Public Health Nutrition: 15(12), 2295–2309 doi:10.1017/S1368980012000705

Review Article

Integrated prevention of obesity and eating disorders: barriers, developments and opportunities

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Submitted 4 June 2011: Final revision received 18 November 2011: Accepted 3 February 2012: First published online 28 March 2012

Abstract

Objective: The serious consequences of obesity and eating disorders (ED), difficulties encountered in treatment and the high prevalence of these conditions are important reasons to develop efforts aimed at their prevention. The implementation of integrated interventions aimed at preventing risk factors for both obesity and ED constitutes a very exciting development. In the present paper we discuss and review the main reasons for an integrated approach to the spectrum of eating- and weight-related problems, which include anorexia nervosa, bulimia nervosa, anorexic and bulimic behaviours, unhealthy dieting practices, body dissatisfaction, binge-eating disorder, overweight and obesity. Given differences between the fields with regard to current perspectives and objectives, key barriers to an integrated approach to prevention are discussed. In order to show the possibilities of development of this approach, we review the main contributions made to date in the fields of both obesity and ED prevention. In particular, environmental approaches in the prevention of obesity and ED are reviewed, given their potential for preventing a broad spectrum of eating- and weight-related problems. Furthermore, several examples of initiatives that have utilized an integrated approach to prevention are discussed.
Design: Narrative review.
Conclusions: We recommend a scenario in which the two fields share knowledge to enhance the difficult work of preventing and treating both ED and obesity.

Keywords
Obesity
Eating disorders
Prevention
Children
Adolescents

Prevalence of eating- and weight-related problems

Both obesity and eating disorders (ED) are problems with substantial health consequences and are highly resistant to treatment[1–12]. ED are serious mental disorders, with a clear chronic tendency and high co-morbidity with other mental disorders, highly resistant to treatment and associated with adverse medical conditions[1,3,5]. In fact, ED are the third most prevalent chronic illness in adolescent girls after obesity and asthma[13], and are associated with some of the highest mortality rates for any psychological disorder[14]. Obesity is associated with diabetes mellitus, CHD, certain forms of cancer and sleep-breathing disorders[15]. Obesity is highly resistant to treatment, so is recognized as a chronic non-communicable disease[16]. The increase in obesity rates in recent years has placed a considerable economic burden on health-care systems[17–21]. Since 1980, epidemiological data have shown that the prevalence of obesity has increased greatly in many countries of the WHO European Region and in the USA[6,22–24]. In the USA, 16% of children (age 6–11 years) and 16% of adolescents (age 12–19 years) are overweight, with wide variation across age and ethnicity (11–27%)[25]. In Spain, official data reveal a very similar tendency, with prevalence rates for obesity in children and adolescents (age 6–17 years) between 10% and 22%, depending on age and sex – among the highest in Europe[26]. Furthermore, recent data indicate that the prevalence of overweight and obesity in younger children (age 3–12 years) in Spain is between 21% and 28%, depending on whether the national or international standard is used to determine weight status[27].

Lifetime prevalence for all ED (including anorexia nervosa, bulimia nervosa and eating disorders not otherwise specified) worldwide is estimated at about 5%[28], while the prevalence of these ED in the USA is estimated at nearly 6%[29]. In Spain, various epidemiological studies[30–33] have produced quite similar data, revealing a prevalence for ED of 4–6% in girls and young

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women aged 12–21 years[34]. Although the prevalence figures for ED are not as high as those for obesity, it is currently estimated that 25 % of girls and 11 % of boys in the USA suffer from disordered eating and weight-control symptoms severe enough to warrant clinical evaluation[35]. Similarly in Spain, studies have found that approximately 28 % of girls and 12 % of boys are engaged in unhealthy weight-control behaviours[36], while nearly 7 % of boys and 14 % of girls reached the cut-off point on instruments for assessing disordered eating behaviours and attitudes[37].

In view of the serious consequences of obesity, ED and disordered eating, the difficulties encountered in treatment and the high prevalence of these conditions, efforts aimed at their prevention are crucial. A prevention approach that addresses a broad range of eating- and weight-related problems may be the best solution. But is it possible to develop such an integrated approach? Previous scientific papers have addressed this topic[38–41], but the present review is the first one that updates and discusses jointly the main reasons for an integrated approach to prevention, barriers inherent to such an approach, the main developments made so far (especially environmental approaches to prevention in both fields), and the most feasible possibilities for carrying out an integrated approach.

The spectrum of eating- and weight-related problems; reasons for an integrated approach to prevention

Although to date research in the two fields has followed quite separate paths, increasingly researchers in the areas of ED and obesity prevention are beginning to recognize the benefits of collaborative efforts aimed at the spectrum of eating- and weight-related problems, which include anorexia nervosa, bulimia nervosa, anorexic and bulimic behaviours (such as fasting, vomiting and the use of laxatives, diet pills or diuretics), unhealthy dieting practices, body dissatisfaction, binge-eating disorder, overweight and obesity[39,42,43]. There are several empirically supported reasons and practical considerations for seeing these problems as parts of a continuum and for developing interventions aimed at preventing a broad spectrum of conditions.

Empirically supported reasons for utilizing an integrated approach include the co-occurrence of these problems and the shared risk factors for different eating- and weight-related problems. Results from cross-sectional and longitudinal studies indicate that individuals may concurrently present more than one disorder or problem and may progress from one problem to another over time[44–48]. The second reason is that shared risk factors may have relevance for the development of different eating- and weight-related problems in adolescent girls and boys. Factors of potential relevance to a broad range of eating- and weight-related problems include: (i) individual factors such as use of dieting and unhealthy weight-control behaviours, media use, body dissatisfaction, weight and body concerns, and self-esteem issues; (ii) family- and peer-related factors such as family meal patterns, parental and peer modelling of dieting behaviour, and exposure to weight-related teasing from family and peers; (iii) school and community factors such as eating and weight-related attitudes and behaviours of coaches and teachers, and food availability; and (iv) societal factors such as sociocultural norms for the ideal body, weight discrimination and media messages about eating, physical activity and body image[38,40,41,47–51]. For example, research has found that body dissatisfaction, a known risk factor for disordered eating and ED, longitudinally predicted excessive weight gain in a population-based sample of overweight adolescent girls[52]. Research has similarly found that dieting behaviours and weight-related teasing by family members increased the risk for both disordered eating behaviours and overweight status in adolescents[48].

