

# Interventions for preventing eating disorders in children and adolescents (Review)

Pratt BM, Woolfenden S



**THE COCHRANE  
COLLABORATION®**

This is a reprint of a Cochrane review, prepared and maintained by The Cochrane Collaboration and published in *The Cochrane Library* 2009, Issue 1

<http://www.thecochranelibrary.com>



---

Interventions for preventing eating disorders in children and adolescents (Review)  
Copyright © 2009 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

## TABLE OF CONTENTS

HEADER . . . . .	1
ABSTRACT . . . . .	1
PLAIN LANGUAGE SUMMARY . . . . .	2
BACKGROUND . . . . .	3
OBJECTIVES . . . . .	4
METHODS . . . . .	4
RESULTS . . . . .	6
DISCUSSION . . . . .	16
AUTHORS' CONCLUSIONS . . . . .	16
ACKNOWLEDGEMENTS . . . . .	17
REFERENCES . . . . .	17
CHARACTERISTICS OF STUDIES . . . . .	19
DATA AND ANALYSES . . . . .	30
Analysis 1.1. Comparison 1 "Eating Attitudes/Behaviours & Adolescent Issues" approach (5 studies), Outcome 1 Body Mass Index (BMI) at 12- to 14-month follow up. . . . .	31
Analysis 1.2. Comparison 1 "Eating Attitudes/Behaviours & Adolescent Issues" approach (5 studies), Outcome 2 Body Mass Index (BMI) (hi-risk) at 12- to 14-month follow up. . . . .	32
Analysis 1.3. Comparison 1 "Eating Attitudes/Behaviours & Adolescent Issues" approach (5 studies), Outcome 3 Eating Attitudes Test (EAT) Total at 6- to 12-month follow-up. . . . .	32
Analysis 1.4. Comparison 1 "Eating Attitudes/Behaviours & Adolescent Issues" approach (5 studies), Outcome 4 Eating Attitudes Test (EAT) Total (high-risk) at 6- to 12-month follow-up. . . . .	33
Analysis 1.5. Comparison 1 "Eating Attitudes/Behaviours & Adolescent Issues" approach (5 studies), Outcome 5 Eating Disorder Inventory (EDI) "Bulimia" at 12- to 14-month follow-up. . . . .	33
Analysis 1.6. Comparison 1 "Eating Attitudes/Behaviours & Adolescent Issues" approach (5 studies), Outcome 6 Eating Disorder Inventory (EDI) (hi-risk) "Bulimia" at 12- to 14-month follow-up. . . . .	34
Analysis 2.1. Comparison 2 "Media Literacy & Advocacy" approach (3 studies), Outcome 1 Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ) "Awareness" at 3-month follow-up. . . . .	34
Analysis 2.2. Comparison 2 "Media Literacy & Advocacy" approach (3 studies), Outcome 2 Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ) "Internalization" at 3-month follow-up. . . . .	35
Analysis 2.3. Comparison 2 "Media Literacy & Advocacy" approach (3 studies), Outcome 3 Social Perception Profile (SPA & SPPC) "Global Self Worth" at 3-month follow-up. . . . .	35
Analysis 2.4. Comparison 2 "Media Literacy & Advocacy" approach (3 studies), Outcome 4 Body Image Assessment (BIA: Silhouettes) at 3-months. . . . .	36
Analysis 3.1. Comparison 3 "Self-esteem" approach (2 studies), Outcome 1 Social Perception Profile (SPA) "Close Friendships" at 3-month follow-up. . . . .	36
Analysis 3.2. Comparison 3 "Self-esteem" approach (2 studies), Outcome 2 Social Perception Profile (SPA) "Social Acceptance" at 3-month follow-up. . . . .	37
WHAT'S NEW . . . . .	37
HISTORY . . . . .	37
CONTRIBUTIONS OF AUTHORS . . . . .	37
DECLARATIONS OF INTEREST . . . . .	38
SOURCES OF SUPPORT . . . . .	38
INDEX TERMS . . . . .	38

[Intervention Review]

# Interventions for preventing eating disorders in children and adolescents

Belinda M Pratt<sup>1</sup>, Susan Woolfenden<sup>2</sup>

<sup>1</sup> CPPPC, Psychological Medicine, The Children's Hospital at Westmead, Westmead, Australia. <sup>2</sup> B Wing, Liverpool Hospital, Liverpool, Australia

Contact address: Belinda M Pratt, CPPPC, Psychological Medicine, The Children's Hospital at Westmead, Locked Bag 4001, Westmead, NSW, 2145, Australia. [Bel\\_Mike@bigpond.com](mailto:Bel_Mike@bigpond.com). (Editorial group: Cochrane Depression, Anxiety and Neurosis Group.)

*Cochrane Database of Systematic Reviews*, Issue 1, 2009 (Status in this issue: *Edited*)

Copyright © 2009 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

DOI: 10.1002/14651858.CD002891

**This version first published online:** 22 April 2002 in Issue 2, 2002. Re-published online with edits: 21 January 2009 in Issue 1, 2009.

**Last assessed as up-to-date:** 2 September 2004. (Help document - [Dates and Statuses](#) explained)

**This record should be cited as:** Pratt BM, Woolfenden S. Interventions for preventing eating disorders in children and adolescents. *Cochrane Database of Systematic Reviews* 2002, Issue 2. Art. No.: CD002891. DOI: 10.1002/14651858.CD002891.

## ABSTRACT

### Background

Eating disorders represent an extremely difficult, time-consuming and costly condition to treat. Being young, female, and dieting are some of the few identified risk factors that have been reliably linked to the development of eating disorders. There is currently limited evidence in the published literature to suggest that any particular type of program is effective in preventing eating disorders and there has been concern that some interventions have the potential to cause harm.

### Objectives

To determine if eating disorder prevention programs for children and adolescents are effective in: (1) promoting healthy eating attitudes and behaviours; (2) promoting protective psychological factors; (3) promoting satisfactory physical health; (4) having a long-term, sustainable, and positive impact on mental and physical health; and, (5) ensuring safety in relation to possible harmful consequences on mental or physical health.

### Search strategy

Relevant trials are identified through searching the Cochrane Controlled Trial Register (CCTR) and relevant biomedical and social science databases, as well as reference lists from articles identified through the search strategy and contact with experts in the field.

### Selection criteria

Randomised controlled trials (RCTs) with a major focus on eating disorder prevention programs for children and adolescents, where there is no known DSM-IV diagnosis of an eating disorder, are eligible for inclusion in the review. Trials must include a control group and at least one objective outcome measure (e.g., BMI) or a standardised psychological measure used with the intervention and control group, pre- and post-intervention.

### Data collection and analysis

A total of 1016 titles have been identified through the search to date. Twenty-two studies were located that reported use of a randomised controlled trial methodology and were critically appraised by two independent reviewers. Twelve studies met the selection criteria outlined above.

## **Main results**

Combined data from two eating disorder prevention programs based on a media literacy and advocacy approach indicate a reduction in the internalisation or acceptance of societal ideals relating to appearance at a 3- to 6-month follow-up (Kusel 1999; Neumark\* 2000) [SMD -0.28, -0.51 to -0.05, 95% CI]. There is insufficient evidence to support the effect of five programs designed to address eating attitudes and behaviours and other adolescent issues in the general community or those classified as being at high risk for eating disorder (Buddeberg\* 1998; Dalle Grave 2001; Killen 1993; Santonastaso 1999; Zanetti 1999) and insufficient evidence to support the effect of two programs designed to improve self-esteem (O'Dea 2000; Wade 2003). Data from two didactic eating disorder awareness programs could not be pooled for analysis. There is not sufficient evidence to suggest that harm resulted from any of the prevention programs included in the review.

## **Authors' conclusions**

The one significant pooled effect in the current review does not allow for any firm conclusions to be made about the impact of prevention programs for eating disorders in children and adolescents, although none of the pooled comparisons indicated evidence of harm. The meta-analysis is in the process of being revised to account for the impact of cluster randomised trials.

## **PLAIN LANGUAGE SUMMARY**

### **Preventing eating disorders in children and adolescents**

Eating disorders represent an extremely difficult, time-consuming and costly condition to treat. Being young, female, and dieting are some of the few identified risk factors that have been reliably linked to the development of eating disorders. Several eating disorder prevention programs have been developed and trialled with children and adolescents. There is currently limited evidence in the published literature to suggest that any particular type of program is effective in preventing eating disorders and there has been concern that some interventions have the potential to cause harm. The aim of this systematic review is to determine whether these interventions are effective in the prevention of eating disorders in children and adolescents. Only one statistically significant result was found in the present meta-analysis - a slight effect of media literacy and advocacy programs in reducing acceptance of societal body image ideals. There is not sufficient evidence to suggest that harm was caused by any of the 12 randomised controlled trials included in the review at short-term follow-up. The meta-analysis is in the process of being revised to account for the impact of cluster randomised trials.

## BACKGROUND

When considering “weight-related” disorders, it is acknowledged that obesity is much more prevalent than both anorexia nervosa and bulimia nervosa. In this regard, the interested reader is also encouraged to refer to the Cochrane review on interventions to prevent obesity in children by [Campbell 2002](#). However, it is also important to recognise that eating disorders represent an extremely difficult, time-consuming and costly condition to treat. For instance, anorexia nervosa represents the third most common chronic illness in the USA ([Emans 2000](#)), and treatment for an episode of anorexia nervosa comes second only to coronary artery bypass surgery for costs in the private hospital sector in Australia. Furthermore, the seventh major cause of mental disorders for women in Australia in 1996 was eating disorders, accounting for 6.3% of the mental health burden for women, calculated in disability-adjusted life years (DALYs) ([Mathers 2000](#)).

The major diagnostic categories for eating disorders are anorexia nervosa (characterised by restrictive eating patterns and significant weight loss), bulimia nervosa (characterised by binge-purge cycles) and eating disorder not otherwise specified (disorders of eating that do not meet the criteria for any specific eating disorder) ([APA 1994](#)). The international prevalence of Anorexia Nervosa (AN) among females in late adolescence and early adulthood is 0.5% to 1% and Bulimia Nervosa (BN) has been estimated to involve approximately 1% to 3% of adolescents and young adult females ([APA 1994](#)). Data from an Australian study by [Ben-Tovim 1990](#) suggest that one in every thousand school students over the age of 12 will develop anorexia nervosa.

The diagnostic category of Eating Disorder Not Otherwise Specified (EDNOS) is more commonly encountered than either anorexia or bulimia nervosa ([APA 1994](#)) and eating problems that do not reach diagnostic threshold are quite common in the community. For instance, [Maloney 1989](#) found that up to 45% of boys and girls in the early school years want to be thinner than they are. As females reach adolescence, unhealthy eating behaviours and eating disorders come to represent major health concerns ([Striegel-Moore 1997](#)). [Grigg 1996](#) showed a high prevalence of disordered eating behaviours (33%), unhealthy dieting practices (57%) and distorted body image (12%) among adolescents. In addition, the majority of adolescents wanted to lose weight (77%) and half had attempted to lose weight in the past month (51%) ([Grigg 1996](#)). Strong correlates of these behaviours included overweight status, low self-esteem, depression, suicidal ideation, and substance use ([Neumark 2000](#)). There has been an apparent increase in the prevalence of eating disorders over the last 50 years ([Lucas 1991](#); [Szmukler 1986](#)). Some researchers speculate that this increase may reflect increased recognition and changes in referral practices over time ([Turnbull 1996](#) for review) while others suggest that this increase is in fact a myth (see [Gresko 1998](#)).

### RISK FACTORS FOR EATING DISORDERS.

Although many biopsychosocial risk factors for eating disorders have been studied, few variables have been identified as reliable risk factors for eating disorder. For instance, it is well documented that eating disorders are much more prevalent amongst females (i.e., fixed marker), with the average age of onset of eating disorder occurring in early to mid-adolescence, ranging from 14 years to 20 years of age (i.e., variable risk factor) ([Striegel-Moore 1997](#)). Consequently, many eating disorder prevention programs aim to target young females. Moreover, [Patton 1999](#) found that dieting was the most important predictor of eating disorders in an Australian study of 1947 girls aged 14 to 15 years between 1992 and 1995. Females who dieted at a severe level were found to be 18 times more likely to develop a new eating disorder within 6 months than those who did not diet, and those who dieted at a moderate level were five times more likely to develop an eating disorder. Case-control studies of risk factors for eating disorders in adults ([Fairburn 1997](#); [Fairburn 1999](#)) indicate “a broad range of risk factors for anorexia nervosa and bulimia nervosa, some of which are shared with other psychiatric disorders”. The development of bulimia nervosa was found to be influenced by: (1) parental obesity, (2) childhood obesity, (3) critical comments by family about shape, weight or eating, (4) early menarche, (5) parental psychiatric disorder, and (6) certain parental problems (low contact and high expectations, and alcohol use disorder). Perfectionism and negative self-evaluation were found to be common antecedents of both anorexia nervosa and bulimia nervosa. More recently, [Ghaderi 2003B](#) has offered a structural modelling analysis of prospective risk factors for eating disorder which highlights low self-esteem, low perceived social support from family, high levels of body concern and escape avoidance coping.

### PREVENTION PROGRAMS FOR EATING DISORDERS.

Prevention programs for eating disorders have been developed and evaluated all over the world, including several research groups in Canada (e.g., [Friedman 1996](#), [Friedman 1998](#); [Olmsted 2002](#); [Piran 1995](#), [Piran 1996](#)), the United States (e.g., [Killen 1993](#); [Kusel 1999](#); [Shisslak 1998](#); [Smolak 1998](#); [Stice 2003](#)), Norway (e.g., [Rosenvinge 1997](#)), Switzerland (e.g., [Buddeberg\\* 1998](#)), Italy (e.g., [Dalle Grave 2001](#); [Santonastaso 1999](#); [Zanetti 1999](#)), the United Kingdom (e.g., [Baranowski 2001](#); [Carter 1997](#); [Stewart 2001](#)), and Australia (e.g., [Huon 1997](#); [O’Dea 2000](#); [Wade 2003](#)). Programs initially involved didactic psychoeducational material on eating disorders in community samples of adolescents and later incorporated issues concerning sociocultural influences on body image. More recently, programs have targeted high-risk samples using interactive formats.

Concerns about the potential to cause harm via eating disorder prevention programs have been raised in relation to one uncontrolled eating disorder prevention study in children and adolescents (i.e., [Carter 1997](#)), as well as a few studies in college women and the suicide prevention literature. It is reassuring to learn that a controlled trial of the same intervention assumed to have caused

harm in the aforementioned uncontrolled study has been completed (Stewart 2001) with modest positive effects being reported for dietary restraint and attitudes to shape and weight (which were not maintained over time).

