



Public Health Response to the Obesity Epidemic: Too Soon or Too Late?¹

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Abstract

Public health actions in response to new threats are often taken despite uncertainty about the efficacy of the action. The challenge, then, is to make ongoing judgments about whether actions are taken too soon, before a sufficient understanding of the efficacy of interventions is known, or too late, after much of the prevention potential is lost. The ongoing obesity epidemic presents exactly this type of challenge. General lessons learned from the AIDS and tobacco epidemics as well as others can be useful now as we contemplate options for reversing the ongoing epidemic of obesity in the United States. In this article we briefly review current evidence regarding the efficacy of obesity interventions in both clinical and community settings. We conclude that although little direct evidence is available on the efficacy of interventions for the obesity epidemic, there are some reasonable options derived from experience with other public health epidemics that can contribute to the solution of the obesity problem. *J. Nutr.* 137: 488–492, 2007.

Introduction

The obesity epidemic in the United States over the past 20 y has been a remarkable event. In the past decade, the prevalence of obesity has more than doubled among both adults and children. The causes of this epidemic are complex, embedded in the many social, cultural, and economic factors that determine the amount and quality of food intake balanced against the amount and quality of energy expenditure. In short, because we are eating more and moving less, we are getting fatter. This epidemic is actually a pandemic, as obesity is on the increase in most countries where nutritional status is being monitored across the world. Populations particularly at risk are those that only a generation ago experienced food shortages. Most developing countries are now facing the coexistence of overweight and underweight in both urban and rural areas with higher prevalence of overweight than underweight being reported (1). Thus, developing and implementing interventions to reverse the epidemic of obesity are global public health needs. This article briefly reviews the current literature regarding the current evidence basis for efficacy of various interventions to reduce the obesity epidemic.

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Methods

We searched the literature using Medline and the Cochrane databases for systematic literature reviews and meta-analyses pertaining to interventions targeting obesity. We did not include studies of dietary supplements or complementary and alternative medicines. We limited our search to the published English literature since 2000 with keywords of *overweight* or *obesity* or *weight-loss*. In this summary, we selected the largest and/or the most recent of these reviews on each of several topic areas. Furthermore, Medline and web-based searches were performed on obesity prevention guidelines using keywords of *obesity*, *prevention*, *guidelines*, and *recommendations*. Selected guidelines since 2000 are presented.

Results

Table 1 summarizes selected systematic reviews and meta-analyses (2–25). These reports cover nutritional topics from breast-feeding to clinical interventions to health promotion in schools, worksites, and selected communities. In general, these reviews conclude that breast-feeding produces very modest reductions in childhood obesity, but the effectiveness of other interventions in children is less certain. Clinical interventions in adults using pharmaceuticals or behavioral methods produce modest effects, but bariatric surgery produces substantial effects. Table 2 describes selected action plans and expert panel reports on overweight and obesity published since 2000 (26–48). In general, these action plans call for education approaches to increase awareness about personal choices in food and physical activity habits as well as a broad set of policy interventions tied to food availability, physical activity promotion, and community design.

Public health programs should, of course, be based on sound evidence of both need and efficacy. The need to reverse the obesity epidemic is clear. However, the current evidence base is very weak, with very few interventions having been proven to be effective. Few large-scale intervention trials with sufficient

TABLE 1 Selected systematic reviews and meta-analyses of interventions to reduce obesity published since 2000