Taking into account practical considerations, one of the most relevant concerns is a possible lack of coherence in the messages being transmitted about different eating- and weight-related problems[39]. People may be confused if they receive conflicting messages. For example, in obesity prevention interventions, young people may be encouraged to restrict their fat intake and get more exercise; while in preventive programmes targeting ED they may be told that body weight is genetically predetermined and difficult to change, that we must accept our body size and shape, that there are no prohibited foods and that they should avoid restrictive dieting. Additionally, in the face of such contradictions, health educators may lose credibility with their audience[39,53]. More research is needed to test the potential iatrogenic and harmful effects of preventive activities and messages from both fields on programme participants.

Given the increasing prevalence of obesity, its consequences for health and the high burden of costs on health systems, the topic of obesity is generating enormous interest not only among the public but also at a scientific and political level, so that public health efforts and investments in the development of programmes for treating and preventing obesity are increasing substantially. The so-called 'war on obesity'[54–56] has been very strong in recent years yet, despite this, the high prevalence rates and growing health and financial burdens remain[21]. Many of the traditional obesity prevention programmes, largely designed and carried out by experts in obesity with little or no background in other fields such as those of body image or ED, basically focus on physical activity, diet and weight control. Thus, unintentionally, the increased investment in the prevention of obesity could have negative effects on areas such as body image, dieting, weight-related teasing, excessive weight preoccupation and other risk factors for ED, cancelling out the efforts and achievements in the field of the prevention of disordered eating and body dissatisfaction[53,57,58]. A very clear example of this would

be some of the measures being adopted in schools – such as periodic assessments of BMI – with the aim of identifying overweight children and reporting back to parents by letter, advising dietary changes and physical activity or that the child should see a doctor. Such measures are already in place in some states in the USA and Australia, despite the lack of data clearly supporting the preventive efficacy of this type of screening[59–61]. Such an approach, if not applied sensitively, could have counterproductive effects, such as parents encouraging their child to diet, increased stigmatization of obesity or the initiation of unhealthy weight-control behaviours in children and adolescents[59,62–66]. More research on the potential impact of population monitoring or screening for obesity, including positive outcomes and harmful side-effects, is needed prior to adopting such an intervention.

It is important to point out that the possible harmful influence of obesity prevention initiatives on the development of disordered eating is a controversial issue[67]. Carter and Bulik[68] conclude that the existing evidence does not support the notion that childhood obesity prevention programmes are associated with unintended psychological harm. But they also state that, since psychological and disordered eating-related variables in these programmes have been poorly assessed, conclusions about their possible iatrogenic effects are premature. We agree with these authors. Precisely because these effects have not been adequately assessed, we do not know if obesity prevention programmes may have iatrogenic effects or not. In order to 'first do no harm'[53], one of the most important principles of modern medicine and prevention science, researchers in the obesity and ED prevention programmes should assess variables of interest for both fields.

An additional practical consideration for an integrated approach is that it could be more cost-effective to implement programmes aimed at preventing a broad spectrum of eating- and weight-related problems than to implement separate programmes[51]. One of the main obstacles to the implementation of health-related programmes, particularly in schools, is time[69]. The design of interventions oriented towards integrated prevention would permit considerable time savings. Likewise, the time invested in the training of professionals, not to mention the costs of materials, would be reduced by joining forces.

Obstacles to integration: different goals, different developments

Although there is justification for integrating efforts aimed at the prevention of both ED and obesity, integrating the two fields will be no easy task, given differences between the fields with regard to current perspectives and objectives. For example, a major objective of obesity prevention is to reduce the incidence of obesity and the costs arising from it, with a focus on body weight. In contrast, a major objective within the field of ED prevention is to reduce risk factors for ED, with emphasis placed on improving body image and self-acceptance. Obesity and ED professionals may have limited opportunities to share their ideas in that they may attend separate conferences, read different scientific journals and work in different settings. Although within the ED field it seems that more attention has been directed towards obesity in recent years, we are not sure that a similar trend has occurred within the obesity field.

What contributions have been made within the eating disorders prevention field to integrated prevention?

Several meta-analyses and reviews have attempted to synthesize and quantify the available knowledge on the efficacy of programmes for the prevention of risk factors for ED[70–73] (see Table 1). We have examined these reviews with the aim of assessing the relevance given in the field of prevention of ED to variables that are of interest for the field of overweight and obesity prevention. In the first meta-analyses[72], although 60% of the programmes included content on the promotion of healthy weight-control behaviours, of these, just one selective programme included specific work with components related to physical activity and the promotion of a healthy lifestyle[74]. Examination of the outcome measures revealed that only nine of the thirty-seven effect sizes analysed for universal programmes, and seven of the twenty-three for selective programmes, included measures of interest for the prevention of obesity, such as BMI. In a subsequent meta-analysis[73], of the total effect sizes calculated, in only 27% of cases was there analysis of measures of interest for obesity prevention, such as BMI. Although this meta-analysis does not present a description of the content of the programmes reviewed, it mentions that one programme reduced risk for future onset of both ED symptoms and obesity[75]. In addition, it includes a school-based obesity prevention trial ('Planet Health') aimed at early high-school years that produced a significant reduction in the number of girls using extreme weight-loss practices compared with those in control schools in the follow-up measures[76]. The programmes included in another meta-analysis[70] focused exclusively on the analysis of results on variables traditionally studied in ED prevention programmes, such as knowledge, general eating pathology, dieting, body dissatisfaction and thin-ideal internalization. In the same line, the programmes included in a Cochrane review[71] focused mainly on ED symptoms and other psychological variables such as affect and self-esteem. Only four programmes included BMI measures[77–80], only one included a questionnaire on food habits[81], and only two included components addressing to health promotion and healthy weight control[78,82].