A meta-analytic review of outcome data from eating disorder prevention programs involving controlled trials and child, adolescent and adult populations has been recently conducted by Stice 2004 which confirms a summary of effects reported in an earlier review by Dalle Grave 2003. The influence of moderator variables such as gender, age, risk status of participants, program format and content, number of sessions and use of validated measures was examined in 51 published and unpublished studies involving children, adolescent and adults. Fifty-three percent of the interventions resulted in significant reductions in at least one established risk factor for eating pathology, and 25% of the interventions resulted in significant reductions in eating pathology. Of relevance to this review, random assignment to intervention or control conditions was not related to any calculated effect sizes. Larger effects were found for programs delivered to high-risk participants compared with universal delivery. Interactive programs had larger effects than didactic (psychoeducational) programs. Program content was less important than other moderating variables in predicting intervention effects and suggested there may be multiple methods to successfully prevent eating pathology. Multisession programs had larger effects than single session programs. Programs offered to females only and to those aged over 15 also produced larger effects. Trials including outcome measures with sound psychometric properties produced significantly greater intervention effects. These positive findings are in contrast to the original version of the present Cochrane systematic review published in 2002 which found only one positive effect after combining outcome data from eight randomised controlled trials (i.e., two media literacy programs produced a reduction in thin ideal internalisation at a 3- to 6-month follow-up). The differences in methodology (i.e., inclusion of randomised versus controlled trials) and selected populations (i.e., child and adolescent versus all ages) between the present meta-analysis and that of Stice 2004 highlight the potential for selection bias and differential impact of prevention programs on adult populations.

#### RATIONALE FOR CURRENT SYSTEMATIC REVIEW.

The development and evaluation of eating disorders prevention programs and the promotion of health eating attitudes/behaviours and weight regulation practices is of crucial importance. The purpose of this systematic review is to evaluate the effectiveness of eating disorder prevention programs for children and adolescents both in the general population and those determined to be at risk.

## OBJECTIVES

1. To determine if eating disorder prevention programs are effective

in promoting healthy eating attitudes and behaviours in children and adolescents;

2. To determine if eating disorder prevention programs are effective in promoting psychological factors that protect children and adolescents from developing eating disorders;

3. To determine if eating disorder prevention programs are effective in promoting satisfactory physical health in children and adolescents (i.e., Body Mass Index);

4. To determine if eating disorder prevention programs have a long-term, sustainable, and positive impact on the mental and physical health of children and adolescents; and,

5. To determine the safety of eating disorder prevention programs in terms of possible harmful consequences on the mental or physical health of children and adolescents.

## METHODS

### Criteria for considering studies for this review

#### Types of studies

Trials are eligible for inclusion in the review if:

- the assignment of study participants to both intervention and control groups is random (a sensitivity analysis will be undertaken);
- the study intervention has its major focus on the prevention of eating disorders in children and adolescents;
- there is at least one objective outcome measure (e.g., BMI) or a standardised psychological measure used with the intervention and control group, pre- and post-intervention; and,
- the data are either reported in a useable form or useable data can be obtained from the trial authors.

#### Types of participants

Studies with children and adolescents from general population samples and other specific (e.g., "high-risk") population samples where there is no known DSM-IV diagnosis of an eating disorder.

#### Types of interventions

Studies with interventions having a major focus on the prevention of eating disorders are eligible for inclusion in the review (e.g., school-based curriculums involving advice and education about eating disorders and their consequences), interventions aimed at increasing resilience to eating disorders (e.g., building self-esteem), interventions aimed at reducing the prevalence of modifiable and specific risk factors for eating disorders (e.g., childhood obesity, frequency of restrictive dieting). Both universal and selective prevention programs will be considered and may include more than one type of intervention.

Studies are required to have a control group (e.g., usual school curriculum).

### Types of outcome measures

The following outcomes are considered important in this review: eating attitudes and behaviours, formal diagnosis of eating disorder, general psychological and physical well-being, body mass index or weight, and protective psychological factors.

Specific outcomes could include:

- Objective measures (e.g., body mass index);
- Standardised psychological measures of eating disorder symptoms (e.g., the Eating Disorder Inventory (Garner 1991));
- Standardised psychological measures of protective psychological factors (e.g., Rosenberg Self-Esteem Scale);
- Standardised psychological measures of psychological and physical well-being (e.g., Child Health Questionnaire).

### Search methods for identification of studies

Relevant trials are identified through searching the Cochrane Controlled Trial Register (CCTR) and the following databases: Biomedical Sciences Databases:

MEDLINE

PsychInfo

CINAHL (Nursing and Allied Health)

Social Sciences Databases:

ERIC

Search terms are modified to meet the requirements of individual databases as regards to differences in fields. All terms necessary to detect prevention programs and the participant groups are used (i.e., separate searches were conducted for clinical trials involving eating disorders in child and adolescent populations and for studies involving a focus on eating disorders and prevention). A strategy to locate randomised controlled trials is used. There are no language restrictions.

Other sources of information are the bibliographies of systematic and non-systematic reviews and reference lists of articles identified through the search strategy.

In order to identify unpublished studies, experts in the field will be contacted by letter and/or electronic mail.

Database: Ovid MEDLINE(R) <1996 to August Week 3 2004>

Search Strategy

- 
- 1 Clinical trials/ or Placebos/ or Single-blind method/
  - 2 Double-blind method/
  - 3 Randomized controlled trials/
  - 4 Random allocation/
  - 5 Randomized controlled trial.pt.
  - 6 1 or 2 or 3 or 4 or 5
  - 7 Controlled clinical trials/
  - 8 Clinical trial.pt.

9 (clin\$ adj25 trial\$).mp. [mp=title, original title, abstract, name of substance, mesh subject heading]

10 ((singl\$ or doubl\$ or trebl\$ or tripl\$) adj25 (blind\$ or mask\$)).mp. [mp=title, original title, abstract, name of substance, mesh subject heading]

11 Research design.sh.

12 7 or 8 or 9 or 10 or 11

13 6 or 12

14 Eating disorders/

15 Anorexia nervosa/

16 Bulimia/

17 14 or 15 or 16

18 "Adolescence"/

19 "Child"/

20 18 or 19

21 17 and 20

22 13 and 21

23 Prevention.mp. or primary prevention/

24 22 and 23

Database: PsycINFO <1887 to August Week 3 2004>

Database: CINAHL (Nursing and Allied Health) <1982 to August Week 3 2004>

Search Strategy

---

1 exp experimental design/ or "randomised controlled trial".mp.

2 exp treatment effectiveness evaluation/ or "random allocation".mp.

3 exp program evaluation/ or "program evaluation".mp.

4 "SINGLE BLIND METHOD".mp.

5 exp methodology/ or "double blind method".mp.

6 "CONTROLLED CLINICAL TRIAL".mp.

7 "CLINICAL TRIAL".mp.

8 exp treatment effectiveness evaluation/

9 exp placebo/

10 1 or 2 or 3 or 5 or 6 or 7 or 8 or 9

11 exp eating disorders/ or "eating disorder".mp.

12 exp anorexia nervosa/ or "anorexia nervosa".mp.

13 exp bulimia/ or "bulimia".mp.

14 exp prevention/ or exp primary mental health prevention/ or "prevention".mp.

15 11 or 12 or 13

16 10 and 14 and 15

17 10 and 15

18 (child or childhood).mp. [mp=title, abstract, subject headings, table of contents, key concepts]

19 (adolescent or adolescence).mp. [mp=title, abstract, subject headings, table of contents, key concepts]

20 18 or 19

21 17 and 20

Database: ERIC (Education) <1966 to August Week 3 2004>

Search Strategy

---

1 exp experimental design/ or “randomised controlled trial”.mp.  
 2 exp treatment effectiveness evaluation/ or “random allocation”.mp.  
 3 exp program evaluation/ or “program evaluation”.mp.  
 4 “SINGLE BLIND METHOD”.mp.  
 5 exp methodology/ or “double blind method”.mp.  
 6 “CONTROLLED CLINICAL TRIAL”.mp.  
 7 “CLINICAL TRIAL”.mp.  
 8 1 or 2 or 3 or 5 or 6 or 7  
 9 exp eating disorders/ or “eating disorder”.mp.  
 10 exp anorexia nervosa/ or “anorexia nervosa”.mp.  
 11 exp bulimia/ or “bulimia”.mp.  
 12 exp prevention/ or exp primary mental health prevention/ or “prevention”.mp.  
 13 9 or 10 or 11  
 14 8 and 12 and 13  
 15 8 and 13  
 16 (child or childhood).mp. [mp=title, abstract, subject headings, table of contents, key concepts]  
 17 (adolescent or adolescence).mp. [mp=title, abstract, subject headings, table of contents, key concepts]  
 18 16 or 17  
 19 15 and 18

## Data collection and analysis

Data is organised using Reference Manager. The titles and abstracts from the search are screened by two reviewers. Articles that clearly do not fulfil inclusion criteria as judged by titles and abstracts are rejected. “Hopeful looking” articles are retrieved. Studies under consideration are evaluated for methodological quality and appropriateness as per the CCDAN rating system for quality of trials, suitably modified for prevention trials. Articles are judged independently by two reviewers and any differences are negotiated between the reviewers.

A data extraction form has been developed and data extraction is performed by two reviewers independently. The information extracted includes study location, methods, participant details, type of intervention, duration of intervention and outcome.

Data synthesis is performed using RevMan software (version 4.1 was used for the present update of the review). For continuous data a standardised mean difference (SMD) or a weighted mean difference (WMD) is used to estimate the effect of intervention. For dichotomous data, a risk ratio is chosen as the measure of effect. 95% confidence intervals are obtained for all estimates. As per the guidelines for statistical analysis for reviewers provided by the Cochrane Collaboration for Depression Anxiety and Neurosis (CCDAN) Group, a summary statistic for each outcome is calculated using both a fixed effect and a random effects model where there is sufficient data. Heterogeneity is assessed using the Chi squared test of heterogeneity along with visual inspection of the data. A significance level of less than 0.1 is interpreted as evidence of statistically significant heterogeneity. For data where statistical

heterogeneity is found the reviewers will look for an explanation in terms of differences in interventions or participants. If these studies are still found to be comparable, the statistical synthesis of the results will be done using a random effects model. The authors will seek statistical advice with regards to heterogeneity. Sensitivity analyses will be undertaken to examine the stability of the results in relation to a number of factors including study quality, the source of the data (published or unpublished), intervention type, presence or absence of signs of eating disorder or risk factors associated with eating disorder and age. Subgroup analysis is undertaken based on the following predefined categories: I) program format (i.e., psychoeducation or skills-building approaches) and II) presence or absence of signs of eating disorder or risk factors associated with eating disorder (i.e., universal or selective approach to prevention).

Support was received from the Cochrane Advanced Reviewer Support (CARS) Service for the 2005 update of this review. Sarah Hetrick, research officer from the Australasian Cochrane Centre, was principally involved in conducting searches, locating and retrieving articles, including and excluding studies, extracting trial information, amending table of included and excluded studies, amending summary table of outcome measures, extracting trial data, quality assessment and outcome data for newly included studies, providing advice on subgrouping studies, double checking data entry and contacting a trial author to request further data.

## RESULTS

### Description of studies

See: [Characteristics of included studies](#); [Characteristics of excluded studies](#).

See : Tables of studies

As at August 2004, a total of 1016 articles potentially relevant to the review were located via use of specific searches of PsycInfo, Medline, CINAHL and ERIC (as outlined above). Several more potentially relevant studies were located via reference lists, a systematic review and via authors in the field.

Articles were rejected at title, abstract and text review if they did not fulfil inclusion criteria as outlined above. Twenty-two studies were located that reported use of a randomised controlled trial methodology and were critically appraised by two independent reviewers. Ten of the 22 studies were excluded: three had data that could not be obtained from the trial authors (Neumark\* 1995; Rosen 1989; Steiner-Adair 2002), three studies randomised very large groups (i.e., schools) (McVey 2002; McVey 2004; McVey submitted), two studies had no “true” no-treatment or usual treatment control group (Abascal 2003; Heinze 2000), one study did not use a pre-test outcome measure (Phelps 2000), and one study involved an adult population (Ghaderi 2003B). Twelve of the 22

studies (Buddeberg\* 1998; Dalle Grave 2001; Jerome 1991; Killen 1993; Kusel 1999; Neumark\* 2000; O'Dea 2000; Olmsted 2002; Santonastaso 1999; Stice 2003; Wade 2003; Zanetti 1999) met the inclusion criteria outlined above.

Of the 12 included studies, a total of 3092 children and adolescents were randomised to receive a prevention program for eating disorders or to be in a control group. All included studies had more than 85 participants. Their ages ranged from 10 to 20 years. In all but three studies, programs were school-based. The exceptions being one study that targeted girl scouts (Neumark\* 2000), one study involving hospital patients with diabetes (Olmsted 2002) and one study that did not mention location (Stice 2003). Seven studies had only female participants (Killen 1993; Kusel 1999; Neumark\* 2000; Olmsted 2002; Santonastaso 1999; Stice 2003; Zanetti 1999) and five had participants from both sexes (Buddeberg\* 1998; Dalle Grave 2001; Jerome 1991; O'Dea 2000; Wade 2003). PREVENTION PROGRAM SUBGROUPS. Eating disorder prevention programs included in the current review can be subgrouped into four categories on the basis of program content:

- One type of intervention involved eating disorder awareness. One study adopted this approach via a media presentation and discussion about bulimia nervosa (Jerome 1991) and another study ran a six-week psychoeducation/didactic program for girls with diabetes (concurrently involving parents) focusing on eating disorder awareness, healthy eating, strategies to control disturbed eating and body image concerns, and the relationship of these issues to diabetes (Olmsted 2002).
- A second type of intervention involved promotion of healthy eating attitudes and behaviours, as well as eating disorder awareness and coping with general adolescent issues. More specifically, two studies included class discussion of body ideals/maturation, healthy eating (one study included a social picnic), options for treatment of eating disorders and coping with the demands of growing up (Buddeberg\* 1998; Zanetti 1999). One study involved an 18-lesson curriculum involving discussion of unhealthful weight regulation practices, promotion of weight regulation via nutrition and exercise, and development of coping skills to address sociocultural pressure to be thin (Killen 1993), and one study included four didactic lessons and group discussion of general adolescent problems and eating disorders (Santonastaso 1999). One study ran a six-week interactive program focusing on increasing awareness of sociocultural pressures on body image, cognitive distortions regarding risk factors for eating disorders, dieting and eating disorders (Dalle Grave 2001) with two booster sessions after six months. Another study ran a three-week intervention involving an interactive dissonance intervention program encouraging participants to critique the thin-ideal and create inconsistent cognitions with the internalised

ideal of beauty, with the aim of reducing subscription to this ideal (Stice 2003).