Reference	Number of studies	Weight management strategy	Findings
Children			
Owen et al. (2)	28	Breast-feeding	Reduction in obesity risk of 13%.
Owen et al. (3)	36	Breast-feeding	Slightly lower BMI (−0.04 units) SES, maternal smoking in pregnancy, and maternal BMI may explain the association.
Summerbell et al. (4)	22	Lifestyle interventions [Physical activity (PA), diet, social support]	Inconclusive
Marshall et al. (5)	52	TV, video, computer	Very small increase in body fatness and decrease in PA with media use.
Summerbell et al. (6)	18	Lifestyle interventions (diet, PA, behavioral therapy)	Inconclusive
Adults			
Krieger et al. (7)	87	Variations in carbohydrate and protein intakes	Carbohydrate intakes of ≤35–41% energy associated with 1.74 kg as compared with higher carbohydrate intakes after adjustment for energy intake. No change in body mass with varying protein intakes.
Nordmann et al. (8)	5	Low-carbohydrate diets without energy restriction vs. low-fat diets	No difference in low-carbohydrate diets without energy restriction as compared with low-fat calorie-restricted diets after 1 y.
Curioni et al. (9)	6	Diet and PA vs. diet alone	Diet and PA together are more effective for weight loss and for sustaining weight loss than diet alone.
Tsai et al. (10)	10	Commercial weight loss programs	Weight Watchers: a loss of 3.2% of initial weight after 2 y. Very Low Calorie diet: substantial weight to those who completed the program but high attrition rates and high probability of regaining weight. Most programs: Inconclusive
Anderson et al. (11)	47	Meal replacements (MR), energy-restrictive diets (ERD), soy very low-energy diets (SOY), and very low-energy diets (VLED)	MRs: Reduction of 9.1% baseline weight after 24 mo ERDs: Reduction of 8.5% baseline weight after 24 mo LEDs: Reduction of 11.4% baseline weight after 24 mo SOYs: Reduction of 16.5% baseline weight after 24 mo VLEDs: Reduction of 21.3% baseline weight after 24 months
Avenell et al. (12)	26	Low-fat diet (LFD), very low-calorie diet (VLCD), protein-sparing modified diet (PSMD)	LFD: reduction of 3.6 kg after 36 mo VLCD: Inconclusive PSMD: Inconclusive
Avenell et al. (13)	8 orlistat 2 sibutramine 17 PA/behavioral	Diet with other weight loss strategies (orlistat, sibutramine, exercise)	Improved long-term weight loss with diet and the addition of orlistat, sibutramine, exercise, and/or behavioral therapy
Heymsfield et al. (14)	6	Partial meal replacements (PMR) vs. reduced-calorie diets (RCD)	A 7–8% body weight reduction for PMR (with fewer dropouts) and a 3–7% body weight reduction for RCD.
Anderson et al. (15)	29	Very low-energy diets (VLED) and hypoenergetic balanced diets (HBD)	VLED: 7.1 kg weight-loss maintenance after 5 y. HBD: 2.0 kg weight-loss maintenance after 5 y.
Pirozzo et al. (16)	12	Fat-restricted diets vs. calorie-restricted diets	Fat-restricted diets are comparable to calorie-restricted diets
Astrup et al. (17)	16	Low-fat diets ad libitum vs. habitual or medium fat diets ad libitum	3.2 kg weight loss with low-fat diets
Padwal et al. (18)	11 orlistat 3 sibutramine	Pharmacological treatments	After 1 y, weight loss with orlistat was 2.7 kg and with sibutramine was 4.3 kg as compared with placebo.
Li et al. (19)	79	Pharmacological treatments	Modest weight reduction for numerous pharmacologic agents in combination with diet recommendations.
Shaw et al. (20)	36	Psychological interventions	Weight reduction of 2.5 kg, greater when combined with diet and physical activity
Maggard et al. (21)	89	Bariatric surgery	Reduction in body weight of 20–30 kg, which was maintained up to 10 y, and decrease in comorbidities.
Buchwald et al. (22)	136	Bariatric surgery	Reduction of 61% body weight with improvement of diabetes, hyperlipidemia, hypertension, and obstructive sleep apnea.
Adults with diabetes			
Norris et al. (23)	22	Dietary, PA, or behavioral interventions among type 2 diabetes mellitus	Multiple interventions that included a low calorie or very low calorie diet produced 1.7 kg weight loss.
Norris et al. (24)	9	Dietary, PA, or behavioral intervention among prediabetics	Reduced weight and incidence of diabetes, with modest improvements in glycemic control, blood pressure, or lipid concentrations.
Norris et al. (25)	22	Pharmacologic treatment among type 2 diabetes mellitus	Modest weight reduction for fluoxetine, orlistat, and sibutramine over 12 to 57 wk.