These meta-analyses, focusing on ED prevention, have reviewed studies aimed at child, adolescent and adult populations, using different types of prevention approaches

Table 1 Reviews on the results of ED prevention programmes

Study	Main characteristics of studies reviewed	Main results*
Pratt & Woolfenden (2002)[71]	Cochrane review; 12 RCT. Time period: studies published prior to review (ranged from 1991 to 2003)	• Combined data from two ED prevention programmes based on a media literacy and advocacy approach indicate a reduction in the internalization or acceptance of societal ideals relating to appearance at a 3- to 6-month follow-up ($d = -0{\cdot}28$; 95 % CI $-0{\cdot}51$, $-0{\cdot}05$; small effect†). • Insufficient evidence to support the effect of five programmes[77,78,80,82,140] designed to address eating attitudes and behaviours and other adolescent issues in the general community or those classified as being at high risk for ED, and insufficient evidence to support the effect of two programmes[79,81] designed to improve self-esteem. • Data from two didactic[141,142] ED awareness programmes could not be pooled for analysis.
Stice & Shaw (2004)[72]	Meta-analysis; 33 studies of universal prevention, 18 of selective prevention. Time period: 1980 to 2003	• Aspects of intervention delivery (e.g. use of an interactive format *v.* a didactic format) or of the population targeted (e.g. high-risk *v.* all adolescents) may be more important than content. • Average effect sizes for the outcomes ranged from $r = 0{\cdot}11$ to $r = 0{\cdot}38$ at termination and from $r = 0{\cdot}05$ to $r = 0{\cdot}29$ at follow-up (small to medium effects†). • 53 % of the interventions resulted in significant reductions in at least one established risk factor for eating pathology, such as body dissatisfaction; 25 % of the interventions resulted in significant reductions in eating pathology. • Larger effects occurred for selective (*v.* universal), interactive (*v.* didactic), multisession (*v.* single session) programmes; for programmes offered solely to females and to participants aged over 15 years; for programmes without psycho-educational content; and for trials that used validated measures.
Fingeret *et al.* (2006)[70]	Meta-analysis; 32 published and 14 unpublished studies. Time period: not specified (studies included ranged from 1993 to 2003)	• Largest positive effects were found on the acquisition of knowledge ($d = 1{\cdot}2$ at post-test and $d = 0{\cdot}75$ at follow-up; larger effect following Cohen's criteria†). • Effect sizes for general eating pathology, dieting and thin-ideal internalization ranged from $d = 0{\cdot}17$ to $0{\cdot}21$ at post-test and from $d = 0{\cdot}13$ to $0{\cdot}21$ at follow-up (small effect†).
Stice *et al.* (2007)[73]	Meta-analysis; 66 studies of universal and selective prevention. Time period: 1980 to 2006	• The heterogeneity in the content of the successful programmes implies that there may be several approaches to preventing eating disturbances, but it appeared that successful programmes often decreased attitudinal risk factors and promoted healthier weight-control behaviours. • Average intervention effect sizes ranged from small to moderate†. • 51 % of ED prevention programmes reduced ED risk factors and 29 % reduced current or future eating pathology. • Larger effects occurred for programmes that were selective (*v.* universal). interactive (*v.* didactic), multisession (*v.* single session); solely offered to females (*v.* both sexes); offered to participants over 15 years of age (*v.* younger ones); delivered by professional interventionists (*v.* endogenous providers); programmes with body acceptance and dissonance-induction content and without psycho-educational content; programmes evaluated in trials using validated measures; and programmes that used a shorter follow-up period.
Lopez-Guimera & Sanchez-Carracedo (2010)[83]	Systematic review; 43 universal prevention studies among youth (ages 8–16 years), administered principally in the school context in 11 countries. Time period: 1993 to 2008	• To date, no content or theoretical approach has been more effective than another. Programmes that have achieved better results vary considerably in content and theoretical approach. • Less than one-third of the reviewed programmes achieved positive results at the follow-up in measures on healthy lifestyles knowledge or reduction of risk factors for ED. • Only eight studies[77,81,86,105,140,143–146] achieved some reliable positive effect (without relevant methodological problems) from the 6-month follow-up on measures such as disordered eating attitudes, body dissatisfaction, beauty-ideal internalization, reductions in dieting and unhealthy weight-control behaviours, or improvements in healthy eating and physical activity.

ED, eating disorder; RCT, randomized controlled trial.
*The strength of meta-analysis and other systematic review depends largely on homogeneity of change measures[147–149]. Thus, the interpretation of these results should be treated with caution, due to lack of agreement in the assessment of key variables, especially in the ED field where attitudes are customary measures.
†Criteria proposed by Cohen[150] for evaluation of effect sizes: 0·2 (*d*) or 0·1 (*r*) indicates a small effect; 0·5 (*d*) or 0·3 (*r*) a moderate effect; and 0·8 (*d*) or 0·5 (*r*) a large effect.

(universal, selective or indicated). In a recent, more focused, review of programmes that employed a universal prevention approach among youths, administered principally in the school context in eleven countries[83], similar results were reported. The inclusion of content related to the promotion of healthy lifestyle or healthy weight control was relatively frequent (about 40 %). However, only one programme (2 %) explicitly addressed the prevention of both obesity and ED[84], and only two studies (4·5 %) were aimed at reducing shared risk factors on the spectrum of eating- and weight-related problems[85,86].