- A third type of intervention involved training in media literacy and advocacy skills. One study ran a two-day program involving use of videos and discussion to raise awareness and encourage critical analysis of media and societal attitudes about body shape and weight (Kusel 1999), and another study comprised six sessions on media literacy and advocacy skills (e.g., writing letters to an eating disorder association) (Neumark\* 2000). A third study conducted the "GO GIRLS!" media literacy program over five lessons (Wade 2003).
- A fourth type of intervention did not have a direct focus on discussion of eating disorders or eating attitudes and behaviours, and instead focused on promoting self-esteem. Two studies adopted this approach and involved five to nine lessons (The "Everybody's Different" program) which covered: dealing with stress, building a positive sense of self, stereotypes in our society, positive self-evaluation, involving significant others, relationship skills and communication skills (O'Dea 2000; Wade 2003).

Control groups included: "usual school curriculum" controls (Buddeberg\* 1998; Dalle Grave 2001; Killen 1993; O'Dea 2000; Wade 2003), "no intervention" controls (Neumark\* 2000; Santonastaso 1999; Zanetti 1999), one study involved a healthy weight control intervention and a waitlist control condition (Stice 2003), one study had a control group that viewed a video and had group discussion not involving media or body types (i.e., stress management, famous people) (Kusel 1999), another study included two control groups that received either no intervention or a "neutral" film (Jerome 1991), and one study involved "treatment as usual" for participants with Type 1 Diabetes Mellitus (Olmsted 2002).

### Risk of bias in included studies

See: Table of included studies

All included trials were randomised controlled trials. All 12 studies stated that random allocation was used to allocate participants to the intervention and control group, with nine studies providing support for adequate concealment allocation (Buddeberg\* 1998; Killen 1993; Kusel 1999; Neumark\* 2000; O'Dea 2000; Santonastaso 1999; Stice 2003; Wade 2003; Zanetti 1999). One other study randomly "selected" participants rather than "allocated" classes to intervention or control conditions suggesting a moderate risk of bias (Dalle Grave 2001). In the two remaining studies, including one unpublished dissertation, concealment allocation was unclear and further information on randomisation was unable to be obtained by the reviewers from the trial authors (Jerome 1991; Olmsted 2002). In particular, the study by Olmsted 2002 was rated as having a "high risk of bias" as it involved partic-

participants being "randomised sequentially" to intervention or control groups on a 2:1 ratio and due to drop-out, some of the "treatment as usual" participants were re-assigned to the psychoeducation group.

Two studies randomly allocated individual participants to intervention or control conditions (Olmsted 2002; Wade 2003). The 10 remaining studies randomly allocated participants according to class or troop (Buddeberg\* 1998; Dalle Grave 2001; Jerome 1991; Killen 1993; Kusel 1999; Neumark\* 2000; O'Dea 2000; Santonastaso 1999; Stice 2003; Zanetti 1999), however, only two of these "cluster randomised trials" applied the appropriate unit of analysis (Killen 1993; Neumark\* 2000). Because individuals within groups will be influenced by class level factors (e.g., teacher), then individuals within a class will be more alike than individuals in different classes. This "clustering" must be taken into account when analysing trials of this type. To this end, authors of cluster randomised trials are currently being contacted to obtain an intracluster correlation coefficient, or a raw data set, to enhance confidence in the outcome of the present meta-analysis. Given that the studies involved the introduction of an alternate school curriculum, a new girl scout program on eating disorders or an alternate intervention for patients with diabetes, participants were not blinded as to whether they were receiving the intervention or not. The content of 10 of the prevention programs/curriculums included discussion of eating disorders and/or eating attitudes and behaviours, so for those studies, blinding of participants to the purpose of the programs/curriculums did not occur. In two studies (O'Dea 2000; Wade 2003), blinding of participants to the purpose of the intervention did occur, as there was not direct discussion of eating disorder, attitudes or behaviours, and a test of the integrity of the blinding in the study by O'Dea 2000 supported this. In seven studies, the assessors were reported to be blind or blinding was not applicable due to use of self-report questionnaires (Buddeberg\* 1998; Killen 1993; Kusel 1999; O'Dea 2000; Olmsted 2002; Stice 2003; Wade 2003). In the remaining five studies, information on blinding of assessors was not reported.

A variety of outcome measures were used across the different studies (see Table 1 and Table 2 for a tabulated summary). Six studies applied anthropometric measurements, including body mass index and body weight (Dalle Grave 2001; Killen 1993; O'Dea 2000; Santonastaso 1999; Wade 2003; Zanetti 1999) and one study included a measure of desired body weight (Jerome 1991). All studies, except one (Neumark\* 2000) applied one or more subscales from a standardised measure designed to assess a range of eating disorder symptoms (e.g., Eating Attitudes Test (EAT) or the Eating Disorder Inventory (EDI) or the Eating Disorders Examination - Questionnaire (EDE-Q) or the Dutch Revised Eating Scale or the Diagnostic Survey for Eating Disorders (DSED)), and the study by Kusel 1999 applied children's versions of the EAT and EDI. Six studies also included a measure of more specific eating disorder symptoms. These included the Restraint Scale (Jerome 1991; Killen 1993), the Modified Body Satisfaction Scale (Neumark\* 2000), the Sociocultural Attitudes to Appearance Questionnaire (Kusel 1999; Neumark\* 2000), the Body Image Assessment Procedure (Kusel 1999; Wade 2003) and the Ideal Body Internalization Measure Revised (Kusel 1999), and the Ideal Body Stereotype Scale Revised (Thin-Ideal Internalisation) and the Adapted Satisfaction and Dissatisfaction with Body Parts Scale (Stice 2003). One study used generic measures of physical health (Giessen Physical Symptom Checklist for Children and Adolescents) and mental health (Symptom Checklist-90-R) (Buddeberg\* 1998). Two studies included measures of affective symptoms. These included the Beck Depression Inventory (Jerome 1991; O'Dea 2000), Positive and Negative Affect Scale Revised (Stice 2003) and the State-Trait Anxiety Inventory (O'Dea 2000). Three studies included measures of self-esteem/self-concept, and involved the Rosenberg Self Esteem Scale (Dalle Grave 2001; Jerome 1991), and the Self-Perception Profile for children (Kusel 1999) and adolescents (O'Dea 2000; Wade 2003). One study used the Message Interpretation Process Scale to test a model of critical analysis of messages (Kusel 1999). Several studies also included new or adapted measures of eating attitudes and behaviours (Dalle Grave 2001; Jerome 1991; Killen 1993; Neumark\* 2000; O'Dea 2000).

**Table 1. Outcome measures used across studies (Eating Disorder symptoms)**

STUDY	BMI/Weight	EAT/EDE/I	EDI	Restraint Scale	Body Image Ax	Ideal Body Internaln	SATAQ	Body Dissatisfaction	New Qnaires
EATING DISORDER AWARENESS									

**Table 1. Outcome measures used across studies (Eating Disorder symptoms) (Continued)**

Jerome 1991			Drive for Thin- ness, Bu- limia, and Body Dis- satisfac- tion subscales	Total, Concern with Diet- ing, Weight Fluctua- tion					General Informa- tion Ques- tionnaire on dieting atti- tudes, level of knowl- edge about bulimia
Olmsted 2002		Restraint subscale of the EDE & Diag- nostic Sur- vey for Eat- ing Disor- ders	Drive for Thinness, Bulimia, Body Dis- satisfac- tion subscales						
EATING ATTI- TUDES/BE & ADO- LES- CENT IS- SUES									
Buddeberg 1998		EAT-26 for overall sample							
Dalle Grave 2001	BMI	ChEAT & EDE-Q							Knowl- edge test
Killen 1993	BMI for overall & hi-risk samples		Bulimia subscale & Appear- ance factor (Drive for Thinness and Body Dissatis- faction) for overall &	Revised Restraint Scale					Knowl- edge Test + Self-re- port assess- ment of eating dis- order symptoms: weight concerns

**Table 1. Outcome measures used across studies (Eating Disorder symptoms) (Continued)**

			hi-risk samples						and purging behaviours
Santonastaso 1999	BMI for hi-risk sample & Weight	EAT-40 for hi-risk sample	For hi-risk sample						
Stice 2002				Dutch Restrained Eating Scale		Thin Ideal Internalization by Ideal Body Stereotype Scale Revised		Body Dissatisfaction - adapted from Satisfaction and Dissatisfaction with Body Parts Scale	
Zanetti 1999	BMI	EAT-40							
ME-DIA LITERACY & ADVOCACY									
Kusel 1999		CHEAT-26	Claims to have used EDI-C-Body Dissatisfaction subscale		Yes	Yes	Yes		
Neumark-Sztainer 2000							Very modified version	Yes	New surveys of dieting and weight-control methods

**Table 1. Outcome measures used across studies (Eating Disorder symptoms) (Continued)**

Wade 2003	BMI	Re- straint sub- scale of the EDE-Q			Yes				
SELF- ESTEEM									
O'Dea 2000	BMI; SBW at baseline & Weight		Drive for Thin- ness, Body Dissatis- faction, In- teroceptive Awareness subscales						Physi- cal Appear- ance Rat- ings; Question- naire on food habits & body image; Student satisfac- tion ques- tionnaire
Wade 2003	BMI	Re- straint sub- scale of the EDE-Q			Yes				

**Table 2. Outcome measures used across studies (Affect, self-esteem, physical)**

STUDY	BDI	STAI	PANAS	Rosen- berg Self- esteem	Self-Per- ception Prof	Phys- ical Symp- toms	Message Interpretn		
EAT- ING DIS- ORDER AWARE- NESS									
Jerome 1991	Yes			Yes					
Olmsted 2002									

**Table 2. Outcome measures used across studies (Affect, self-esteem, physical) (Continued)**

EATING ATTI- TUDES/BE & ADO- LES- CENT IS- SUES									
Buddeberg 1998						Giessen Physical Symptom Checklist for Children & Ado- lescents & Symptom Checklist- 90-R			
Dalle Grave 2001				Yes					
Killen 1993									
Santonas- taso 1999									
Stice 2002						PANAS - Re- vised (Sad- ness, Guilt, Fear/Anxiety subscales)			
Zanetti 1999									
ME- DIA LIT- ERACY & ADVO- CACY									
Kusel 1999						Self- Perception Profile for Children -		Message Interpre- tation Pro- cess Scale	



weight loss reported on the Diagnostic Survey for Eating Disorders (Olmsted 2002), and (6) unquantified self-reported body image concerns (Stice 2003).

Subject participation (including drop-out) rates varied across studies. Participation rate of individuals in the study by Buddeberg\* 1998 at 6-month follow-up was 95% (N=314 of 329), with 96% of participants remaining in the intervention group (n=159 of 165) and 95% of participants in the control group (n=155 of 164). The participation rate of all participants in the study by Santonastaso 1999 at 12-month follow-up was 86% (N=264 from 308), with 78% of participants remaining in the intervention group (n=120 of 154) and 94% participants in the control group (n=144 of 154). For high-risk participants, the participation rate at 12-month follow-up was 82% (N=23 of 28), with 76% remaining in the prevention group (n=13 of 17) and 91% remaining in the control group (n=10 of 11). For low-risk participants, the participation rate at 12-month follow-up was 86% (N=241 of 280), with 78% remaining in the prevention group (n=107 of 137) and 94% remaining in the control group (n=134 of 143). Consideration of participation rates in the study by Killen 1993 (N=931) was complicated by multiple follow-up intervals and the fact that original sample sizes for the control and intervention groups were not reported. Using sample sizes reported, an index of participation rate was calculated by comparing the participants who provided data at both initial follow-up (either 18-weeks or 7-months) and at least one other follow-up assessment (7-, 14- or 24-months) and ranged from 59% to 81%. The study by Neumark\* 2000 reported response rates at 3-month follow-up to be 90% and 91% for the intervention and control group girls respectively. Zanetti 1999 reported that 91.5% of participants were assessed at both baseline and 12-month follow-up (N=129 of 141). O'Dea 2000 reported a 100% participation rate for the intervention, with a drop-out rate of 1.1% (n=5) at 12-month follow-up. Participation rates in the unpublished dissertation by Jerome 1991 at 18-month follow-up were 51% (n=22 of 43) for the intervention group, 56% (n=29 of 52) for a no-film control condition and 60% (n=24 of 40) for a neutral film control condition. Participation rates for Dalle Grave 2001 were high (i.e., 100% (n=106) at baseline, 98.1% (n=104) post-intervention, 97.2% (n=103) at six-month follow-up and 98.1% (n=104) at one-year follow-up). Stice 2003 reported overall participation rates of 91%. Olmsted 2002 reported a 72.9% participation rate from an initial pool of 291 invited participants with diabetes (i.e., 11.7% refused participation and 15.5% did not return screening questionnaires), with 65.4% of diabetes participants screened to be at high risk of eating disorders participating in the study (n=85 of 130). A participation rate of 72% for the intervention group was reported (i.e., n=36 of 50) so additional participants were assigned to the intervention condition (Olmsted 2002). Participation rates in the study by Kusel 1999 were not reported. In the study by Wade 2003, participation rates were: Media group, 100% for baseline and five-week follow-up, and 84% for baseline, five-week follow-up and three-month follow-up, Self-

esteem group, 76.7% for baseline and five-week follow-up, 67.4% for baseline, five-week follow-up and three-month follow-up, and Control group, 94.4% at both follow-up points.

## Effects of interventions

Of the 12 randomised controlled trials included in the review to date, only 12 pooled comparisons of two or more studies using similar outcome measures and similar intervention types were possible. No heterogeneity in the data was noted for these pooled comparisons. Note that in all of the analyses conducted in this review, only data reported for follow-up intervals of 3-months or greater were selected for consideration. Only data from control and intervention participants who received both pre-test and post-test measures in the study by Kusel 1999 were considered for the purposes of this review as per the study inclusion criteria specified above (see section on Criteria for considering studies for this review above).

