

1 **Update of the Best Practice Dietetic Management**
2 **of Overweight and Obese Children and Adolescents:**
3 **a Systematic Review Protocol**

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43 **Review objective**

44 To update an existing systematic review series^{1,2} of randomized controlled trials (RCT) that include a
45 dietary intervention for the management of overweight or obesity in children or adolescents.

46

47 **Research Questions**

48 In RCTs of interventions which include a dietary intervention for the management of overweight or
49 obesity in children or adolescents:

- 50
- what impact do these interventions have on participants' adiposity and dietary outcomes?
 - what are the characteristics or intervention components that predict adiposity reduction or
52 improvements in dietary outcomes?
- 53

54 **Background**

55 Over the past four decades overweight and obesity prevalence has increased globally in children.³ Once
56 considered a problem only in high-income countries, prevalence of overweight and obesity is increasing
57 in low- and middle-income countries, particularly in urban settings. The magnitude of these changes
58 are such that in 1980, 8% and 16% of children from developing and developed countries, respectively,
59 were overweight (including obese), and by 2013 these rates had increased to around 13% and 23-24%,
60 respectively.³ At the upper-end of the weight spectrum, recent estimates suggest that worldwide in
61 2015, 107.7 million (~5%) children under 20 years of age were obese⁴, and in 2016, 41 million (~6%)
62 children under five years of age were classified as having moderate-severe overweight.⁵

63 Overweight, and especially obesity, in childhood is a significant public health issue due to its impact on
64 health and quality of life in childhood⁶ and its propensity to persist into adulthood.⁷ Aside from the impact
65 of overweight and obesity on individuals, its global economic impact is estimated to be in the order of
66 trillions of dollars annually.⁸ The health consequences of childhood overweight and obesity that may
67 present in childhood include: delayed motor development, asthma, obstructive sleep apnoea,
68 dysglycemia and type 2 diabetes, elevated blood pressure, dyslipidemia, chronic inflammation,
69 muscular skeletal problems, accelerated maturation, psychological difficulties and disorders, non-
70 alcoholic fatty liver disease, gastroenterological problems and reproductive problems.⁶ In adults,
71 overweight and obesity is associated with increased risk of all-cause mortality,^{9,10} and the incidence of

72 numerous co-morbidities including type 2 diabetes, various types of cancer, cardiovascular diseases,
73 asthma, gallbladder disease, osteoarthritis and chronic backpain.¹¹

74 While prevention must remain the key focus for medical and public health communities responding to
75 child and adolescent overweight and obesity, effective strategies are required for populations already
76 affected. The cornerstone of managing child and adolescent overweight and obesity is family-centered,
77 multicomponent lifestyle intervention based on dietary, physical activity and behavioral modification.^{12,13}
78 Lifestyle interventions can reduce body mass index (BMI), and improve other cardiometabolic outcomes
79 including blood lipids, fasting insulin and glucose, and blood pressure in children and adults.¹⁴⁻¹⁹

80 In 2007 our original systematic review on best practice dietetic management of overweight and obese
81 children and adolescents was published,¹ and the first update was published in 2013.² Data gathered
82 in those reviews also formed the basis of several secondary reviews on related topics.^{14-15, 20-22} This
83 series of reviews has been widely cited in over 125 peer-reviewed publications. Given the prevalence
84 of overweight and obesity in childhood remains at a historical high, and the seriousness of its
85 consequences, a second update of our review on best practice dietetic management of overweight and
86 obese children and adolescents is warranted. In parallel, a series of Cochrane reviews on interventions
87 for the treatment of child and adolescent overweight and obesity management were published between
88 2003 and 2017, those reviews included but were not restricted to interventions that featured a dietary
89 component.²³⁻³⁰ There is some overlap between our series of reviews and the Cochrane review series
90 with regards to the reporting of adiposity outcomes. However, the novel aspect of our primary
91 systematic review and its update^{1,2} is that we examine in detail the dietary outcomes of the included
92 dietary interventions, and also the characteristics of these interventions which are associated with
93 improvement in adiposity and dietary outcomes.

94 This second update of our review on best practice dietetic management of overweight and obese
95 children and adolescents will provide key information to inform clinical practice guideline and policy
96 development. It will also identify gaps in the evidence base requiring further research and potential
97 areas where innovations in dietary management are needed to improve adiposity and dietary outcomes.
98 This protocol is based on that used for the first update of this review.³¹ The methods described in this
99 protocol were guided by the Joanna Briggs Institute Reviewer's Manuals³²⁻³³ and recommendations for
100 updating systematic reviews.³⁴

101

102 **Keywords**

103 Child; adolescent; dietary intervention; obesity; randomized controlled trial

104

105

106 **Inclusion criteria**

107 As this is an updated systematic review the inclusion criteria are based on the criteria used in our
108 previous reviews^{1,2} and which are specified in our previous protocol.³¹

109 ***Types of participants***

110 This review will include interventions targeting children or adolescents who at baseline are less than 20
111 years of age, and who are defined as overweight or obese.