In conclusion, these reviews revealed that very few programmes aimed at preventing risk factors for ED assessed the impact of the programme on weight status and other obesity-related outcomes. Although many ED prevention programmes seemed to include content of relevance to obesity prevention (e.g. promotion of healthy weight management), few studies examined the impact of the programmes on risk factors for obesity.

What contributions have been made within the obesity prevention field to integrated prevention?

In this section we look at some key reviews on obesity prevention programmes to assess which programmes incorporated content of potential relevance to the prevention of ED (e.g. promotion of positive body image, dieting reduction and reduction of weight-related teasing) and/or evaluated variables of interest to the ED field. Table 2 summarizes the main results of published reviews on obesity prevention programmes.

As previously stated, Carter and Bulik[68] concluded, in an analysis of a Cochrane review[87] on the prevention of obesity in children, that a minority of studies assessed symptoms of disordered eating, global measures of well-being and functioning, and psychosocial variables of particular relevance to the fields of both obesity and disordered eating, such as attitudes related to food and physical activity. Instead, the measures focused almost exclusively on aspects related to eating and physical activity, and the results were not very encouraging.

A year after the Cochrane review[87] came the publication of the first meta-analysis on the efficacy of programmes for the prevention of obesity aimed at children and adolescents[88], whether or not these were originally conceptualized as programmes for the prevention of obesity (some were prevention programmes for other health problems). Examination of the characteristics and content of the interventions carried out revealed that practically all of the programmes included in that review focused on changes related to eating and physical activity. Just three universal programmes[89–91] (4·7 %) and five selective ones[75,92–95] (7·8 %) assessed the possible effects of the programme on disordered eating risk variables (e.g. body dissatisfaction or weight-control behaviours) or on other variables of interest for the spectrum of eating- and weight-related problems, such as media use. Another review published in the same year[96] highlighted the need to focus more attention on preventing adverse outcomes of obesity prevention interventions, such as an unexpected increase in underweight prevalence.

Another highly relevant review was conducted by Britain's National Institute for Health and Clinical Excellence in 2006[97,98]. This review concluded that the interventions showing some preventive effects did so while the intervention was taking place, but there were scarcely any data on long-term outcomes. Furthermore, the review did not include a discussion about the impact of these programmes on variables traditionally examined within the ED field, such as body image or unhealthy weight-control behaviours. A recent update of this review including new studies is newly centred only on studies reporting weight outcomes[99]. The results were quite similar.

Two other recent meta-analyses[100,101] examined effects of school-based interventions on childhood obesity and showed contradictory results regarding short-term and long-term results. These meta-analyses report data focused exclusively on commonly used weight-related outcomes.

Based upon these reviews, it can be concluded that considerably more work is needed to develop effective obesity prevention programmes. These reviews suggest that obesity prevention programmes focus almost solely on the promotion of changes in eating behaviour, physical activity and weight reduction, while assessments regarding the possible effects of these interventions on body image, disordered eating and unhealthy weight-control behaviours are minimal at best. Additionally, a review on school-based interventions conducted outside the USA identified just twenty-one interventions published between 1999 and 2005, highlighting the need for more obesity prevention programmes internationally[102]. However, as will be discussed further in the following sections, a number of interesting initiatives in this field are currently being implemented outside the USA.

Environmental approaches in the prevention of eating disorders and obesity

Environmental approaches in the prevention of eating disorders

Within the ED prevention field, the need for more socio-environmental approaches has been stressed, given that children's body image, self-esteem, weight bias and eating behaviours are influenced by parents, peers, teachers, the school environment and their community and culture[103,104]. In this regard, some programmes have already incorporated sessions aimed at parents or school staff[105–108], but to date there have been few large-scale initiatives aimed at modifying the different socio-environmental influences on the development of ED, in contrast to what has recently occurred in the field of obesity prevention, as will be discussed below.