- PREVENTION PROGRAM TYPE 1: Eating disorder awareness versus control (2 studies).

No pooled comparisons were possible for the two studies relating to "eating disorder awareness" due to differences in the risk status of participants (i.e., Jerome 1991 recruited male and female school participants and Olmsted 2002 recruited girls with diabetes at high risk for eating disorders).

- PREVENTION PROGRAM TYPE 2: Eating attitudes/behaviours & adolescent issues versus control (6 studies).

Two pooled comparisons of intervention outcomes relating to body mass index (BMI) were possible for studies focusing on "Eating attitudes and behaviours and adolescent issues". In four studies of this intervention type (Dalle Grave 2001; Killen 1993; Santonastaso 1999; Zanetti 1999), BMI could be compared for control and intervention groups at 12- and 14-month follow-up. No significant differences were indicated when results from these four studies were pooled [WMD -0.10, -0.45 to 0.25, 95% CI]. However, it is important to consider here that the study by Killen 1993 included younger male and female adolescents while the other two studies involved older female adolescents. In two studies of this intervention type (Killen 1993; Santonastaso 1999), BMI could be compared for control and intervention groups at 14- and 12-month follow-up respectively for participants identified to be at "high risk" for developing eating disorders. Again, no significant differences were indicated when results from these two studies were pooled [WMD -1.09, -2.27 to 0.10, 95% CI]. An important note regarding the study by Killen 1993 relates to the younger male and female adolescents in that study, while the study by Santonastaso 1999 involved older female adolescents. It is also important to note that the definition for participants at high risk was different for each of these two studies, but they were comparable on the basis of scores from measures of abnormal eating

attitudes and behaviours (see Methodological quality of included studies above).

Several comparisons of intervention outcomes relating to eating attitudes, behaviours and formal diagnosis of eating disorder were also possible for studies of this intervention type. In four studies (Buddeberg\* 1998; Dalle Grave 2001; Santonastaso 1999; Zanetti 1999), scores on different versions of the Eating Attitudes Test (i.e., EAT-26 and EAT-40) could be compared via use of the standardised mean difference (SMD) statistic at post-intervention (6-month follow-up in the study by Buddeberg\* 1998 and 12-month follow-up in the studies by Dalle Grave 2001, Santonastaso 1999 and Zanetti 1999) for studies where the focus of intervention was on "eating attitudes and behaviours and adolescent issues". These comparisons revealed no significant differences when the studies were pooled [SMD 0.01, -0.13 to 0.15, 95% CI]. It is important to note here that three of these four studies are comparable in terms of subject age (i.e., mid to older teenagers with the exception of Dalle Grave 2001), however, different follow-up intervals were selected for these studies. The study by Buddeberg\* 1998 specifically selected classes with a high rate of students having higher baseline scores on a measure of abnormal eating attitudes and behaviour and included both male and female participants, while Dalle Grave 2001's study involved males and females and the other two studies involved only females. A further comparison was possible which investigated the outcome of high-risk participants on the Eating Attitudes Test (EAT) in the studies by Buddeberg\* 1998 and Santonastaso 1999 at 6- and 12-month follow-up. This analysis again revealed no significant difference between groups when the studies were pooled [SMD -0.05, -0.47 to 0.38, 95% CI].

In two studies of this intervention type (Killen 1993; Santonastaso 1999), scores on the Bulimia subscale on the Eating Disorder Inventory (EDI) could be pooled and compared at post-intervention (14- and 12-month follow-up respectively) for the overall sample groups as well as high-risk participants. This analysis revealed no significant differences for either overall sample groups [SMD -0.03, -0.16 to 0.10, 95% CI] or high-risk participants [SMD -0.28, -0.63 to 0.06, 95% CI] when the studies were pooled. Note here that the study by Killen 1993 involved younger male and female adolescents while older female adolescents were involved in the study by Santonastaso 1999. In addition, although it is assumed that the two studies used the same outcome measure, the standardised mean difference statistic (SMD) was applied due to the large difference in group means.

Two studies of this intervention type used structured clinical interviews to detect symptoms/severity of eating disorders, however, only one study (Zanetti 1999) specifically reported how many cases of subclinical or clinical eating disorders were detected throughout their study.

- PREVENTION PROGRAM TYPE 3: Media literacy & advocacy versus control (3 studies).

In two studies where the focus of intervention was on "media literacy and advocacy" (Kusel 1999; Neumark\* 2000), the Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ) was administered in its standard form in one study (Kusel 1999) and in a modified form in another study (Neumark\* 2000) at post-intervention (3- and 6-months respectively). This pooled analysis was complicated by the fact that the modified version of the SATAQ involved adapting items of the questionnaire into three subscales instead of two validated subscales (i.e., awareness and internalisation) and an overall score was not reported. Thus, in an attempt to pool data from these two similar studies using common outcome measures, it was assumed that two of the three SATAQ subscales reported in the study by Neumark\* 2000 could be compared with data from the two SATAQ subscales reported in the study by Kusel 1999. This pooled analysis is the only one in the current review to show a significant difference between intervention and control groups and indicates that two interventions involving media literacy and advocacy resulted in less internalisation or acceptance of societal ideals relating to appearance [SMD -0.28, -0.51 to -0.05, 95% CI]. Pooled comparison of studies revealed no significant differences between groups in awareness of social ideals relating to appearance [SMD 0.18, -0.05 to 0.41, 95% CI].

In two studies of this intervention type (Kusel 1999; Wade 2003), no significant differences were found between groups on the Global Self-worth subscale of the Self-Perception Profile [SMD -0.05, -0.44 to 0.34, 95% CI] and the Body Image Assessment Procedure (silhouettes) [WMD 0.02, -0.37 to 0.42, 95% CI] when data were pooled and compared at three-month follow-up. Influencing factors for these comparisons concern the gender of participants recruited to the studies (Kusel 1999 recruited females and Wade 2003 recruited both sexes) and choice of control group (Wade 2003 employed a usual school curriculum control group whereas Kusel 1999 employed a stress management control group).

Only one measure of protective psychological factors, the Message Interpretation Process (MIP) scale, was identified in all studies included in the review and was used in the study by Kusel 1999 as a measure of subject's beliefs about the media and the influence of the media in decision-making, so pooled comparisons were not possible.

- PREVENTION PROGRAM TYPE 4: Self-esteem approach versus control (2 studies).

In two studies where the focus of intervention was on improving self-esteem (O'Dea 2000; Wade 2003), no significant differences were found between groups in scores on the Close Friendships [WMD -0.01, -0.09 to 0.06, 95% CI] and Social Acceptance [WMD -0.03, -0.10 to 0.04, 95% CI] subscales of the Self-Perception Profile when data were pooled and compared at three-month follow-up.

## DISCUSSION

The aim of this systematic review was to determine whether eating disorder prevention programs evaluated via a randomised controlled trial methodology have a positive impact on the serious physical and psychological consequences of eating disorders and other significant abnormal eating behaviours. The results of the review, based on 12 randomised controlled trials and 12 pooled comparisons of studies using similar intervention types and common outcome measures, do not allow any firm conclusions to be made about the effectiveness of eating disorder prevention programs in children and adolescents in the general population or in those determined to be at risk. Combined data from two eating disorder prevention programs based on a media literacy and advocacy approach indicate a reduction in the internalisation or acceptance of societal ideals relating to appearance at a 3- to 6-month follow-up (Kusel 1999; Neumark\* 2000) [SMD -0.28, -0.51 to -0.05, 95% CI]. However, there is insufficient evidence to conclude that this approach also demonstrated a significant impact on awareness of societal standards relating to appearance. Pooled comparisons also indicated insufficient evidence to suggest a positive effect for five programs designed to address eating attitudes and behaviours and other adolescent issues in the general sample or those classified as being at high risk for eating disorder (Buddeberg\* 1998; Dalle Grave 2001; Killen 1993; Santonastaso 1999; Zanetti 1999). Programs using a pure, didactic eating disorder awareness approach (Jerome 1991; Olmsted 2002) could not be compared due to differences in the risk status of participants. Finally, there is insufficient evidence to suggest a positive effect for two programs designed to enhance self-esteem (O'Dea 2000; Wade 2003).

In terms of the five objectives for the review, there is not sufficient evidence to suggest that the included prevention programs are effective in promoting healthy eating attitudes and behaviours in children and adolescents (Objective 1), although the one significant result of the meta-analysis suggests some small improvement in protective psychological factors (i.e., reduced internalisation of societal ideals) (Objective 2). It is difficult to judge whether the lack of change in BMI reflects the promotion of satisfactory physical health (Objective 3) because an increased BMI may indicate an increased occurrence of obesity or appropriate weight management and a reduced BMI may indicate increased dietary restraint or appropriate weight management.

A difficulty in evaluating prevention programs is the likelihood that the effects of the intervention may not be seen for some years after the program is completed. No immediate intervention effect may later result in a very important long-term effect. Evaluation of the longer-term effects of the above programs will aid in determining if eating disorder prevention programs have a long term, sustainable, and positive impact on the mental and physical health of children and adolescents (Objective 4). Finally, there is not sufficient evidence to suggest that harm resulted from any of

the prevention programs included in the review (Objective 5).

Of the 12 studies included in the review, the choice of subject group varied from primary school students to high school students and involved either males and females combined or females alone. The choice of preventive intervention in the studies included in the review varied according to different causal models of eating disorders. The most common models adopted were based on cognitive-behavioural principles (which target eating attitudes and behaviours) and the media literacy model (which targets societal ideals), although two studies used a psychoeducation model and two studies adopted an indirect causal model and focused on building self-esteem as a means of preventing eating disorders. Overall, the results of the review offer insufficient evidence for targeting specific age groups or gender mixes and the review also indicates that there is insufficient support for the effectiveness of any specific type of eating disorder prevention program for children and adolescents.

## AUTHORS' CONCLUSIONS

### Implications for practice

The one statistically significant pooled effect in the current review involved less acceptance of societal body standards via discussion and critical evaluation of media messages for participants receiving a three-day intervention program. However, this result may no longer be apparent once the meta-analysis is revised, taking into account the impact of cluster randomised trials. While the pooled between-group differences is an isolated one, and may not necessarily be considered "clinically" significant, this does provide a starting point for clinical practice. The impact of the media and the peer group on a developing adolescent's belief systems are very strong and appear quite resistant to short-term individual or small group therapeutic intervention, so more wide-ranging messages about acceptance of a variety of body shapes and sizes could be conveyed at a societal level.

Therapists and education staff have become increasingly aware of the need to strike a balance between delivering preventive interventions for eating disorders and fears about the potential to cause harm. An important practical implication of the findings of this systematic review concerns the lack of evidence for "harm" being caused as a result of any of the interventions included in the review.

### Implications for research

The findings from the current meta-analysis of outcomes from eating disorder prevention programs for children and adolescents indicate that the risk factors and content of interventions investigated to date have not yielded particularly promising results in the short-term and suggests the need to explore other potentially useful areas. Further research into the incidence and prevalence of eating disorders (and associated risk factors) via high quality epidemiological studies as well as further randomised controlled trials

of prevention programs is necessary. In particular, further research aimed at identifying both risk factors and protective factors for eating disorders will be an important precursor to the refinement of the content of prevention programs.

Many studies to date have reported increases in scores on non-standardised measures of knowledge of eating disorder risk factors, attitudes and behaviours without associated changes in actual attitudes or behaviours as a result of preventive efforts. Future research may shed some light on the nature of the discrepancy between gaining new knowledge on the harmful effects of eating disorder and the application of this knowledge in everyday life. The answer to this research question may lie in an increased focus on protective factors and skills training approaches to build up regulatory strategies for teenagers facing the many developmental challenges of adolescence and to assist in the practical uptake of prevention messages.

## ACKNOWLEDGEMENTS

First and foremost, the reviewers would like to acknowledge the support of Associate Professor Kenneth Nunn, former Head of the Centre for the Prevention of Psychological Problems in Children (CPPPC) at The Children's Hospital at Westmead, in Sydney, Australia, who has maintained a strong clinical and research

interest in the issues relating to prevention and treatment for children and adolescents with eating disorders for many years and who secured the funding for this review. We would also like to thank Dr Philomena Renner, former Head of Prevention in Clinical Services in the Department of Psychological Medicine at The Children's Hospital at Westmead, for her editorial finesse, and Dr David Dossetor for his ongoing guidance as Chair of Psychological, Developmental and Rehabilitative Medicine at The Children's Hospital at Westmead.

We gratefully acknowledge the enthusiasm, input and guidance of Dr Natalie Khin, CCDAN Coordinator, and Dr Rebecca Hardy, CCDAN Statistician. The comments of reviewers have been invaluable in refining the reviewers' understanding of the terms involved in risk factor research and in clarifying the implications of the findings of the meta-analysis.

We would like to thank Dr Katrina Williams, past Head of the CPPPC for encouraging us to initiate this review and for her early comments on a draft protocol and on subgroup analysis.

The reviewers would like to extend their gratitude to the Australasian Cochrane Centre for including us as part of the pilot of the Cochrane Advanced Reviewer Support Service during the 2005 update of this review. Our nominated Research Officer, Sarah Hetrick, was especially kind and efficient in her support via email over the specified 3-month period of the pilot program.

## REFERENCES

### References to studies included in this review

#### **Buddeberg\* 1998** {published and unpublished data}

\* Buddeberg-Fischer B, Klaghofer R, Gnam G, Buddeberg C. Prevention of disturbed eating behaviour: A prospective intervention study in 14- to 19-year-old Swiss students. *Acta Psychiatrica Scandinavica* 1998;**98**(2):146–55.

#### **Dalle Grave 2001** {published and unpublished data}

Dalle Grave R, De Luca L, Campello G. Middle school primary prevention program for eating disorders: A controlled study with a twelve-month follow-up. *Eating Disorders* 2001;**9**:327–337.

#### **Jerome 1991** {unpublished data only}

\* Jerome IW. Primary intervention for bulimia: The evaluation of a media presentation for an adolescent population. *Dissertation Abstracts International B: The Sciences & Engineering* 1991;**52**(6-B):3296.

#### **Killen 1993** {published data only}

Killen JD. Development and evaluation of a school-based eating disorder symptoms prevention program. In: Smolak L, Levine MP, Striegel-Moore R editor(s). *The developmental psychopathology of eat-*

*ing disorders: Implication for research, prevention and treatment*. Mahwah, NJ: Lawrence Erlbaum & Associates, 1996.

