outcomes for other factors, such as providers' experience).
Abbreviations: BMI, body mass index; MI, motivational interviewing; QoL, quality of life.

life, when compared with three sessions of conventional counseling, with most improvement in the physical and psychosocial domains.[48] A single-session MI-based EBI[42] and a five-session dietitian-led EBI (both targeting families of primary and secondary school-aged children)[36] led to nonsignificant improvement in children's quality of life. A three-session EBI, not based on MI, found no change in children's quality of life whereas the comparison condition of an intensive, group-based intervention led to significant improvement.[34]

There was no clear pattern in child outcomes according to whether EBIs were delivered to parents only, children only, or parents and children together (see Table 1). The EBIs delivered only to parents all targeted younger children (preschool and primary age), and results were mixed in terms of child outcomes. EBIs delivered to both parents and children had wider target child age ranges yet tended to only include older children in delivery (i.e., delivery was to parents only if the child was not yet in secondary education/11 years); again, child outcomes for these interventions were mixed.

3.9 | Parent outcomes

Five studies of EBIs that were delivered only to parents assessed parental determinants of family behavior change, including parental confidence,[45] goal setting,[41] motivation,[40,45,51] modeling healthy behaviors, and changing the home environment.[43] All of these were MI-based and involved either a single session,[41,51] two sessions delivered within a month,[45] or three sessions delivered over 5 months[43] or 6 months.[40] Four studies reported improvements in the parental determinants they assessed.[40,43,45,51] No studies assessed or reported parental awareness or acceptance of their child's weight status. Parental determinants of behavior change tended to be reported using study-specific, nonvalidated survey questions and were assessed either immediately post-intervention or after a short follow-up period (2 weeks to 1 month).

3.10 | Differences in outcomes according to participant or intervention characteristics

There were no clear differences in outcomes between studies according to either reported participant characteristics or intervention features, specifically target child age, gender or race of child/parent, provider background (healthcare professional or not), or content of intervention. We were not able to infer whether outcomes differed according to whether or not MI or other BCTs were used, as only three studies did not use MI, and use of additional BCTs were not reliably reported within the MI-based studies. Reporting of family's SES, parental educational level, rural/urban status and whether children had any disabilities was not sufficient to allow any comparisons according to these factors.

3.11 | Uptake and retention

Uptake of EBIs (i.e., initial contact in the EBI) was not well reported and was mostly conflated with enrolment in studies. Of the 10 EBIs involving more than a single session, retention of participants in multiple sessions ranged from 31% to 97%. Retention in four EBIs delivered by non-healthcare professionals (mostly researchers),[38–40,43] ranged from 77% to 89%, whereas retention in EBIs delivered by healthcare professionals (n = 6)[34,45,46,48–50] ranged from 31% to 97%, which may reflect their "real life" setting. There was no clear pattern in retention outcomes according to whether the EBI was delivered to parents only, children only, or parents and children. Parent and child reports of satisfaction with or experience of the interventions were generally positive.

3.12 | Onward referrals to further support

Three studies reported findings on uptake of, or retention in, further CWM support,[38–40] but none found significant improvement associated with the EBI. A further study, exploring changes in providers' practice following implementation of an EBI to increase follow-up appointments and referrals for families, reported no improvement in these factors.[37]

3.13 | Barriers and facilitators

Nine studies reported barriers and facilitators to delivery of EBIs.[35,37,40,43–45,47,50,51] There was no discernible pattern in barriers according to EBI content, length, or provider. However, a challenge faced when an EBI was delivered as part of a health check was the need for other issues (such as children's behavioral or medical problems) to take priority.[44,50] Further barriers identified specifically associated with the MI approach included the following:

- MI taking too long to implement properly in a health check[44] or twice as long as the comparator, with no additional improvement in outcomes.[51,52]
- When the child and/or caregiver did not perceive the child to be living with overweight, school nurses reported feeling conflicted between keeping to the spirit of MI (i.e., respecting client autonomy) and their professional responsibility for the child's health.[47]
- Sessions involving both the child and parent were found to be difficult to deliver if the child and parent were at different stages regarding motivation, especially when children wanted to change but parents did not.[47]
- The reliance of MI on children and parents accurately self-reporting their current behaviors.[43]
- School nurses perceived a conflict between the focus on family/individual responsibility within MI and their professional knowledge of the wider environmental impacts (e.g., finances and food access) on weight.[47]
- The importance of thorough training and ongoing support for staff in delivering MI was highlighted, yet a lack of resources and high staff turnover was reported as making it difficult to ensure that staff trained in MI are always available.[45]

Two studies identified barriers relating to parents: Parental engagement was low among parents with depression, and this was common in populations living with high deprivation.[40] In addition, for EBIs delivered by telephone, parents needed access to phones and suitable places to take and concentrate on calls.[45]

Facilitators of successful EBI delivery included good training and ongoing support for staff in delivery, and two studies reported that it was helpful to providers to have electronic systems set up to prompt them deliver and record EBIs.[44,45] A further study highlighted that providing all staff involved in referral pathways with access to electronic records could help ensure continuity of care, which may improve families' experiences.[35]