Table 2 Reviews on the results of obesity prevention programmes

Study	Main characteristics of studies reviewed	Main results*
Summerbell *et al.* (2005)[87]	Cochrane review; 22 RCT and CCT (10 long-term (at least 12 months) and 12 short-term (12 weeks to 12 months)), 19 school/pre-school-based interventions, 1 community-based intervention targeting low-income families and 2 family-based interventions targeting non-obese children of obese or overweight parents. Time period: not specified (studies included ranged from 1993 to 2004)	• Six long-term studies combined dietary education and PA interventions: only one[89] resulted in some positive effect (for girls receiving the intervention, but not boys); two studies focused on PA alone, and only a multi-media approach appeared to be effective in preventing obesity[151]; two studies focused on nutrition education alone, but neither was effective in preventing obesity. • Four short-term studies focused on interventions to increase PA levels, and two of these studies resulted in minor reductions in overweight status[90,152]. The other eight studies combined advice on diet and PA, but none had a significant impact. • The studies were heterogeneous in terms of study design, quality, target population, theoretical underpinning and outcome measures, making it impossible to combine study findings using statistical methods. Absence of cost-effectiveness data.
Stice *et al.* (2006)[88]	Meta-analysis; 64 universal and selected prevention programmes evaluated in RCT and CCT; 84 % were school-based programmes. Time period: 1980 to 2005	• Average effect size across all studies $r = 0{\cdot}04$ (very small†). • 21 % produced significant prevention effects that were typically pre to post effects. • Larger effects emerged for: programmes that targeted children and adolescents (*v.* preadolescents) and females; programmes that were relatively brief; programmes that solely targeted weight control *v.* other health behaviours (e.g. smoking); programmes evaluated in pilot trials; and programmes in which participants self-selected. • Factors including mandated improvements in diet and exercise, sedentary behaviour reduction, delivery by trained interventionists and parental involvement were not associated with significantly larger effects.
NICE (2006)/Brown *et al.* (2007)[97,98]	NICE Clinical Guidelines; 66 observational studies with follow-ups of over 1 year and RCT, and 3 systematic reviews. Five types of reviews: (i) determinants of overweight and obesity; (ii) interventions for the prevention of overweight and obesity in schoolchildren; (iii) interventions for the prevention of overweight and obesity in children aged 2–5 years and family-based interventions; (iv) interventions for the prevention of overweight and obesity in vulnerable groups; and (v) strategies based around raising awareness of obesity. Time period: 1990 to 2005	• *Determinants*: convincing evidence was found only in relation to the role of total increase in PA as a factor that would help reduce the risk of developing overweight and obesity. • *Weight outcomes*: evidence of effectiveness of multi-component school-based interventions is equivocal; school-based PA interventions (PA promotion and reduced TV viewing) may help children maintain a healthy weight; only one UK-based study[153] suggested that interventions to reduce consumption of carbonated drinks containing sugar may have a role in reducing the prevalence of overweight and obesity. • *Diet and activity outcomes*: abundant evidence supporting the efficacy of environmental approaches adopted in schools in the improvement of PA and eating, but with short-term results; considerable evidence to support the efficacy of interventions, both brief and intensive, aimed specifically at improving dietary intake, through measures such as the promotion of increasing fruit and vegetable intake and drinking more water, or improving school menus, but once again only with results assessed in the short term; evidence was also found for the efficacy of school-based interventions aimed at improving PA.
Katz *et al.* (2008)[101]	Systematic review and meta-analysis; 19 studies (6 were 'treatment' and 13 were strictly 'primary prevention') included in systematic review and only 8 in meta-analysis; studies with follow-up at least 6 months from the beginning of the intervention, targeted children aged 3–18 years in a school setting. Studies employed interventions related to nutrition, PA, reduction in TV or combinations thereof. Time period: 1996 to 2004	• Nutrition and PA interventions resulted in significant reductions in body weight compared with control conditions; standardized mean difference ($d = -0{\cdot}29$; 95 % CI $-0{\cdot}45$, $-0{\cdot}14$; small effect†). • Parental or family involvement in nutrition and PA interventions also resulted in weight reduction ($d = -0{\cdot}20$; 95 % CI $-0{\cdot}41$, $0{\cdot}00$; small effect following Cohen's criteria†).
Gonzalez-Suarez *et al.* (2009)[100]	Meta-analysis; 19 RCT and CCT; school-based interventions generally designed to decrease overweight by increasing PA, to decrease participation in sedentary activities and to decrease intake of food high in fat and sugar content. Time period: 1995 to 2007	• Significantly protective effect of the programmes in the short term (OR = 0·74; 95 % CI 0·60, 0·92). • Only three studies[154–156] reported long-term follow-up results (more than 6 months). Interventions that were conducted for more than 1 year had a higher effect on obesity reduction. • There was no difference in the long-term effectiveness of the interventions compared with the controls in decreasing the prevalence of overweight and obesity.

RCT, randomized controlled trial; CCT, controlled clinical trial; NICE, National Institute for Health and Clinical Excellence; PA, physical activity; TV, television; ED, eating disorder.

*The strength of meta-analysis and other systematic review depends largely on homogeneity of change measures[147–149]. Thus, the interpretation of these results should be treated with caution, due to lack of agreement in the assessment of key variables, especially in the ED field where attitudes are customary measures.

†Criteria proposed by Cohen[150] for evaluation of effect sizes: 0·2 (*d*) or 0·1 (*r*) indicates a small effect; 0·5 (*d*) or 0·3 (*r*) a moderate effect; and 0·8 (*d*) or 0·5 (*r*) a large effect.

Several governments around the world have developed public policy initiatives designed to prevent body dissatisfaction and ED including legislation, the use of non-binding industry codes of conduct and pledges, social marketing, and government support for school-based prevention[109]. But the intensity of these initiatives, their dissemination and the commitment of the governments involved have not been sufficient thus far. The state of Victoria in Australia is a rare example where serious attention has been given to a public health approach to prevent these problems[110]. Actions taken have included an anti-dieting public campaign[111], a nationwide voluntary media code of conduct regarding the portrayal of models[112,113], the training of teachers in ED prevention efforts[114], and a grant mechanism to support community efforts aimed at reducing risk factors for ED[115].

However, despite impressive progress in Victoria and in many others parts of the world, adequate public health interventions in this area are still needed, together with further research to identify the most effective intervention of this type. In our view, and in line with the suggestions of experts, greater efforts should be devoted to modifying the factors that shape our physical and social environment by means of: (i) working with parents, so that they refrain from making comments that contribute to body dissatisfaction and disordered eating behaviours and promote healthy norms with regard to eating, weight, body shape and how to deal adequately with stress; (ii) working with groups of peers to promote healthy norms with regard to weight-related teasing; (iii) educating teachers in relation to prejudices about weight and ED so as to facilitate changes in the school environment and promote healthy norms on eating and physical activity, as well as acceptance and tolerance of different body shapes and individual differences; (iv) training health professionals to take into account shared risk factors for obesity, eating disturbances and ED, so that they are able to correctly handle different types of problems while avoiding possibly affecting the development of problematic aspects; (v) working with the fashion industry, journalists, politicians and public health professionals to convince them to neither promote nor reinforce messages in favour of commercial diets, the objectification of women, extreme thinness in girls or extremely muscular bodies in boys; and (vi) engaging governments in multilevel public policy initiatives to prevent body image problems and ED[41,57,103,104,109,116–119].