\* Killen JD, Taylor CB, Hammer LD, Litt I, Wilson DM, Rich T, et al. An attempt to modify unhealthy eating attitudes and weight regulation practices of young adolescent girls. *International Journal of Eating Disorders* 1993;**13**(4):369–84.

#### **Kusel 1999** {unpublished data only}

\* Kusel AB. Primary prevention of eating disorders through media literacy training of girls. *Dissertation Abstracts International B: The Sciences & Engineering* 1999;**60**(4-B):1859.

#### **Neumark\* 2000** {published and unpublished data}

\* Neumark-Sztainer D, Sherwood N, Collier T, Hannan P. Primary prevention of disordered eating among preadolescent girls: Feasibility and short-term effect of a community-based intervention. *Journal of the American Dietetic Association* 2000;**100**(12):1466–73.

#### **O'Dea 2000** {published and unpublished data}

\* O'Dea JA, Abraham S. Improving the body image, eating attitudes and behaviors of young male and female adolescents: A new educational approach which focuses on self-esteem. *International Journal of Eating Disorders* 2000;**28**(1):43–57.

#### **Olmsted 2002** {published data only}

Olmsted MP, Daneman D, Rydall AC, Lawson ML, Rodin G. The

effects of psychoeducation on disturbed eating attitudes and behavior in young women with Type 1 Diabetes Mellitus. *International Journal of Eating Disorders* 2002;**32**:230–239.

**Santonastaso 1999** {published data only}

\* Santonastaso P, Zanetti T, Ferrara S, Olivotto MC, Magnavita N, Favaro A. A preventive intervention program in adolescent school-girls: A longitudinal study. *Psychotherapy & Psychosomatics* 1999;**68**(1):46–50.

**Stice 2003** {published data only}

Stice E, Trost A, Chase A. Healthy weight control and dissonance-based eating disorder prevention programs: Results from a controlled trial. *International Journal of Eating Disorders* 2003;**33**(10-21).

**Wade 2003** {published and unpublished data}

Wade TD, Davidson S, O'Dea JA. A preliminary controlled evaluation of a school-based media literacy program and self-esteem program for reducing eating disorder risk factors. *International Journal of Eating Disorders* 2003;**33**:371–383.

**Zanetti 1999** {unpublished data only}

\* Zanetti T, Ferrara S, Favaro A, Santonastaso P. Teaching teachers prevention interventions. European Council on Eating Disorders, Stockholm, 15-17 September. 1999:19.

## References to studies excluded from this review

**Abascal 2003** {published data only}

Abascal L, Bruning Brown J, Winzelberg AJ, Dev P, Barr Taylor C. Combining universal and targeted intervention for school-based eating disorder programs. *International Journal of Eating Disorders* 2004;**35**:1–9.

**Ghaderi 2003A** {published data only}

Ghaderi A, Scott B. Pure and guided self-help for full and sub-threshold bulimia nervosa and binge eating disorder. *British Journal of Clinical Psychology* 2003;**42**(3):257–269.

**Heinze 2000** {published data only}

\* Heinze V, Wertheim EH, Kashima Y. An evaluation of the importance of message source and age of recipient in a primary prevention program for eating disorders. *Eating Disorders: The Journal of Treatment & Prevention* 2000;**8**(2):131–45.

**McVey 2002** {published data only}

McVey GL, Davis R. A program to promote positive body image: A 1 year follow-up evaluation. *Journal of Early Adolescence* 2002;**22**(1):96–108.

**McVey 2004** {published data only}

McVey GL, Davis R, Tweed S, Shaw BF. Evaluation of a school-based program designed to improve body image satisfaction, global self-esteem, and eating attitudes and behaviors: A replication study. *International Journal of Eating Disorders* 2004;**36**:1–11.

**McVey submitted** {unpublished data only}

McVey GL, Davis R, Tweed S, Shaw BF. Parental involvement in the prevention of eating disorders: Findings from a 1-year evaluation study. *Eating Behaviors* (submitted for publication).

**Neumark\* 1995** {published data only}

\* Neumark-Sztainer D, Butler R, Palti H. Eating disturbances among adolescent girls: Evaluation of a school-based primary prevention program. *Journal of Nutrition Education* 1995;**27**(1):24–31.

**Phelps 2000** {published and unpublished data}

\* Phelps L, Sapia J, Nathanson D, Nelson L. An empirically supported eating disorder prevention program. *Psychology in the Schools (Special Issue: Empirically validated interventions in school psychology)* 2000;**37**(5):443–52.

**Rosen 1989** {published and unpublished data}

\* Rosen JC. Prevention of eating disorders. *National Anorexic Aid Society Newsletter* 1989;**Apr-Jun**:1–3.

**Steiner-Adair 2002** {published data only}

Steiner-Adair C, Sjoström L, Franko DL, Pai S, Tucker R, Becker AE, Herzog DB. Primary prevention of risk factors for eating disorders in adolescent girls: Learning from practice. *International Journal of Eating Disorders* 2002;**32**:410–411.

## Additional references

**APA 1994**

American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)*. 4th Edition. Washington, DC: American Psychiatric Association, 1994.

**Baranowski 2001**

Baranowski MJ, Hetherington MM. Testing the efficacy of an eating disorder prevention program. *International Journal of Eating Disorders* 2001;**29**(2):119–24.

**Ben-Tovim 1990**

Ben-Tovim DI, Morton J. The epidemiology of anorexia nervosa in South Australia. *Australian & New Zealand Journal of Psychiatry* 1990;**24**(2):182–6.

**Campbell 2002**

Campbell K, Waters E, O'Meara S, Summerbell C. Interventions for preventing obesity in children. *The Cochrane Library* 2002, Issue 1.[Art. No.: CD001871. DOI: 10.1002/14651858.CD001871.pub2]

**Carter 1997**

Carter JC, Stewart DA, Dunn VJ, Fairburn CG. Primary prevention of eating disorders: Might it do more harm than good?. *International Journal of Eating Disorders* 1997;**22**(2):167–72.

**Dalle Grave 2003**

Dalle Grave R. School-based prevention programs for eating disorders: Achievements and opportunities. *Dis Manage Health Outcomes* 2003;**11**(9):579–593.

**Emans 2000**

Emans SJ. Eating disorders in adolescent girls. *Pediatrics International* 2000;**42**(1):1–7.

**Fairburn 1997**

Fairburn CG, Welch SL, Doll HA, Davies BA, O'Connor ME. Risk factors for bulimia nervosa: A community-based case-control study. *Archives of General Psychiatry* 1997;**54**(6):509–17.

**Fairburn 1999**

Fairburn CG, Cooper Z, Doll HA, Welch SL. Risk factors for anorexia nervosa: Three integrated case-control comparisons. *Archives of General Psychiatry* 1999;**56**(5):468–76.

**Friedman 1996**

Friedman SS. Girls in the 90's. *Eating disorders: The Journal of Treatment & Prevention* 1996;**4**(3):238–44.

- Friedman 1998**  
Friedman SS. Girls in the 90s: A gender-based model for eating disorder prevention. *Patient Education & Counseling* 1998;**33**(3): 217–24.
- Garner 1991**  
Garner DM. *The Eating Disorder Inventory (EDI-2)*. 2nd Edition. Psychological Assessment Resources, 1991.
- Ghaderi 2003B**  
Ghaderi A. Structural modeling analysis of prospective risk factors for eating disorder. *Eating Behaviors* 2003;**3**:387–396.
- Gresko 1998**  
Gresko RB, Rosenvinge JH. The Norwegian school-based prevention model: Development and evaluation. In: Vandereycken W, Noordenbos G editor(s). *The prevention of eating disorders*. London: Athlone Press, 1998:75–98.
- Grigg 1996**  
Grigg M, Bowman J, Redman S. Disordered eating and unhealthy weight reduction practices among adolescent females. *Preventive Medicine* 1996;**25**(6):748–56.
- Huon 1997**  
Huon GF, Roncolato WG, Ritchie JE, Braganza C. Prevention of dieting-induced disorders: Findings and implications of a pilot study. *Eating disorders: The Journal of Treatment & Prevention* 1997;**5**(4): 280–93.
- Lucas 1991**  
Lucas AR, Beard CM, O'Fallon WM, Kurland LT. 50-year trends in the incidence of anorexia nervosa in Rochester, Minn.: A population-based study. *American Journal of Psychiatry* 1991;**148**(7):917–22.
- Maloney 1989**  
Maloney MJ, McGuire J, Daniels SR, Specker B. Dieting behavior and eating attitudes in children. *Pediatrics* 1989;**84**(3):482–9.
- Mathers 2000**  
Mathers CD, Vos ET, Stevenson CE, Begg SJ. The Australian burden of disease study: Measuring the loss of health from diseases, injuries and risk factors. *Medical Journal of Australia* 2000;**172**(12):592–6.
- Neumark 2000**  
Neumark-Sztainer D, Hannan PJ. Weight-related behaviors among adolescent girls and boys: Results from a national survey. *Archives of Pediatrics & Adolescent Medicine* 2000;**154**(6):569–77.
- Patton 1999**  
Patton GC, Selzer R, Coffey C, Carlin JB, Wolfe R. Onset of adolescent eating disorders: Population based cohort study over 3 years. *BMJ* 1999;**318**(7186):765–8.
- Piran 1995**  
Piran N. Prevention: Can early lessons lead to a delineation of an alternative model? A critical look at prevention with school children. *Eating disorders: The Journal of Treatment & Prevention* 1995;**3**(1):28–36.
- Piran 1996**  
Piran N. The reduction of preoccupation with body weight and shape in schools: A feminist approach. *Eating Disorders: The Journal of Treatment & Prevention* 1996;**4**(4):323–33.
- Rosenvinge 1997**  
Rosenvinge JH, Gresko RB. Do we need a prevention model for eating disorders? Recent developments in the Norwegian school-based prevention model. *Eating disorders: The Journal of Treatment & Prevention* 1997;**5**(2):110–8.
- Shisslak 1998**  
Shisslak CM, Crago M, Renger R, Clark-Wagner A. Self-esteem and the prevention of eating disorders. *Eating disorders: The Journal of Treatment & Prevention* 1998;**6**(2):105–18.
- Smolak 1998**  
Smolak L, Levine MP, Schermer F. A controlled evaluation of an elementary school primary prevention program for eating problems. *Journal of Psychosomatic Research* 1998;**44**(3-4):339–53.
- Stewart 2001**  
Stewart A, Carter JC, Drinkwater J, Hainsworth J, Fairburn CG. Modification of eating attitudes and behavior in adolescent girls: A controlled study. *International Journal of Eating Disorders* 2001;**29**(2):107–18.
- Stice 2004**  
Stice E, Shaw H. Eating disorder prevention programs: A meta-analytic review. *Psychological Bulletin* 2004;**130**(2):206–227.
- Striegel-Moore 1997**  
Striegel-Moore RH. Risk factors for eating disorders. In: Jacobson MS, Rees JM, et al. editor(s). *Adolescent nutritional disorders: Prevention and treatment*. New York, NY: New York Academy of Sciences, 1997:98–109.
- Szmukler 1986**  
Szmukler G, McCance C, McCrone L, Hunter D. Anorexia nervosa: A psychiatric case register study from Aberdeen. *Psychological Medicine* 1986;**16**(1):49–58.
- Turnbull 1996**  
Turnbull S, Ward A, Treasure J, Jick H, Derby L. The demand for eating disorder care: An epidemiological study using the General Practice Research Database. *British Journal of Psychiatry* 1996;**169**: 705–712.
- \* Indicates the major publication for the study

## CHARACTERISTICS OF STUDIES

### Characteristics of included studies [ordered by study ID]

#### Buddeberg\* 1998

Methods	RCT (Cluster) - 20 classes where a high percentage of students had increased eating disorder symptoms were randomly allocated (drawing lots) to receive health promotion lessons & other 10 classes matched for school type, grade, metropolitan area and sex served as controls.
Participants	314 students of both sexes; 14-19 years of age; selected 20 classes from 1944 students in which a high percentage of students exhibited disturbed eating behaviour (ie. EAT score $\geq 10$ ); 95% compliance of attendees for intervention group.
Interventions	Three health promotion lessons over 12-weeks covering disturbed eating behaviour (dealt with issues concerning beauty ideals, gender differences in psychosexual maturation and body awareness, healthy eating behaviour, physiology of nutrition, early symptoms of eating disorders and therapeutic approaches) and other risk-taking behaviour via (1) discussion of body ideals/maturation, (2) social picnic and discussion of healthy eating requirements; and (3) discussion of options for treatment of eating disorders and coping with the demands of growing up (eg. conduct disorder, suicide, drug and alcohol use).
Outcomes	Eating Attitudes Test (EAT-26); Giessen Physical Complaint List for Children and Adolescents (GSCL-C); Self-Report Symptom Check-List (SCL-90-R).
Notes	Improvement on all three symptom scales for both groups over time, but there were no significant differences between the intervention high-risk group and the control high-risk group. However, the previous analysis was based on group scores for a mixture of high-risk and low-risk students in the classes selected, and may have masked the effect of the intervention on target high-risk females who displayed a high number of eating disorder symptoms. When data from high-scoring female participants only were then analysed (ie. total N=63), a significant interaction between time and group (15.2% of variance explained) for the GSCL-C was found indicating an improvement in the physical well-being of females at high-risk of eating disorders as a result of the intervention.

#### *Risk of bias*

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

#### Dalle Grave 2001

Methods	RCT (Cluster) (Random number generation). Classes randomly selected (not random allocation to treatment or control).
---------	--

**Dalle Grave 2001** (Continued)

Participants	Total Number: 106. Number in prevention: 55. Number in control: 51. Age: 11-12 (mean 11.6; SD 1.2). Gender: 61 females; 45 males. Source: middle school in Lecce, Italy.
Interventions	Intervention group: Eating Disorder Prevention Program including psychoeducation and based on Cognitive Behavioural Therapy model incorporating cognitive restructuring. Duration: 6 sessions of 2 hours each once a week with 2 booster sessions after 6 months. Delivered by: psychologists. How delivered: 30 minutes didactic with the rest practical activities and group discussion. Control group: "Usual school curriculum". Duration: not stated. Delivered by: not stated. How delivered: not stated.
Outcomes	Eating Disorders Examination Questionnaire (EDE-Q) (eating disorder features); Eating Attitudes Test - children's version (ChEAT); Rosenberg Self Esteem Scale; Knowledge Questionnaire; BMI. Data collection points: 1 week before, 1 week after intervention and 6 and 12 month follow-up.
Notes	

**Risk of bias**

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

**Jerome 1991**

Methods	RCT (Cluster) (method of random allocation not known).
Participants	135 male and female high school students recruited through their health classes.
Interventions	Use of a media presentation conducted on one-day (Bulimia: A binge-purge obsession) and a debriefing session and handout entitled "About bulimia".
Outcomes	Eating Disorder Inventory (EDI - DT, B, BD); Restraint Scale; Quick Screener; General Information Questionnaire; Beck Depression Inventory (BDI); Rosenberg Self-Esteem Scale (RSES).
Notes	Increased knowledge relating to bulimia and decreased restraint and body dissatisfaction at immediate follow-up, however, this effect was not maintained at 18-month follow-up.