112 Participants will be free living outpatients or inpatients in obesity clinical units or attending community
113 programs, camps, school or one-off programs. Interventions directed exclusively at parents of eligible
114 participants will also be reviewed. Studies will be excluded if they focus on children or adolescents with
115 obesity attributable to a secondary or syndromal cause with the exception of Type 2 Diabetes Mellitus
116 or its precursor states.

117 ***Types of intervention***

118 Nutrition or dietary interventions of interest will be those used for the treatment of elevated body weight.
119 Interventions will include but not be limited to those provided by:

- 120 • a dietitian solely;
- 121 • a dietitian and other health professionals; or
- 122 • other professionals including obesity clinics, practice nurses, GPs, commercial programs, train-
123 the-trainer, community groups, gyms, schools or via the internet, telephone or mail.

124 The intervention focus may be described as: lifestyle modification, including modification of dietary
125 intake alone (inclusive of meal replacements and dietary supplements), or combined with cognitive
126 behavioral therapy and/or physical activity and/or sedentary behavior modification and/or
127 pharmacotherapy and/or a surgical intervention.

128 Childhood obesity prevention RCTs will be excluded. For the purpose of this review obesity prevention
129 interventions are defined as the implementation of strategies to limit excess weight gain in samples that
130 include healthy weight children or adolescents.

131 ***Types of comparator groups***

132 Acceptable control groups will include no treatment/wait-list control, usual care, a lower dose or intensity
133 of treatment (e.g. minimal advice, written education materials) or an alternative treatment.

134 ***Types of outcomes***

135 Measures of outcome will include but not be limited to changes in:

- 136 • anthropometry, including BMI, age and/or sex standardized BMI measures (e.g. BMI z-score,
137 BMI percentile), % overweight for age, waist measurement, or skinfolds;
- 138 • clinical indicators of weight changes (e.g. serum cholesterol, plasma insulin and glucose, or
139 blood pressure);
- 140 • body composition, including % body fat or % lean body mass; or
- 141 • any measure related to diet, nutrition or eating. For example dietary intake, dietary behaviors,
142 nutrition knowledge and attitudes, social cognitive theory constructs that relate to eating
143 behaviors (e.g. eating intentions, self-efficacy in making food choices).

144 **Types of studies**

145 Given the large volume of RCTs identified by our previous reviews,^{1,2} this review will only include RCTs
146 published in the peer-reviewed literature.

147

148 **Search strategy**

149 The search strategy is based on the previous search strategy used in 2010,^{2,31} and is shown in Appendix
150 1. The only deviation from the 2010 strategy will be that two databases searched in 2010 (shown with
151 an asterisk) will be replaced with more relevant databases, as recommended by the Senior Research
152 Librarian who will implement the literature search strategy. The databases that will be searched are:
153 CINAHL, MEDLINE, PreMEDLINE, Cochrane Library (all databases), Embase, Informit Health
154 Collection (instead of AUSTROM*), Dissertations and Theses, and Scopus (instead of Current
155 Contents*). To identify additional eligible studies, we will also examine the reference lists of the most
156 recent Cochrane review series, published between 2015 and 2017, on interventions for treating child
157 and adolescent overweight and obesity.²⁵⁻³⁰

158 All citations identified through the search strategy will be imported into Covidence.³⁵ Initially two
159 reviewers will use Covidence to independently screen studies for eligibility against the inclusion criteria,
160 based on information contained in the title and abstract. Full texts of all potentially relevant articles will
161 then be retrieved and uploaded to Covidence. Two reviewers will examine the full text articles through
162 Covidence and will independently designate if the study meets the inclusion criteria. Conflicts in
163 eligibility decisions will be resolved by a third reviewer.

164

165 **Assessment of methodological quality**

166 All studies that meet the inclusion criteria for this review will be independently assessed for
167 methodological quality by two reviewers, using the JBI Critical Appraisal Checklist for RCTs.³⁶ We will
168 modify item 11, so that item 11a will be "Were adiposity-related outcomes measured in a reliable way?"
169 and item 11b will be "Were dietary outcomes measured in a reliable way?". Responses will be recorded
170 in a Microsoft Excel spreadsheet. Any disagreements that arise between the reviewers will be resolved

171 through discussion, or with a third reviewer. These assessments will be used to develop statements on
172 the quality of the included studies with a clear indication of the risks of bias present.

173

174 **Data extraction**

175 Data will be extracted from studies included in the review using a standardized data extraction tool in
176 the form of a Microsoft Excel spreadsheet. The tool will include all the items on the JBI Data Extraction
177 Form for Experimental / Observational Studies³² and additional items considered pertinent to the
178 assessment of methodological quality and data synthesis. One reviewer will extract the required data
179 and a second reviewer will check the first reviewer's extraction for accuracy and completeness. If there
180 is disagreement between reviewers regarding the extracted data, a third reviewer will be consulted. If
181 additional information about an included study is required then authors of the study will be contacted.