TABLE 2 Selected obesity prevention guidelines issued as expert panel reports since 2000

Year	Expert panel	Guidelines
2000	National Institutes of Health (26)	Identification, evaluation, and treatment of overweight and obesity in adults
2001	Surgeon General (27)	Overweight and obesity: a vision for the future
2001	American Heart Association (28)	The American Heart Association dietary guidelines for 2000: a summary report
2002	American Cancer Society (29)	American Cancer Society on nutrition and physical activity for cancer prevention
2002	President Bush's Plan (30)	HealthierUS (steps to a healthier US)
2002	American Dietetics Association (31)	Position of the American Dietetic Association: weight management
2003	U.S. Preventive Task Force (32)	Screening for obesity in adults
2003	American Association of Pediatrics (33)	Prevention of pediatric overweight and obesity
2003	American Diabetes Association (34)	Evidence-based nutrition principles and recommendation for the treatment and prevention of diabetes and related complications.
2004	Food and Drug Administration (35)	Calories count: report of the working group on obesity
2004	Institute of Medicine (36)	Preventing childhood obesity: health in the balance
2004	World Health Organization (37)	Global strategy on diet, physical activity, and health
2004	American Diabetes Association (38)	Weight management through lifestyle modification for the prevention and management of type 2 diabetes: rationale and strategies
2004	American Dietetics Association (39)	Position statement of the American Dietetic Association: dietary guidance for healthy children ages 2 to 11 y
2004	American Heart Association (40)	Clinical implications of obesity with specific focus on cardiovascular disease
2004	National Institutes of Health (41)	Strategic plan for NIH obesity research
2005	U.S. Department of Health and Human Services (42)	Dietary guidelines for Americans, 2005
2005	U.S. Preventive Task Force (43)	Screening and interventions for overweight in children and adolescents
2005	American Society of Nutrition (44)	Obesity in older adults: technical review and position statement of the American Society of Nutrition and NAASO
2005	Task Force on Community Preventive Services (45)	Public health strategies for preventing and controlling overweight and obesity in school and worksite settings
2006	Institute of Medicine (46)	Food marketing to children and youth: threat or opportunity?
2006	American Heart Association (47)	Dietary recommendations for children and adolescents: a guide for practitioners
2006	American Dietetic Association (48)	Position of the American Dietetic Association: local support for nutrition integrity in schools

statistical power have been conducted. Despite the weakness of the evidence base, a shadow epidemic has followed the obesity epidemic: the epidemic of obesity action plans. Many organizations have issued action plans of various sorts, from very general strategies to more specific tactics.

The cornerstone of these prevention plans focuses on the need to promote lifelong healthy eating patterns with regular physical activity, thus maintaining a healthy weight throughout life. The U.S. Health and Human Services 2005 Dietary Guidelines that emphasize a diet rich in nutrient-dense foods such as fruits, vegetables, and whole grains combined with regular physical activity (42) are very similar to recommendations that have been proposed by other organizations including the American Cancer Society (29), American Heart Association (28), American Diabetes Association (38), American Dietetic Association (39), American Association of Pediatrics (33), the Institute of Medicine (IOM)² (36), and the World Health Organization (WHO) (37). The Surgeon General's *Call to Action to Prevent and Decrease Overweight and Obesity* provides specific measures to promote healthy food choices with reasonable portion sizes in the home, schools, worksites, and communities as well as to promote building physical activity in normal routines through

quality physical education in the schools, physical activity in worksites, establishing community facilities, and reducing sedentary activity (27). The Task Force on Community Preventive Services has found sufficient scientific evidence to support workplace diet and physical activity programs (45). To encourage beneficial food choices for children, one of the recommendations of the IOM report *Preventing Childhood Obesity* is to limit advertisement and marketing of unhealthy foods to children (36). Evidence of the role of food advertisements targeted at children and their choices and purchases has been presented in the IOM report *Food Marketing to Children and Youth: Threat or Opportunity?* (46). WHO has recommended fiscal policies to encourage favorable health choices similar to the tax on tobacco products (37). Several organizations have recommended education for prevention and treatment of individuals, healthcare providers, and society, including WHO (37), the Surgeon General (27), the Food and Drug Administration (35), and the IOM (36). The U.S. Preventive Task Force has found fair evidence to support screening of adults for obesity, a recommendation echoed in several action plans (32). To complement the community programs as well as treatment options, an investment in research has been proposed by the Surgeon General and by WHO, with specific agendas highlighted by the National Institutes of Health (27,37,41).