Jerome 1991 (Continued)

<i>Risk of bias</i>		
Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Killen 1993

Methods	RCT (Cluster) - Classes were randomized (random number table) to intervention or control conditions by class.	
Participants	931 of 967 sixth and seventh-grade girls (11-13 years) from four Californian schools; High risk subjects were identified by a score >57 on a measure of "Weight Concerns".	
Interventions	A prevention curriculum designed to modify eating attitudes and unhealthful weight regulation practices. 18 lesson curriculum designed to modify the eating attitudes and unhealthful weight regulation practices of young adolescent girls: (1) instruction on the harmful effects of unhealthful weight regulation; (2) promotion of healthful weight regulation through the practice of sound nutrition and dietary principles and regular aerobic physical activity; (3) development of coping skills for resisting the diverse sociocultural influences that appear linked to the current popular obsessions with thinness and dieting. Presented via slide show and workbook.	
Outcomes	Height; Weight; BMI; Structured Clinical Interview - Bulimia Nervosa section; Knowledge test; Revised Restraint Scale; Eating Disorder Inventory (EDI); Self-report assessment of eating disorder symptoms: weight concerns and purging behaviours.	
Notes	"The intervention failed to achieve the hoped-for impact". There was a significant increase in knowledge among girls receiving the intervention and among high-risk students, there was a small albeit statistically significant effect on body mass index in girls in the high-risk group.	

<i>Risk of bias</i>		
Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

**Kusel 1999**

Methods	RCT (Cluster) - Using a Solomon Four-Group Design, participants were randomly assigned by school and by class to one of four groups: intervention-pretest, intervention-no pretest, control-pretest and control-no pretest (Random draw).
Participants	172 fourth-, fifth- and sixth-grade girls (mean age 10 years, 10 months) from two suburban school districts in New York State participated in the study.
Interventions	A two-day program involving videos and discussion. Girls learned how to recognize deceptive media techniques, to critically analyse media messages, and to evaluate people in ways other than by appearance. Individuals in the control group watched a video and discussed ways to deal with stress, examined magazine photos of music stars, and talked about the pros and cons of being famous - the activities for the control group did not relate to the media nor body types.
Outcomes	Children's Eating Attitude Test (ChEAT); Eating Disorder Inventory for Children; Body Dissatisfaction Subscale (EDI-C-BD); Body Image Assessment Procedure for Children (BIA-C); Self-Perception Profile for Children (SPPC); Ideal Body Internalization Measure - Revised (IBIM-R); Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ); Message Interpretation Process Scale (MIP).
Notes	From pretest to posttest, individuals in the intervention groups significantly decreased their levels of dieting, body dissatisfaction, internalization of body stereotypes, perceived realism, desirability, and expectancies, and increased their self-esteem, whereas levels of these constructs in participants in the control groups either remained the same or increased. From posttest to follow-up (at approximately 3-months after the program), girls in the intervention group decreased their levels of body distortion, perceived realism, and perceived similarity, and increased their awareness of body stereotypes significantly more than did participants in the control groups. Surprisingly, during this timeframe, results revealed that participants in the control groups decreased their levels of restricting and purging significantly more than did those in the intervention groups. This result suggests that stress management may be a more effective means of intervention for targeting signs of eating disorder than focusing on shape and weight.

***Risk of bias***

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

**Neumark\* 2000**

Methods	RCT (Cluster) (Envelopes/postcard-like system).
Participants	226 fifth- and sixth-grade girls from 24 girl scout groups (mean age 10.6).

Neumark\* 2000 (Continued)

Interventions	Six 90-minute sessions on media literacy and advocacy skills.	
Outcomes	Modified Body Satisfaction Scale; Modified Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ); New surveys of dieting and weight-control methods.	
Notes	The authors cite a notable positive influence on media-related attitudes and behaviours, including internalisation of sociocultural ideals and a modest effect on body-related knowledge and attitudes.	
<b>Risk of bias</b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Yes	A - Adequate

O'Dea 2000

Methods	RCT (Cluster) (Drawing lots).	
Participants	470 eligible students (63% female); aged 11-14 years (Years 7 and 8); recruited from one co-educational school and one girl's school; High-risk students defined as those in the lowest tertile of self-esteem (Global SPA score <2.6) and with the highest trait anxiety (STAI ≥31.9 for males and ≥35.0 for females).	
Interventions	Nine lessons over nine weeks were introduced by teachers to the students' usual health and development curriculum via the "Everybody's Different" program which covered: dealing with stress; building a positive sense of self; stereotypes in our society; positive self-evaluation; involving significant others; relationship skills; communication skills, while the control group students received their scheduled personal development and health class.	
Outcomes	Body weight; Eating Disorder Inventory (EDI); Beck Depression Inventory (BDI); State-Trait Anxiety Inventory (STAI); Self-Perception Profile for Adolescents (SPA); Questionnaire on food habits, body image; Physical appearance ratings (0-10); Student satisfaction questionnaire.	
Notes	The program significantly improved body satisfaction and self-esteem; social acceptance, body image, and athletic ability became less important for the intervention students and more important for control students. Female intervention students rated their physical appearance as perceived by others significantly higher than control students. At the completion of the intervention, female students in the intervention group "allowed their body weight to increase appropriately by preventing the age-related increase in weight-losing behaviours of the control subjects". However, this effect was not maintained at 12-month follow-up, as the percentage of females in the intervention and control groups reporting current weight-	

O'Dea 2000 (Continued)

loss behaviours was roughly equivalent; Females in the intervention group reported a significant increase in their attempts to lose weight (Baseline: 28.0%, 3-months: 30.1%, 12-months: 36.5%) whereas females in the control group had no significant increase in attempts to lose weight (Baseline: 26.8%, 3-months: 34.6%, 12-months: 32.5%). One year after the intervention, body image and attitude changes were still present. The above findings also held for the 116 students (63% females) who were considered "at-risk" for the development of eating disorders. These students also had significantly lower drive for thinness following the intervention, although this effect did not persist at 12 month follow-up. "The intervention was effective, safe, having no effect on measures of students' anxiety or depression, and was rated highly by students".

**Risk of bias**

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

**Olmsted 2002**

Methods	RCT (Individuals) - Method of randomisation: 3 cohorts of participants randomly allocated to psychoeducation or treatment as usual. Randomisation procedure briefly described as utilizing random assignment sheets for each of the three cohorts with participants then stratified for age and severity of eating symptoms and randomised on a 2:1 ratio. Some participants refused to attend psychoeducation so that additional participants were assigned to this condition.
Participants	Total Number: 85. Number in prevention: 50. Number in control: 35. Age: 12-20 (mean 16 SD 2). Gender: all female. Source: attendees of a paediatric diabetes clinic. Ontario. If high risk - how identified: At least one of - Score of 9+ on Drive for Thinness (EDI) or Score of 5+ on Bulimia (EDI) or Score of 15+ on Body Dissatisfaction (EDI) or Current or past binge eating, self induced vomiting, laxative or diuretic use, dieting or insulin omission for weight loss reported on DSED.
Interventions	Intervention group: psychoeducation as adapted for diabetes from standardised intervention for eating disorders by Olmsted et al 1991. Information presented included that on the nature of eating problems, how they develop, set point theory, sociocultural influences, how to eat normally without dieting, and strategies to control symptoms of disturbed eating and body image concerns. Continued to have quarterly visits with diabetes care providers who were asked to refrain from commenting on eating. Duration: 6 sessions of 90 minutes once a week. Delivered by: one person with expertise in eating disorders and one with expertise in diabetes. How delivered: standardised lectures and reading materials. Control group: Treatment as usual consisting of quarterly visits and Type 1 Diabetes Mellitus management with the following encouraged: 2-3 daily insulin injections, 2-4 self measurements of blood glucose and

**Olmsted 2002** (Continued)

	target of preprandial blood sugars of 4-10mmol/L with adherence to a structured meal plan. Duration: quarterly. Delivered by: multidisciplinary team.	
Outcomes	Diagnostic Survey for Eating Disorders (DSED); Eating Disorder Inventory (EDI) - drive for thinness, bulimia, body dissatisfaction; Eating Disorder Examination - modified for diabetes; HbA1c levels. Data collection points: before and after intervention, with 4 week and 6 month follow-up.	
Notes		
<b><i>Risk of bias</i></b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Yes	A - Adequate

**Santonastaso 1999**

Methods	RCT(Cluster) - 10 classes were randomly allocated (random number generator) to intervention and control groups.	
Participants	254 16-year-old schoolgirls were evaluated, of whom 154 participated in the program and a further 154 subjects formed the control group; High risk students were identified by score $\geq 30$ on the EDI.	
Interventions	To explore the impact of a prevention program on the eating and body attitudes of a sample of adolescent school girls; Program involved four lessons and group discussions of general adolescent problems and eating disorders which were run by a psychiatrist and a psychologist which covered physiological changes in puberty, body image concerns (association with self-esteem and pleasing others), coping with adolescence (relationships and attachment-autonomy conflicts) and early detection/sociocultural pressures associated with eating disorders.	
Outcomes	Weight; Eating Attitudes Test; Eating Disorder Inventory.	
Notes	Among high-risk subjects, no significant differences were found between the prevention and the control group. The preventive program appeared to significantly reduce body dissatisfaction and to decrease the risk of bulimic attitudes in low-risk subjects.	
<b><i>Risk of bias</i></b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Yes	A - Adequate

**Stice 2003**

Methods	RCT (Cluster) - Randomly allocated via coin toss to: 1. healthy weight control; 2. dissonance based intervention; 3. waitlist.
Participants	Total Number: 148. Number in prevention - healthy weight control: 51. Number in prevention - dissonance: 48. Number in control: 36. Age: 13-20 (mean 17.4). Gender: all female. Source: fliers placed on campuses of three high schools and one university and announcements made in introductory courses. USA. If high risk - how identified: targeted group selected on basis of self reported body image concerns.
Interventions	Intervention group 1: Healthy weight control program is an education based program aimed to help participants to develop a permanent healthy lifestyle characterized by consumption of lower fat diet and regular exercise. Duration: 3 sessions of one hour once a week. Delivered by: facilitated by a psychology doctoral student and co-facilitated by an undergraduate psychology student. How delivered: group format (4-12 participants). Intervention group 2: Dissonance intervention program employing a series of verbal, written and behavioural exercises encouraging participants to critique the thin-ideal thus creating inconsistent cognitions with the internalised ideal of beauty with the aim of reducing subscription to this ideal. Duration: 3 sessions of one hour once a week. Delivered by: facilitated by a psychology doctoral student and co-facilitated by an undergraduate psychology student. How delivered: group format (4-12 participants). Control group: wait list. Duration: wait list. Delivered by: wait list.
Outcomes	Ideal Body Stereotype Scale Revised (Thin-Ideal Internalisation); Adapted Satisfaction and Dissatisfaction with Body Parts Scale; The Dutch Revised Eating Scale; Positive and Negative Affect Scale Revised; Eating Disorders Examination Questionnaire (EDE-Q) (bulimic symptoms). Baseline, termination, and 1, 3, and 6-month follow-up surveys (no 6-month follow-up for waitlist controls).
Notes	

***Risk of bias***

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

**Wade 2003**

Methods	RCT (Individuals) (Drew lots to select which classes went into which intervention). Random allocation to 1. media literacy group; 2. self esteem group; 3. usual school curriculum control group.
Participants	Total Number: 86. Number in prevention - self esteem: 43. Number in prevention - media literacy: 25. Number in control: 18. Age: Grade 8 (mean 13.42; SD 0.39). Gender: 33 female; 53 male. Source: private school, Australia.

Wade 2003 (Continued)

Interventions	<p>Intervention group 1: Adapted from the media literacy 'Go Girls' program (EDAP 1991) includes the elements of literacy (the ability to evaluate media messages), activism (promoting efforts to protest or praise media products), and advocacy (tactics to allow communities to express their own story in their own words) with the essential message that everyone is different and we should not try to conform to stereotypes). Duration: 5 class sessions of 50 minute duration. Delivered by: usual teacher. How delivered: didactic and class discussion plus small group exercises.</p> <p>Intervention group 2: Self Esteem program. Duration: 5 class sessions of 50 minutes each. Delivered by: usual teacher. How delivered: didactic and class discussion plus small group exercises.</p> <p>"Usual school curriculum" Control group.</p>	
Outcomes	<p>Body mass index (BMI);            Shape and Weight Concern (13-items) and Dietary Restraint subscales (5-items) from EDE-Q (Eating Disorder Examination Questionnaire);            Figural stimuli (silhouettes) (Stunkard 1983);            Self-Perception Profile for Adolescents (45-items). Baseline, post-intervention and 3-month follow-up.</p>	
Notes		
<b>Risk of bias</b>		
<b>Item</b>	<b>Authors' judgement</b>	<b>Description</b>
Allocation concealment?	Yes	A - Adequate

Zanetti 1999

Methods	<p>RCT (Cluster) (Random number generator used to allocate one in three school classes to the intervention group).</p>	
Participants	<p>129 female students attending nine classes in a vocational training school, aged from 16 to 18 (38 students in intervention group and 91 in control group).</p>	
Interventions	<p>Six 2-hour sessions conducted by teachers on adolescent problems and eating disorders (adolescence, body image, pressure to be thin, information on eating disorders, prevention of eating disorders, role of media).</p>	
Outcomes	<p>BMI;            Structured Clinical Interview for DSM-IV (SCID);            Eating Attitudes Test (EAT-40).</p>	
Notes	<p>At 12-month follow-up, no significant differences in BMI between groups but significant improvement in the intervention group on EAT scores for "Bulimia and Food Preoccupation".</p>	
<b>Risk of bias</b>		

**Zanetti 1999** (Continued)

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

**Characteristics of excluded studies** [ordered by study ID]

Abascal 2003	Randomised allocation procedure used for students to participate in an intervention with other students having the same risk status for eating disorders and motivation for change versus a combined group of high/low risk and high/low motivated students, but no (ie. no intervention) control group.
Ghaderi 2003A	Adult population.
Heinze 2000	Randomised allocation procedure used for four variations of one intervention, but no "true" (ie. no intervention) control group.
McVey 2002	Randomisation of whole schools not individuals or classes.
McVey 2004	Randomisation of whole schools not individuals or classes.
McVey submitted	Randomisation of whole schools not individuals or classes.
Neumark* 1995	Randomised allocation procedure used for one out of three schools recruited in this study, but authors unable to provide data for that one school.
Phelps 2000	Cluster-sampling used as allocation procedure for Middle school sample. Adequate allocation concealment (random number generator) for High School Sample, however, no pre-test measure used.
Rosen 1989	Randomised controlled trial but data unable to be obtained from author.
Steiner-Adair 2002	Randomised allocation procedure used for 16 of 24 schools recruited in this study, but authors unable to provide data for only randomised schools.