4 | DISCUSSION

This rapid review has identified and synthesized the evidence from 19 studies on EBIs for childhood weight management and obesity prevention. The quality of studies was mixed, and no clear patterns in any of the outcomes emerged in relation to content or delivery of

intervention, or participant characteristics. Of the studies assessing the outcome of EBIs on children's weight status through BMI, no significant changes were found. This is perhaps unsurprising given the "light touch" nature of EBIs and their intended purpose as a first step in promoting behavior change, rather than providing more intensive support. There was some evidence that EBIs were effective in positively influencing parental determinants of behavior change (such as parents' motivation to make changes to their family's health behaviors) when targeting parents of younger children (2–11 years). However, this evidence came from studies assessing only short-term outcomes; further research is needed to establish whether these positive effects are maintained over months and years. Studies assessing behavioral outcomes and behavioral determinants, tended to use non-validated measures, limiting the credibility of the findings. There was no positive impact noted for the use of EBIs for onward referral to more intensive CWM programs. However, this was not well reported in the included studies, nor an aim of all studies, but would be useful to explore as an outcome in future research. To assess the long-term impact of EBIs, it will also be necessary for future research to include follow-up assessments after at least 1 year. In this review, we identified only four studies that undertook long-term follow-up assessments (6 months to 2 years).

The content of EBIs and the training of the people delivering them were often not reported in sufficient detail to allow replication or to reliably compare interventions. However, the majority of the EBIs reported were based on MI. The included EBIs were delivered by people from a range of backgrounds including healthcare professionals, allied health practitioners, and non-healthcare professionals; several EBIs were delivered by multiple different practitioners within the same study, making it difficult to draw conclusions on the impact of provider background on outcomes. Further, intervention content and training of providers was often not reported in sufficient detail to allow replication or to reliably compare interventions. Overall, there is currently not enough evidence to show what CWM EBIs should include, or how or by whom they should be delivered.

4.1 | Implications for future research and practice

The majority of EBIs involved MI, but it can be challenging to deliver a full motivational interview within the context of an EBI. The NICE guidance for EBIs in the domain of alcohol-use disorders describe these as "motivationally-based," suggesting that they "would not qualify as full motivational interviewing."[26] We believe this is also the case in the CWM EBIs reviewed here; to be conducted fully, MI involves developing a rapport with a client exploring their values, beliefs, perceived barriers, and confidence to change before any planning or goal setting can take place. This is unlikely to be possible in a single 30-min to 1-h long session and, depending on the client, may require more than five sessions. In the studies we reviewed, it was often unclear how and which MI techniques had been implemented. To help establish how well MI can

be applied in EBIs and what the clients are receiving in interventions, further research should make use of existing tools to assess providers' integrity to MI principles (e.g., the Motivational Interviewing Treatment Integrity Coding Manual[56]). These can also be used in practice for training and supervision purposes. For MI techniques to be delivered effectively, providers need to have undergone training in MI and receive regular supervision. If EBIs based on MI are to be introduced more widely, these requirements should be taken into account, alongside awareness of the funding pressures on healthcare and public health teams and staff turnover rates. Further, given the absence of evidence so far as to the superiority of EBIs in which BCTs are delivered with a MI style or not, research is needed to explore non-MI-based EBIs both in terms of their effectiveness and cost-effectiveness.

Although there was insufficient evidence in this review to recommend CWM EBIs, there may be advantages to being able to provide some support within a wider system; for example, GPs and other healthcare professionals are more likely to raise a health concern when they know there is somewhere to refer patients for further support,[57,58] so providing some service, such as EBIs, may increase the number of brief interventions attempted, resulting in some population level gain. In this respect, an advantage of EBIs may be that they can be delivered by non-healthcare professionals, as was the case for some of the EBIs in this review, potentially increasing the capacity for service provision. Other types of "light touch" intervention that could provide support for children's weight management, such as digital interventions that can be delivered remotely (e.g., the MapMe tool to help parents better recognize overweight in children[23]), show promise and may be worth to review.[59–61] Standard research projects may take many years to generate definitive evidence, so in line with the new MRC framework for complex interventions in settings where existing research evidence does not yet exist,[62] EBIs and other light touch interventions could be implemented alongside appropriately designed natural experiment to generate the necessary robust evidence in situ.

4.2 | Limitations

This analysis was limited to studies meeting our strict definition for an EBI, it is reasonable that others may have defined this differently. For research and practice in this field to progress, it would be helpful to have a standardized and accepted definition of a CWM EBI as well as a clear minimum contact for more intensive CWM services (e.g., group programs). Given the rapid nature of this review, only single screening of the retrieved articles was possible, although all researchers first underwent a calibration process to ensure consistency. We were unable to retrieve 55 reports for full text screening, either because there was no full text (i.e., the abstract retrieved related to a conference presentation, $n = 53$) or the full text was not in English ($n = 2$). A further limitation is that the BCTs included in EBIs were assessed based on the descriptions in the articles, which often lacked detail. It was beyond the scope of this review to request

intervention protocols for each of the included EBIs in order to identify BCTs according to standardized taxonomies. Thus, the EBIs may have included more BCTs than reported here, and there may be discrepancies between EBIs in how BCTs were defined, which would not have been identified. It was beyond the scope of this review to investigate the cost effectiveness of EBIs—this will be an important area for further research.

5 | CONCLUSION

This rapid systematic review has summarized the available literature on EBIs for children's weight management; we found insufficient evidence to support the use of CWM EBIs or to identify what such EBIs should include and how and by whom they should be delivered. No adverse impacts were reported, however, and further research using robust designs and measures could help to establish appropriate BCTs and modes of delivery for EBIs in this field.

CONFLICT OF INTEREST STATEMENT
No conflict of interest statement.

ORCID
Elisabeth Grey https://orcid.org/0000-0001-9719-9690
Miranda Pallan https://orcid.org/0000-0002-2868-4892

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.