Environmental approaches in the prevention of obesity

In order to reduce the burden associated with obesity, there have been calls for a change from the traditional focus on personal responsibility to new public policy actions[56,120,121]. Attention is being directed towards modification of the physical and social environments in order to make our environments less obesogenic[56,120–122]. Of note, whereas environmental factors that are being addressed within the ED field tend to relate more to the social environment, within the obesity prevention field attention has been directed towards both the social and physical environments in which we live. Although not yet evidence-based, the American Dietetic Association (ADA) states that community-based and environmental interventions are recommended as among the most feasible ways to support healthful lifestyles for the greatest numbers of children and their families[123]. In addition to educating children about healthy eating and physical activity, it is important to provide families with opportunities to be physically active, live in communities that provide safe spaces for physical activities, and have access to a variety of affordable healthy foods[124,125]. A recent editorial in the *New England Journal of Medicine* echoed this idea[126], highlighting the failure of weight-loss diets in the prevention and treatment of obesity and insisting on the need to seek alternatives based on community prevention and the environmental approach.

Such an approach has been implemented successfully in France[127]. The French initiative began in 1992 as a school-based nutrition information programme in two towns in northern France (Fleurbaix and Laventie). From 2000 onwards the programme developed into a number of community-based interventions, so that the evolution of child overweight and obesity prevalence could be assessed over 12 years. In 2004, the same assessments were conducted in two comparison towns (Bois-Grenier and Violaines) with similar socio-economic characteristics but no intervention. All children aged 5–12 years in the populations of both intervention towns (633 at the last measurement in 2004) were assessed. Screenings took place to detect families at risk for obesity. These high-risk families met with a dietitian who provided advice on healthy eating and physical activity and referred them to a general practitioner in cases of identified health problems. Dietitians were also employed to carry out interventions in schools and in various other community settings. Additionally, the town councils supported actions to encourage physical activity, new sporting facilities were built, sports educators were employed to promote physical activity in primary school, walking-to-school days and family activities were organized, and several local stakeholders set up family activities focused on a 'healthy lifestyle'. There was considerable local and national media interest in the programme during the study period. Twelve years after the start of the programme the prevalence of child overweight had not increased, and stood at 8·8 %, while in the comparison towns the prevalence had doubled over the same period, standing at 17·8 % and in line with the trend throughout the country.

This community approach was launched in 2004 in another ten cities from different French regions under the title of EPODE ('Ensemble, prévenons l'obésité des enfants' – 'Together, let's prevent childhood obesity';

http://www.epode.fr), and is currently in progress in more than a hundred French communities. The EPODE project has the support of the government and the private sector, and indeed British authorities are considering similar initiatives[128]. The EPODE European Network (EEN; http://www.epode-european-network.com) was recently set up, its aim being to help facilitate the implementation of community-based initiatives using the EPODE methodology in other European countries. The EEN is a European project running from 2008 to 2011 with the support of the European Commission DG for Health and Consumers. Current participants include France, Belgium through the 'Viasano' programme, Spain through the 'THAO-Childhood Health' initiative, and Greece through the 'Paideiatrofi' programme. By way of example, we now describe the principal characteristics of the THAO-Childhood Health programme, developed and adapted for implementation in Spain with the EPODE methodology. This programme is characterized by a specific gastronomic context ('Mediterranean diet', with considerable regional variation), a social context (Mediterranean lifestyle, based on emotional and social elements), a cultural context (strong cultural diversity with four official languages) and a political context (one national government and seventeen regional governments). The objectives are to encourage positive attitudes and behaviours of children (aged 0–12 years) and families, with a view to favouring healthier lifestyles with more physical activity and healthy/pleasant diet. The intervention consists of a planned programme of continual and coordinated actions on a long-term basis, is developed at the town level with involvement of all stakeholders, includes annual monitoring and evaluation, and is receiving consistent and extensive media coverage. It was launched in 2007 in five pilot cities. In the most recent phase, 2009–2010, there are forty-two participating cities, ten regions, and a total of 2 593 000 inhabitants and 302 500 children. Evaluation is currently under way.

With a similar environmental-based approach, the Spanish Ministry of Health, jointly with the Spanish Agency for Food Safety and Nutrition, launched a multi-faceted strategy for nutrition, physical activity and the prevention of obesity (NAOS) in 2005[26,129]. This strategy focuses on the promotion of healthy eating and physical activity in collaboration with health professionals, municipalities and regional authorities, families, and the educational and business sectors. It includes a range of actions aimed at the early detection of obesity, the development of follow-up programmes, the stimulation of research on obesity, epidemiological control (through the Observatory of Obesity) and a plan of action for prevention, a part of which is the PERSEO Program[129], a school-based initiative for promoting healthy eating and physical activity habits for combating obesity. This programme consists of simple interventions in primary schools to promote healthy eating and exercise behaviours in pupils; the objective being to involve the family and school environment in the promotion of the best healthy options. Participants were pupils aged 6–10 years from sixty-seven schools in six Spanish regions. In all, nearly 13 000 pupils took part, from thirty-four schools in the intervention condition and thirty-three schools in the control condition. The first results are expected to be made public shortly.

These environmental initiatives are relevant, and represent a significant advance in public policy actions in the obesity prevention field. However, we should point out that, as far as we know, little or no attention has been directed towards body image, excessive weight concerns, unhealthy weight-control behaviours and other variables relevant to an integrated approach to prevention, in either the intervention or the assessment protocols.

Focus on health and behaviour change across the weight spectrum, not on weight

One of the most relevant arguments offered by advocates of integrated prevention is that the focus should be on health and behaviour change, not on weight, and interventions should promote a positive body image and acceptance of the diversity of body sizes, so as to help reduce the stigmatization of obesity.