182

183 **Data synthesis**

184 Results of comparable RCTs will be pooled in a meta-analysis to determine the effectiveness of the
185 intervention. Comparability of the studies will be defined by the population, interventions, comparator
186 groups and outcome measures. Review Manager will be used to perform meta-analyses.³⁷ Chi square
187 and visual interpretation of graphs will be used to assess heterogeneity. Significant heterogeneity will
188 be defined when the p value is less than 0.05. Odds ratio will be used to summarize effect for
189 dichotomous data, while the weighted mean difference or standardized mean difference will be used
190 for continuous data. Where statistical pooling is not possible the findings will be presented in narrative
191 form including tables and figures to aid in data presentation where appropriate. The Preferred Reporting
192 Items for Systematic Reviews and Meta-Analyses (PRISMA) statement will be used in preparation of
193 the final report.³⁸ A GRADE 'Summary of Findings' table will be compiled following the guidance in the
194 GRADE handbook.³⁹

195

196 **Conflicts of interest**

197 None to declare.

198 Dr Alessandro Demaio is a staff member of the World Health Organization in Geneva. He alone is
199 responsible for the views expressed in this publication and they do not necessarily represent the
200 decisions or policies of any third party.

201

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316 **Appendix 1. Literature search strategies**

317

318 **Database(s): Epub Ahead of Print, In-Process & Other Non-Indexed Citations, Ovid MEDLINE(R)**
 319 **Daily and Ovid MEDLINE(R)**

#	Searches
1	*Obesity/dh, dt, pc, rh, su, th [Diet Therapy, Drug Therapy, Prevention & Control, Rehabilitation, Surgery, Therapy]
2	intervention.mp.
3	weight control.mp.
4	weight management.mp.
5	weight loss.mp.
6	healthy weight.mp.
7	(family or parent* or school).mp.
8	weight reduction program*.mp.
9	(dietitian* or dietician*).mp.
10	2 or 3 or 4 or 5 or 6 or 7 or 8 or 9
11	(child or children or adolescen*).mp.
12	1 and 10 and 11
13	limit 12 to english language
14	limit 13 to ed=20100907-present

320

321

322

323 **Database(s): Embase Classic+Embase**

#	Searches
1	*obesity/dt, pc, rh, su, th, dm [Drug Therapy, Prevention, Rehabilitation, Surgery, Therapy, Disease Management]
2	intervention.mp.
3	weight control.mp.
4	weight management.mp.

5	weight loss.mp.
6	healthy weight.mp.
7	(family or parent* or school).mp.
8	weight reduction program*.mp.
9	(dietitian* or dietician*).mp.
10	2 or 3 or 4 or 5 or 6 or 7 or 8 or 9
11	(child or children or adolescen*).mp.
12	1 and 10 and 11
13	limit 12 to english language
14	limit 13 to dd=20100907-present

324

325 **CINAHL**

#	Query
S1	(MH "Obesity/TH/RH/SU/DH/DE/PC")
S2	intervention
S3	weight control
S4	weight management
S5	weight loss
S6	healthy weight
S7	(family or parent* or school)
S8	weight reduction program*
S9	(dietitian* or dietician*)
S10	S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9
S11	(child or children or adolescen*)
S12	S1 AND S10 AND S11 (limited to English and September 2010+)

326

327

328 **Dissertations and Theses**

329 ti(obes*) AND ti(child* OR adolesc*) AND ti(dieti* OR intervention OR treatment OR weight control OR
 330 weight management OR weight loss OR healthy weight OR weight reduction program*). Limited to
 331 English and 2010+

332

333 **Cochrane Library**

334 **ID Search**

335 #1 MeSH descriptor: [Obesity] explode all trees and with qualifier(s): [Diet therapy - DH, Drug
336 therapy - DT, Prevention & control - PC, Rehabilitation - RH, Surgery - SU, Therapy - TH]
337 6483

338 #2 intervention

339 #3 weight control

340 #4 weight management

341 #5 weight loss

342 #6 healthy weight

343 #7 (family or parent* or school)

344 #8 weight reduction program*

345 #9 (dietitian* or dietician*)

346 #10 {or #2-#9}

347 #11 child or children or adolescen*

348 **#12 {and #1, #10-#11} Publication Year from 2010**

349

350 **Informit Health Collection**

351 obes* AND (child* OR adolescen*) AND (dietitian* OR dietician* OR intervention OR "weight
352 control" OR "weight management" OR "weight loss" or "healthy weight" OR family OR parent* OR
353 school OR "weight reduction program*")

354 Limited to 2010-

355

356 **Scopus**

357 (TITLE (obes*) AND TITLE (child* OR adolescen*) AND TITLE (dietitian* OR dietician*
358 OR intervention OR "weight control" OR "weight management" OR "weight loss" OR "healthy
359 weight" OR family OR parent* OR school OR "weight reduction
360 program*")) AND PUBYEAR > 2009 AND (LIMIT-TO (LANGUAGE , "English"))