Discussion

We now find ourselves in a situation with urgent need and armed with numerous recommendations but only weak evidence to guide interventions. In this setting, then, we should expect controversy

² Abbreviations used: AIDS, acquired immunodeficiency syndrome; BMI, body mass index; ERD, energy restrictive diets; HBD, hypoenergetic balanced diets; IOM, Institute of Medicine; LFD, low-fat diet; MR, meal replacements; PA, physical activity; PMR, partial meal replacement; PSMD, protein-sparing modified diet; RCD, reduced-calorie diets; SOY, soy very low-energy diets; VLCD, very low-calorie diet; VLED, very low-energy diets; WHO, World Health Organization.

for most interventions, especially for those featuring policy changes designed to alter either food intake or physical activity. Policy discussions in this type of setting can be contentious. Much of the rhetoric regarding obesity policy tends to assume that there is a discrete boundary between individual choice and public policy. The rhetoric, at its extreme, paints a picture of distinct options being personal responsibility, with obesity being a cumulative consequence of unfavorable choices in diet and physical activity, versus public policy, with obesity being a consequence of the synergistic effects of food marketing and technology that favor a sedentary lifestyle in both work and leisure settings. Many in the general public are alarmed by overzealous nutritionists who would restrict food choice (often derided as "Food Nazis"). The ongoing struggle between choice and policy that is playing out in tobacco control is also often apparent in food policy. Public health nutritionists who see the enormous successes in tobacco control through policy initiatives look to positive policy solutions involving food and physical activity, whereas many in the more skeptical public regard such policies as infringements on free choice. In fact, however, individual choice and public policy are not in conflict. Combinations of choice and policy have been synergistically effective in many different public issues in the past. Personal choice to smoke cigarettes has not been substantially threatened by policies that protect nonsmokers from the harm of second-hand smoke or that fund tobacco-control programs with cigarette excise taxes.

In the current situation, where the evidence for effectiveness of interventions to reverse the obesity epidemic is scant, what should we now do? It would be unwise to choose simply to await convincing evidence before taking action. In fact, a strategy of experimentation, evaluation, and modification could well guide a process whereby we take action as part of the very process of creation of evidence. This is precisely the general strategy we have taken to reduce the burden from other epidemics. We did not await certainty of effectiveness of community-based educational interventions for acquired immunodeficiency syndrome (AIDS) or the effectiveness of policy interventions for tobacco control before we embarked on the still-evolving public health process of implementation, evaluation, adaptation, and reimplementation. The overall effect of such public health approaches to new threats has been to reduce disease burden over time. Likewise, the obesity epidemic could benefit from reasonable interventions that are implemented, evaluated, and adapted in an ongoing process. The evidence base for effective interventions can thereby be developed as part of the process of addressing the problem rather than as a preliminary step before the process begins.

The obesity epidemic clearly has occurred subsequent to population-wide increases in caloric intake coupled with reductions in physical activity. It is certainly reasonable, therefore, to assume that caloric intake and physical activity will necessarily be the targets of any interventions to reverse this epidemic. Recommendations to reduce the obesity epidemic have included such policy options as increased education on diet and physical activity, limiting advertisements of unhealthy food to children and adolescents, limiting access to unhealthy foods in schools, levying a tax on foods of low nutritional value, and promoting physical activity in schools and worksites. These guidelines provide the most logical starting place from which to begin implementing public health interventions along with evaluation components to further guide the public health effort to reduce the obesity epidemic.

Because the obesity epidemic is on us, and as the usual process of scientific discovery is not likely to provide evidence in

the near future, we think a process of experimentation, evaluation, and adaptation is the best current option for slowing and then reversing the obesity epidemic.

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