In this regard we can cite three examples. The first is that of the NAOS strategy in Spain[129], to which we referred above. As part of this strategy, a Guide to Clinical Practice has just been published for the prevention and treatment of childhood overweight and obesity[34]. This initiative is without doubt highly relevant, but the focus is exclusively on the improvement of diet and physical activity. Scarce attention is directed towards issues of body image, the importance of promoting the acceptance of body size diversity, or the possible harmful effects of the programme with regard to the development of disordered eating and unhealthy weight-control behaviours. The only encouraging sign in this regard are the recommendations about preventive initiatives in the health-care context: 'interventions for promoting healthy eating and encouraging physical activity should favor a positive image of one's own body and help to construct and reinforce children's self-esteem. It is recommended to pay special attention to avoiding stigmatization and blame in the cases of overweight children or their families' (p. 16). We strongly applaud this recommendation, although we would have preferred to see this type of recommendation made more strongly and broadly in the document.

The second example is the position statement of the ADA on interventions for paediatric overweight[123]. The ADA states that the main focus should be on the efficacious promotion of healthful eating habits and increased physical activity in all children and adolescents, regardless of weight status. The report expresses some concern about the possibility of children who participate in secondary prevention programmes becoming stigmatized because of

their size, and it is encouraging that the ADA argues for targeted health-related outcomes such as self-esteem or body image (among others) to be included in more paediatric obesity research.

The third example of relevance is the Canadian clinical practice guidelines on the management and prevention of obesity in adults and children[130]. Certainly, in the section on recommendations about the prevention of obesity in adults and children, most of the suggestions concern advice on lifestyle interventions, but topics of potential relevance to the prevention of ED are not discussed. We found just one recommendation, in the section on 'clinical and laboratory assessment', in which it is suggested that the health-care professional screen the overweight or obese adult for ED, depression and psychiatric disorders, as appropriate.

Recently, and based on the results of an extensive longitudinal study, a series of recommendations were drawn up for health professionals with a view to preventing obesity and ED in adolescents in clinical and school settings and other contexts[41]. These recommendations stress the importance of helping adolescents and their families focus less on weight and more on sustained behavioural change, and more specifically are as follows: (i) discourage unhealthy dieting, instead encourage and support the use of eating and physical activity behaviours that can be maintained on an ongoing basis; (ii) avoid utilizing body dissatisfaction as a motive for change and to promote a positive body image; (iii) encourage more frequent, and more enjoyable, family meals; (iv) encourage families to talk less about weight and do more at home to facilitate healthy eating and physical activity; and (v) assume that overweight teens have experienced weight mistreatment and address this issue with teens and their families. Along these lines is the recently stated position of the Society for Adolescent Medicine, which stressed among its recommendations for the prevention of obesity in adolescents that 'the efforts aimed at preventing overweight need to be congruent with adolescents' sensitivity to weight-related issues so as to avoid inadvertently evoking body dissatisfaction and/or unhealthy food-restricting behaviors […,] placing less focus on body weight, shape and size'[131] (p. 785).

Proposals and initiatives for the integrated prevention of obesity and eating disorders

Prevention programmes utilizing an integrated preventive approach

Recent years have seen the development of preventive programmes addressing, in joint fashion, a broad spectrum of eating- and weight-related problems[76,84–86,132], which reflect significant progress on the path towards integrated prevention. Some are obesity prevention programmes, which have evaluated the effects of intervention on disordered eating. A notable example is Planet Health, an obesity prevention programme, which had previously shown itself to be effective in reducing obesity prevalence in girls[89]. Subsequent analyses of the efficacy of the preventive intervention in a randomized controlled trial conducted in middle-school students showed that the intervention had an unanticipated but beneficial effect in reducing the risk of disordered weight-control behaviours after two years in intervention schools, compared with control schools[76]. The latest study to date ('5-2-1 Go!') has a larger sample, data for boys, new content, and the specific goal of determining the effect of a school-based intervention for promoting healthful nutrition and physical activity on disordered weight-control behaviours. That study, which includes 1451 early adolescent girls and boys, supports the effectiveness of the intervention to prevent disordered weight-control behaviours in early-adolescent girls, though no intervention effect was observed in boys[133]. According to its authors, it may be that the programme findings on disordered weight-control behaviours were achieved through a reduction in unhealthful weight concerns and body dissatisfaction, but further research will be needed to identify the mechanism of the observed protective effect.

Additionally, there have been a few initiatives aimed primarily at the prevention of one problem (obesity or ED) that have addressed risk factors or variables of interest for integrated prevention. Among these is a randomized controlled trial that evaluated a programme aimed at the prevention of ED[75] involving dissonance-inducing activities to reduce thin-ideal internalization and a prevention programme promoting healthy weight management. The trial also included two control conditions, with female high-school and college students presenting moderate body dissatisfaction. In the follow-up evaluation, the dissonance and healthy weight group participants showed significantly lower binge eating and obesity onset and less use of health services, including mental health services.

'New Moves' was funded primarily as an obesity prevention programme for sedentary adolescent girls, but was designed to prevent a broader spectrum of weight-related problems[134]. The primary component of New Moves is an all-girls physical education class, supplemented with activities aimed at improving eating patterns without dieting and self-image. New Moves strives to provide an environment in which girls feel comfortable being physically active, regardless of their size, shape or skill level, and focuses on improving body image while increasing healthy eating and exercise behaviours. New Moves was evaluated in a randomized controlled trial; although the programme was not effective in decreasing BMI or percentage body fat, it did lead to improvements in attitudes and behaviours of relevance to both obesity and ED, including sedentary behaviours, unhealthy weight-control behaviours, body image and self-worth.

The programme was very well accepted by the girls and continues to be implemented in most of the schools that participated in the study. Findings point to the challenges in developing interventions that can be effective in preventing a broad spectrum of weight-related problems and indicate a need for more work in this area.