## DATA AND ANALYSES

### Comparison 1. "Eating Attitudes/Behaviours & Adolescent Issues" approach (5 studies)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Body Mass Index (BMI) at 12- to 14-month follow up	4	1235	Mean Difference (IV, Fixed, 95% CI)	-0.10 [-0.45, 0.25]
2 Body Mass Index (BMI) (hi-risk) at 12- to 14-month follow up	2	145	Mean Difference (IV, Fixed, 95% CI)	-1.09 [-2.27, 0.10]
3 Eating Attitudes Test (EAT) Total at 6- to 12-month follow-up	4	792	Std. Mean Difference (IV, Fixed, 95% CI)	0.01 [-0.13, 0.15]
4 Eating Attitudes Test (EAT) Total (high-risk) at 6- to 12-month follow-up	2	86	Std. Mean Difference (IV, Fixed, 95% CI)	-0.05 [-0.47, 0.38]
5 Eating Disorder Inventory (EDI) "Bulimia" at 12- to 14-month follow-up	2	955	Std. Mean Difference (IV, Fixed, 95% CI)	-0.03 [-0.16, 0.10]
6 Eating Disorder Inventory (EDI) (hi-risk) "Bulimia" at 12- to 14-month follow-up	2	134	Std. Mean Difference (IV, Fixed, 95% CI)	-0.28 [-0.63, 0.06]

### Comparison 2. "Media Literacy & Advocacy" approach (3 studies)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ) "Awareness" at 3-month follow-up	2	297	Std. Mean Difference (IV, Fixed, 95% CI)	0.18 [-0.05, 0.41]
2 Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ) "Internalization" at 3-month follow-up	2	293	Std. Mean Difference (IV, Fixed, 95% CI)	-0.28 [-0.51, -0.05]
3 Social Perception Profile (SPA & SPPC) "Global Self Worth" at 3-month follow-up	2	104	Std. Mean Difference (IV, Fixed, 95% CI)	-0.05 [-0.44, 0.34]
4 Body Image Assessment (BIA: Silhouettes) at 3-months	2	127	Mean Difference (IV, Fixed, 95% CI)	0.02 [-0.37, 0.42]

### Comparison 3. "Self-esteem" approach (2 studies)

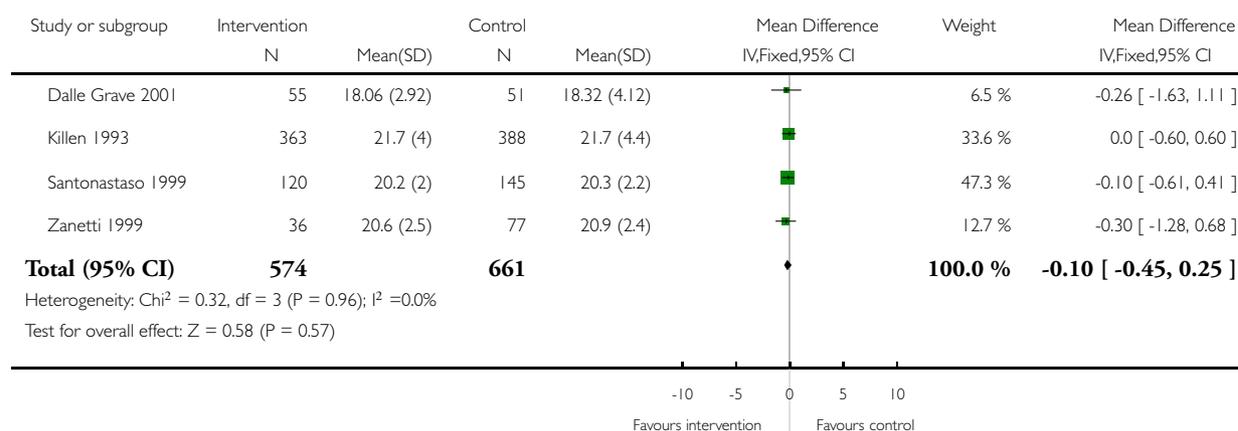
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Social Perception Profile (SPA) "Close Friendships" at 3-month follow-up	2	524	Mean Difference (IV, Fixed, 95% CI)	-0.01 [-0.09, 0.06]
2 Social Perception Profile (SPA) "Social Acceptance" at 3-month follow-up	2	531	Mean Difference (IV, Fixed, 95% CI)	-0.03 [-0.10, 0.04]

### Analysis 1.1. Comparison 1 "Eating Attitudes/Behaviours & Adolescent Issues" approach (5 studies), Outcome 1 Body Mass Index (BMI) at 12- to 14-month follow up.

Review: Interventions for preventing eating disorders in children and adolescents

Comparison: 1 "Eating Attitudes/Behaviours % Adolescent Issues" approach (5 studies)

Outcome: 1 Body Mass Index (BMI) at 12- to 14-month follow up

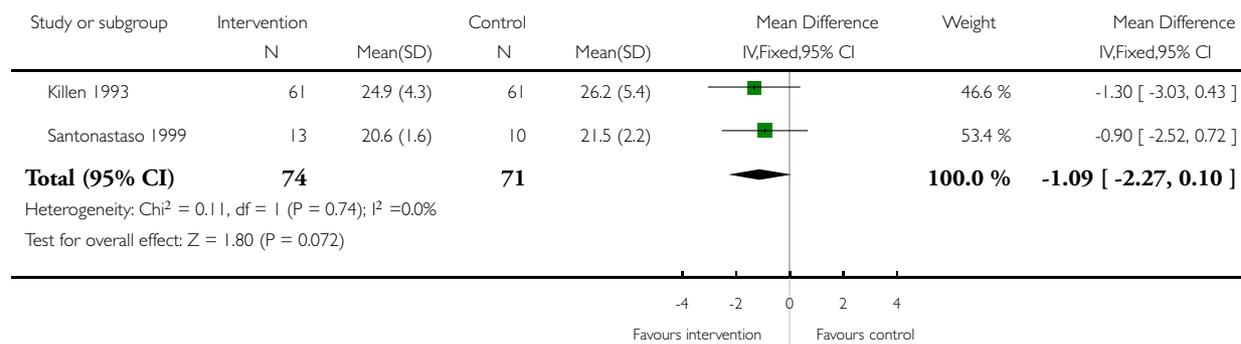


### Analysis 1.2. Comparison 1 "Eating Attitudes/Behaviours & Adolescent Issues" approach (5 studies), Outcome 2 Body Mass Index (BMI) (hi-risk) at 12- to 14-month follow up.

Review: Interventions for preventing eating disorders in children and adolescents

Comparison: 1 "Eating Attitudes/Behaviours % Adolescent Issues" approach (5 studies)

Outcome: 2 Body Mass Index (BMI) (hi-risk) at 12- to 14-month follow up

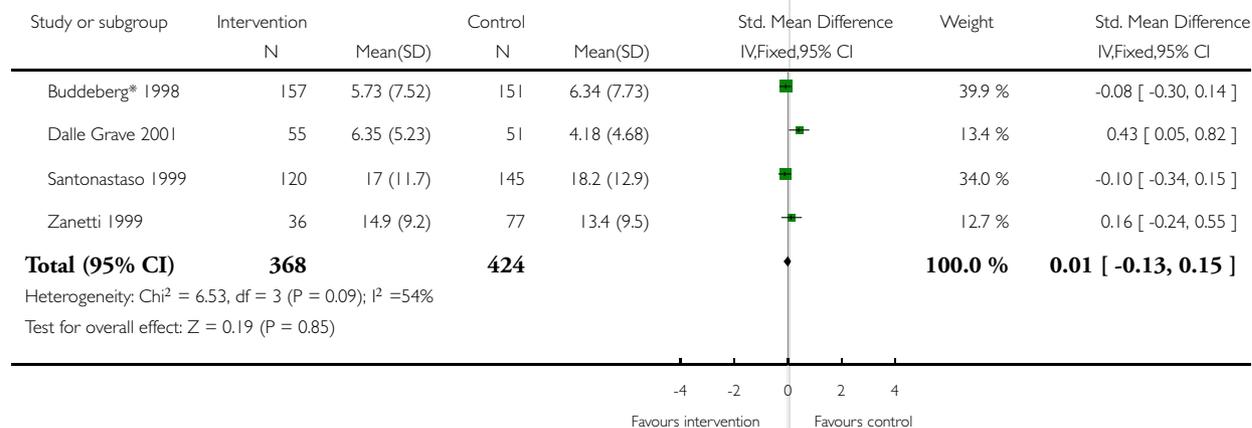


### Analysis 1.3. Comparison 1 "Eating Attitudes/Behaviours & Adolescent Issues" approach (5 studies), Outcome 3 Eating Attitudes Test (EAT) Total at 6- to 12-month follow-up.

Review: Interventions for preventing eating disorders in children and adolescents

Comparison: 1 "Eating Attitudes/Behaviours % Adolescent Issues" approach (5 studies)

Outcome: 3 Eating Attitudes Test (EAT) Total at 6- to 12-month follow-up

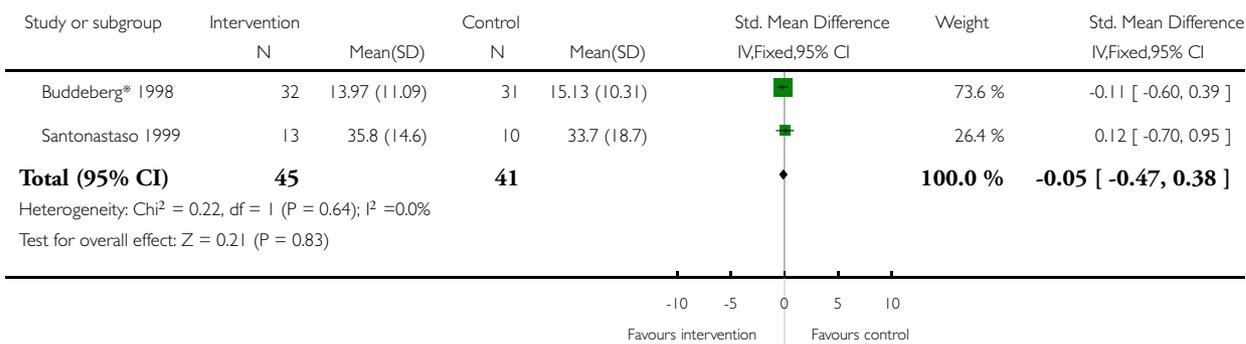


**Analysis 1.4. Comparison 1 "Eating Attitudes/Behaviours & Adolescent Issues" approach (5 studies), Outcome 4 Eating Attitudes Test (EAT) Total (high-risk) at 6- to 12-month follow-up.**

Review: Interventions for preventing eating disorders in children and adolescents

Comparison: 1 "Eating Attitudes/Behaviours % Adolescent Issues" approach (5 studies)

Outcome: 4 Eating Attitudes Test (EAT) Total (high-risk) at 6- to 12-month follow-up

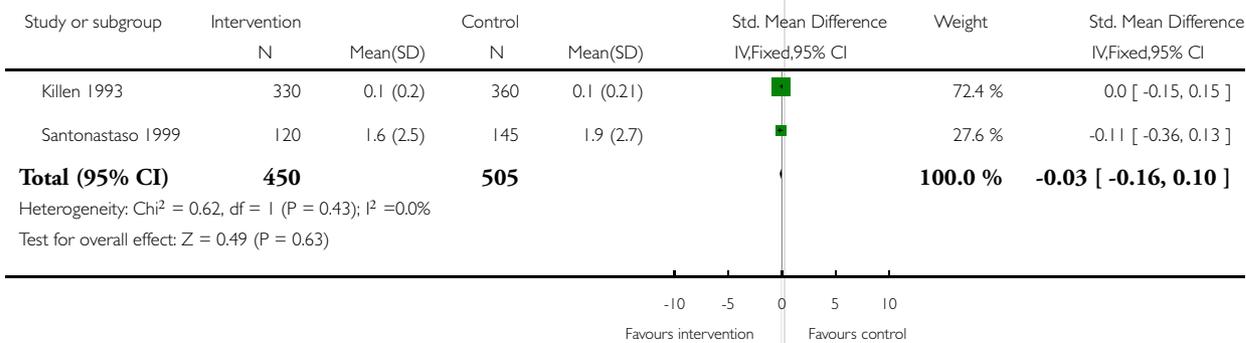


**Analysis 1.5. Comparison 1 "Eating Attitudes/Behaviours & Adolescent Issues" approach (5 studies), Outcome 5 Eating Disorder Inventory (EDI) "Bulimia" at 12- to 14-month follow-up.**

Review: Interventions for preventing eating disorders in children and adolescents

Comparison: 1 "Eating Attitudes/Behaviours % Adolescent Issues" approach (5 studies)

Outcome: 5 Eating Disorder Inventory (EDI) "Bulimia" at 12- to 14-month follow-up