Recently, programmes have begun to be designed which expressly address the integrated prevention of obesity and ED, as is the case of 'Healthy Buddies'[84]. This programme is aimed at the promotion of healthy living and has three components: nutrition, physical activity and healthy body image. The first two are typical of obesity prevention programmes. On the other hand, the third component, healthy body image, includes activities related to self-esteem, healthy growth and development, social skills, and media literacy. The programme's slogan – 'Go Move! Go Fuel! Go Feel Good!' – sums up its content very well. Administered to pre-school children (aged 5–6 years) by older children (aged 9–13 years), the programme showed itself to be efficacious in health-promotion measures oriented to the prevention of obesity at the end of a school-year-long intervention. Unfortunately, no significant changes were observed in measures of risk factors for disordered eating, although the results could be explained by a possible floor effect ('pre' scores in these measures were very low in both the intervention and control groups). Currently, the same research team is assessing the larger-scale effects of the programme.

The inclusion of components aimed at promoting body acceptance and body size diversity or reducing unhealthy weight-control behaviours in programmes for the promotion of physical activity and healthy eating constitute an important advance on the path towards the integration of prevention efforts addressing the whole spectrum of eating- and weight-related problems.

Other developments towards integrated prevention

In spite of the difficulties already pointed out for achieving integration of efforts to prevent both obesity and ED, various initiatives have been launched in this direction recently. Thus, it is becoming increasingly common to find studies dealing with obesity-related matters in ED journals, and vice versa. The *American Journal of Public Health* recently published a commentary that labelled ED as a 'blind spot' in the drive for childhood obesity prevention and indicated that public health efforts to address obesity can no longer afford to ignore ED and related behaviours[135]. The guidelines of the National Institute for Health and Clinical Excellence[98], which consider general issues related to work on the prevention or treatment of obesity, state clearly that 'interventions to help children eat a healthy diet and be physically active should develop a positive body image and build self-esteem' (p. 7). The US Department of Health and Human Services Office on Women's Health has drawn up a general interest document on the matter[42], while the American Psychological Association (APA) recently set up a website that includes relevant sources and information on the work of the APA in this area[136]. APA, as part of its Public Interest policy, has also drawn up an interesting document[137] in which it declares its support for legislative initiatives in six areas: (i) improving nutrition and physical activity; (ii) increasing body satisfaction; (iii) decreasing weight stigmatization and weight-related teasing; (iv) promoting responsible marketing to children; (v) supporting healthy home environments; and (vi) addressing cultural and socio-economic factors related to obesity and disordered eating. Moreover, the document includes a list of specific recommendations for the development of federal policies with the aim of preventing obesity and disordered eating in young people through an integrated approach. Finally, in 2007 an interesting conference on this issue entitled 'Obesity and Eating Disorders: Seeking Common Ground to Promote Health. A national meeting of researchers, practitioners, and policy makers' took place in Calgary, Canada[138,139].

In June 2010 in Salzburg, Austria, the 2010 International Conference on Eating Disorders was held, organized by the Academy for Eating Disorders. Part of the scientific programme was the Special Interest Group Discussion Panel 'What do Transdisciplinary Approaches Bring to the Integrated Prevention of Obesity and Disordered Eating?', that the authors of the present work attended, one of us as a panellist (G.L.-G.). The main points discussed, and on which conclusions were reached, were as follows. First, the lack of connections between the two fields is largely due to the types of professionals working in them, who see obesity and ED as separate problems. Those involved in obesity prevention tend to come from medical or public health backgrounds, while those working in the field of ED prevention tend to come from the mental health field. Few professionals have a background in both fields, and there is a need for much more communication between them. Second, some experts in ED are concerned about the fact that experts in obesity are unaware or show little interest in the potential negative repercussions of prevention with a strong weight focus (as opposed to a health focus) on the development of disordered eating. Third, a strategy for moving forward would be to make efforts to ensure that those working in each field have access to key information about the intersections between the two and the possible undesirable consequences of certain types of prevention aimed at one problem on the other.

New and existing programmes should take these conclusions into account. Given the broader scope of obesity interventions, a pragmatic approach would be to ensure that those planning large-scale obesity prevention programmes with community- and environmental-based approaches, which have substantial resources available

and are already reaching out to broad sections of the population, have access to the relevant information on integrated approaches to prevention. In this way, they should be able to take into consideration the possibility of modifying their strategies or incorporating additional components and measurements that contribute to promoting a healthy and positive body image, accepting the diversity of body sizes, reducing weight- and appearance-related teasing, removing the stigma associated with obesity, and eradicating unhealthy weight-control behaviours.

Conclusions

In summary, research has detected common risk factors across the spectrum of eating- and weight-related problems, some effective preventive programmes have already been developed to cover the whole spectrum, and interest in this new, integrated approach is growing. Community- and environmental-based obesity prevention is taking on new dimensions with the implementation of programmes and the creation of networks on a national and international scale. Actions of this type are undoubtedly necessary for promoting healthy lifestyle changes in today's society, but it is no less important to ensure that such changes do not result in disordered eating or perpetuate weight stigmatization; hence, this is the ideal moment for encouraging those responsible for these programmes to take account of the available information on the potential benefits of integrated prevention. In the future, more attention should be paid to understanding the shared risk and protective factors that are potentially modifiable via preventive initiatives, developing interventions to simultaneously prevent a spectrum of eating- and weight-related problems, and testing the efficacy and effectiveness of these interventions[40,43,51,118].

Acknowledgements

This work was supported by Research Grants from the Ministry of Science & Innovation (PSI2009-08956) of the Spanish Government. The authors state that there are no conflicts of interest. D.S.-C. and G.L.-G. did the first draft of the manuscript. They included in the manuscript several contributions and ideas from D.N.-S., with her consent. G.L.-G. focused especially on the sections 'The spectrum of eating- and weight-related problems; reasons for an integrated approach to prevention' and 'What contributions have been made within the eating disorders prevention field to integrated prevention?' D.S.-C. did the rest and revised the global first draft. D.N.-S. revised this first draft, did suggestions and added new data. D.S.-C. did the last changes and the final version, and D.N.-S. revised the English. All three authors approved the final version, and D.S.-C. did the submission.

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