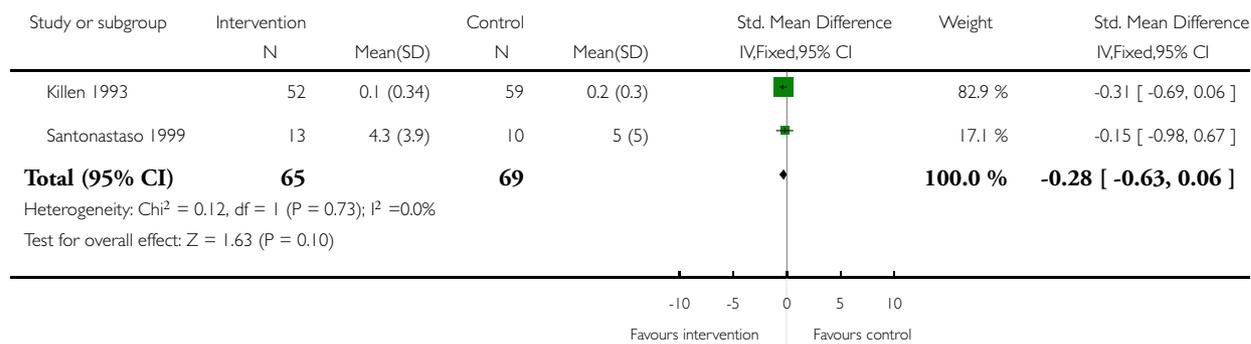


**Analysis 1.6. Comparison 1 "Eating Attitudes/Behaviours & Adolescent Issues" approach (5 studies), Outcome 6 Eating Disorder Inventory (EDI) (hi-risk) "Bulimia" at 12- to 14-month follow-up.**

Review: Interventions for preventing eating disorders in children and adolescents

Comparison: 1 "Eating Attitudes/Behaviours % Adolescent Issues" approach (5 studies)

Outcome: 6 Eating Disorder Inventory (EDI) (hi-risk) "Bulimia" at 12- to 14-month follow-up

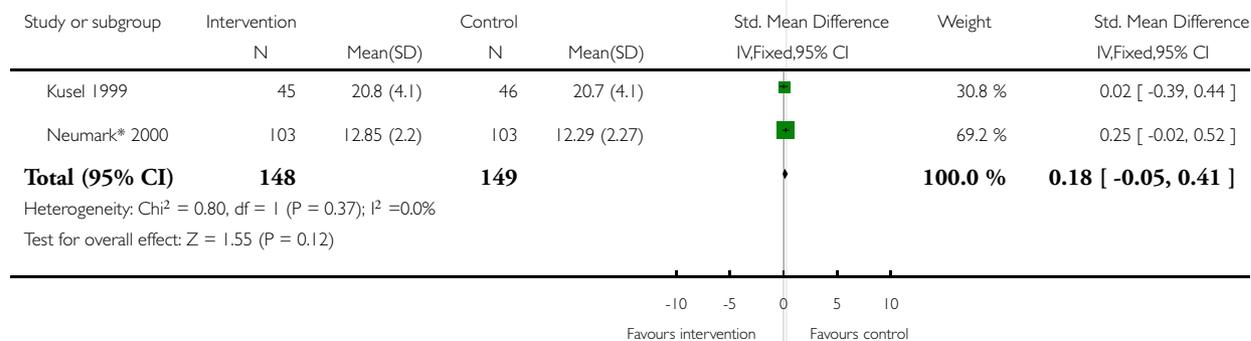


**Analysis 2.1. Comparison 2 "Media Literacy & Advocacy" approach (3 studies), Outcome 1 Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ) "Awareness" at 3-month follow-up.**

Review: Interventions for preventing eating disorders in children and adolescents

Comparison: 2 "Media Literacy % Advocacy" approach (3 studies)

Outcome: 1 Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ) "Awareness" at 3-month follow-up

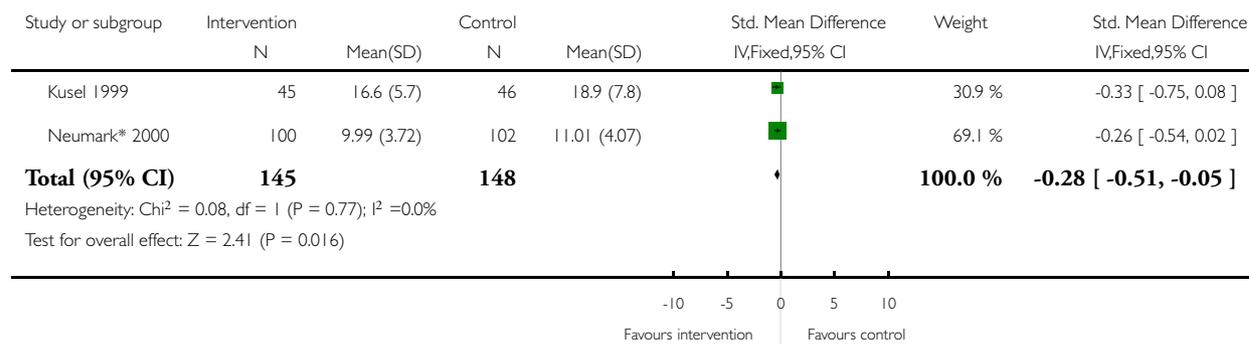


### Analysis 2.2. Comparison 2 "Media Literacy & Advocacy" approach (3 studies), Outcome 2 Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ) "Internalization" at 3-month follow-up.

Review: Interventions for preventing eating disorders in children and adolescents

Comparison: 2 "Media Literacy % Advocacy" approach (3 studies)

Outcome: 2 Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ) "Internalization" at 3-month follow-up

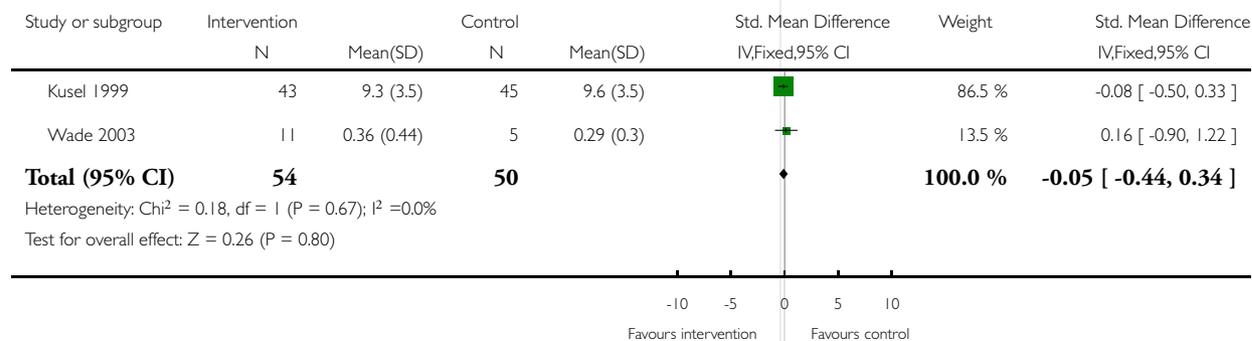


### Analysis 2.3. Comparison 2 "Media Literacy & Advocacy" approach (3 studies), Outcome 3 Social Perception Profile (SPA & SPPC) "Global Self Worth" at 3-month follow-up.

Review: Interventions for preventing eating disorders in children and adolescents

Comparison: 2 "Media Literacy % Advocacy" approach (3 studies)

Outcome: 3 Social Perception Profile (SPA % SPPC) "Global Self Worth" at 3-month follow-up

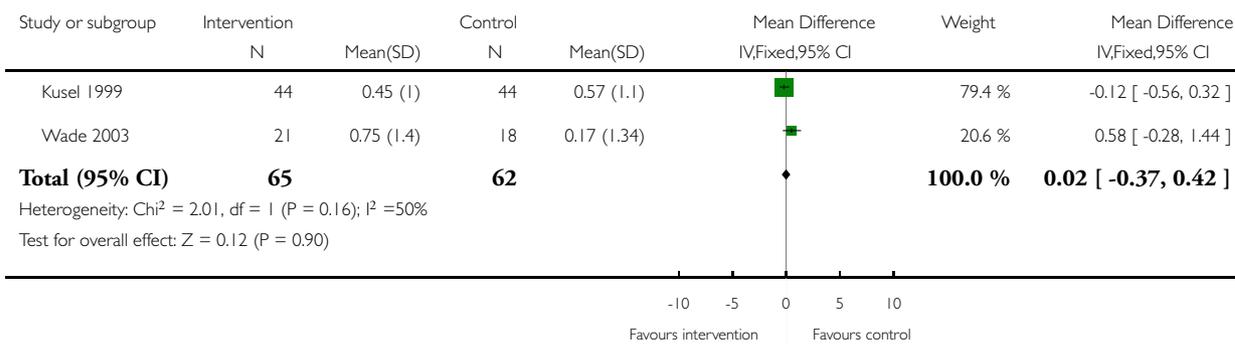


### Analysis 2.4. Comparison 2 "Media Literacy & Advocacy" approach (3 studies), Outcome 4 Body Image Assessment (BIA: Silhouettes) at 3-months.

Review: Interventions for preventing eating disorders in children and adolescents

Comparison: 2 "Media Literacy % Advocacy" approach (3 studies)

Outcome: 4 Body Image Assessment (BIA: Silhouettes) at 3-months

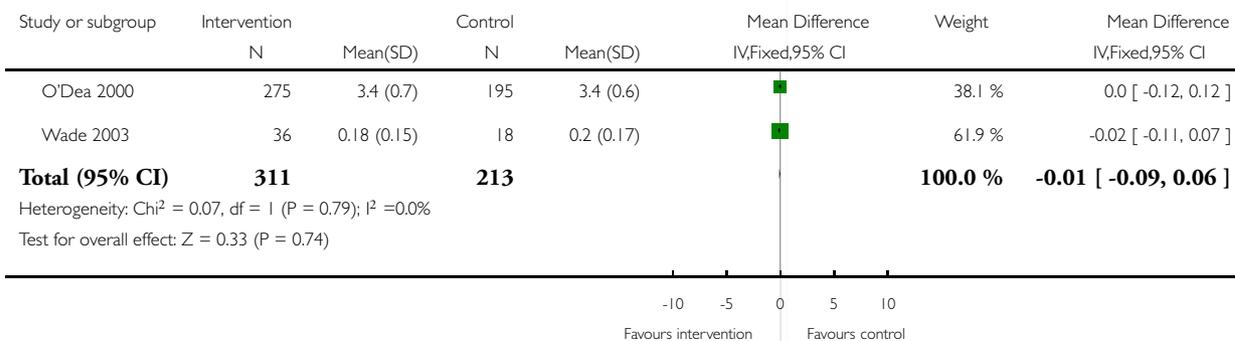


### Analysis 3.1. Comparison 3 "Self-esteem" approach (2 studies), Outcome 1 Social Perception Profile (SPA) "Close Friendships" at 3-month follow-up.

Review: Interventions for preventing eating disorders in children and adolescents

Comparison: 3 "Self-esteem" approach (2 studies)

Outcome: 1 Social Perception Profile (SPA) "Close Friendships" at 3-month follow-up

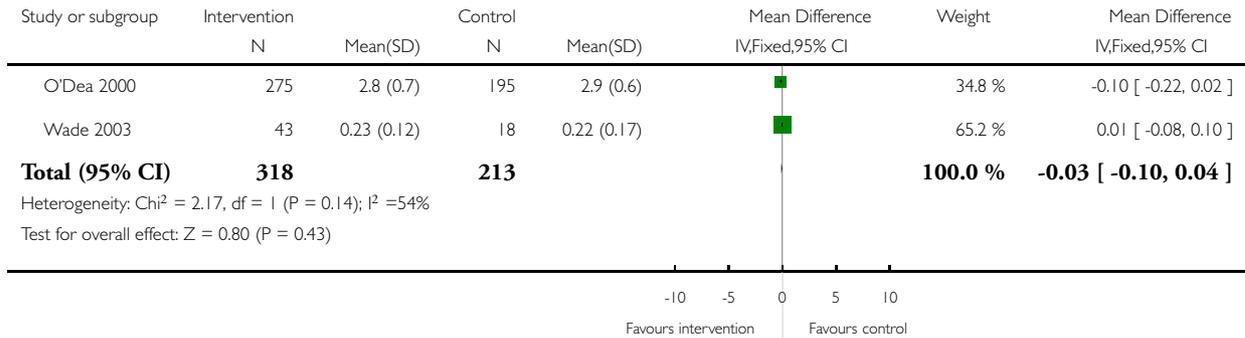


### Analysis 3.2. Comparison 3 "Self-esteem" approach (2 studies), Outcome 2 Social Perception Profile (SPA) "Social Acceptance" at 3-month follow-up.

Review: Interventions for preventing eating disorders in children and adolescents

Comparison: 3 "Self-esteem" approach (2 studies)

Outcome: 2 Social Perception Profile (SPA) "Social Acceptance" at 3-month follow-up



## WHAT'S NEW

Last assessed as up-to-date: 2 September 2004.

2 November 2008	Amended	Converted to new review format.
-----------------	---------	---------------------------------

## HISTORY

Protocol first published: Issue 1, 1999

Review first published: Issue 2, 2002

8 February 2002	New citation required and conclusions have changed	Substantive amendment
-----------------	--	-----------------------

## CONTRIBUTIONS OF AUTHORS

### BELINDA PRATT

For the original protocol and review in 2002, Belinda compiled the background review and contributed to clinical aspects of objectives, study criteria, search strategy, methods and data entry. Belinda planned the majority of comparisons, results and discussion and integrated suggestions of reviewers.

Belinda conducted the 2005 update of this review in association with the Sarah Hetrick of the Australasian Cochrane Centre Cochrane Advanced Reviewer Support (CARS) Service.

### SUSAN WOOLFENDEN

For the original review, Sue directed the protocol format and contributed to objectives, study criteria, search strategy, methods and data entry. Sue also guided the sections on results and discussion.

Sue proof-read the final draft, addressed reviewer's comments and pursued issues relating to cluster analysis for the 2005 update of this review.

### SARAH HETRICK (Australasian Cochrane Centre)

For the 2005 update, Sarah was principally involved in conducting searches, locating and retrieving articles, including and excluding studies, extracting trial information, amending table of included and excluded studies, amending summary table of outcome measures, extracting trial data, quality assessment and outcome data for newly included studies, providing advice on subgrouping studies, double checking data entry and contacting a trial author to request further data.

## DECLARATIONS OF INTEREST

None.

## SOURCES OF SUPPORT

### Internal sources

- Centre for the Prevention of Psychological Problems in Children, The Children's Hospital at Westmead, Australia.

### External sources

- Australasian Cochrane Centre Cochrane Advanced Reviewer Support (CARS) Service (2005 Update), Australia.

## INDEX TERMS

### Medical Subject Headings (MeSH)

Adolescent; Eating Disorders [\*prevention & control; psychology]; Program Evaluation; Psychotherapy

## **MeSH check words**

Child; Humans