

Motivational Interviewing for Weight Loss

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KEYWORDS

- Weight management • Motivational interviewing
- Behavioral interventions • Lifestyle counseling

Weight loss interventions have improved over the years, although sustained weight management remains a challenge for overweight individuals and practitioners alike.¹ One approach that has been proposed to enhance the efficacy of behavioral weight loss treatment is motivational interviewing (MI). Although the application of MI in this context is relatively new, emerging research isolating the unique contributions of MI to weight loss treatment² suggests that this approach has utility as part of a comprehensive multicomponent behavioral obesity intervention. Therefore, an introduction to MI and the evidence supporting the approach is warranted for practitioners in applied settings who seek to promote weight loss among their patients.

AN OVERVIEW OF MOTIVATIONAL INTERVIEWING

MI is a patient-centered, directive approach to counseling for behavior change that emphasizes individual autonomy and a collaborative relationship between patient and provider.^{3,4} MI strives to help patients move toward behavior change by assisting them in the process of identifying, articulating, and strengthening personally relevant reasons for change and addressing ambivalence about the change. The counseling strategy was initially implemented in the context of problem drinking and has since been successfully adapted to a wide range of challenging behavior problems including weight loss.^{5–8} This approach seeks to promote behavior change using an empathic, interactive style that supports self-determination, enhances self-efficacy, and underscores individual control for behavior change. MI differs from a traditional patient education–based approach, which tends to provide advice and information, often in a didactic or prescriptive manner.

A defining characteristic of the MI counseling approach is the collaborative style of the health promotion encounter in which the provider elicits from the patient

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autonomous, personally relevant reasons for behavior change and builds the health promotion message around these goals and concerns. The collaborative relationship between patient and provider does not place the provider in the role of “expert” whose job it is to “fix” the patient by disseminating information on what the patient “should do” or dispensing unsolicited advice. Rather, the provider views the patient as an individual with expertise in his or her own behavior that is critical to the success of the behavior change effort. Consistent with this approach, the provider actively seeks the patient’s input and direction throughout the encounter.

Another hallmark of the MI approach is the elicitation and reinforcement of change talk, or statements made by the patient suggesting personal investment in changing current behavior. Emerging research suggests that change talk predicts actual behavior change.⁹ Therefore, significant emphasis is placed on the exploration, enhancement, and elaboration of change talk using techniques such as open-ended questioning, reflective listening, and offering periodic strategic summaries using terms and phrases that patients themselves have generated. A key MI strategy for generating change talk involves framing the targeted lifestyle behavior changes into the context of broader life goals and personal values that the patient holds.

In contrast to some other counseling styles, MI explicitly takes a nonconfrontational approach to the resistance to behavior change that sometimes arises. Within MI, resistance is conceptualized as a function of the patient-provider relationship rather than as a characteristic of an uncooperative or difficult patient who “just does not want to change.” More important, MI views resistance as a sign that a provider has been pushing for behavior change rather than allowing the impetus for change to come from the patient, and this impasse should serve as a signal to the provider to change his or her behavior. MI recommends that providers alter their behavior to sidestep resistance by engaging in reflective listening that mirrors both sides of the ambivalence about change and then refocusing on the elicitation of change talk. This technique is referred to as “rolling with resistance” and is another hallmark feature of MI. Arguing or persuading a patient into behavior change is not consistent with MI (and likely not effective).

WHAT IS THE EVIDENCE SUPPORTING MOTIVATIONAL INTERVIEWING FOR WEIGHT LOSS?

Well-designed research evaluating the efficacy of MI in the context of behavioral weight control tests whether MI, as a distinct intervention offered as an adjunct to a behavioral weight loss intervention, confers any advantages to weight loss outcomes over and above the behavioral intervention alone. Perhaps of particular interest is a small but growing body of research on the efficacy of MI delivered by health care providers to promote weight loss. There are also studies of multicomponent weight management programs that include MI or MI-based strategies as part of an integrated weight loss program. For example, both the Look AHEAD Lifestyle intervention and the Diabetes Prevention Program Lifestyle Balance program demonstrated impressive weight losses, averaging 8% and 7%, respectively.^{10,11} Although weight loss outcomes and associated health benefits documented in these studies are compelling, the isolated contributions from MI cannot be disentangled from the other components in the overall treatment package.

UNIQUE CONTRIBUTIONS OF MI TO WEIGHT LOSS OUTCOMES

Studies that provide insight into the unique weight loss enhancements that may be achieved with the addition of MI to behavioral obesity treatment methods have used a randomized controlled study design to directly compare behavioral approaches

augmented by MI to the same behavioral approach without MI. There are a limited number of such studies, but they tend to provide support for the efficacy of MI in enhancing weight loss outcomes. For example, West and colleagues⁵ investigated the impact of adding a series of individually delivered MI sessions to a group behavioral weight loss intervention for overweight and obese women with type 2 diabetes. All women were offered a group-based multidisciplinary behavioral weight loss intervention, and study participants were randomized to receive either an additional 5 individual MI counseling sessions or to receive 5 health education sessions (attention placebo control). Results indicated that women who received the MI sessions lost significantly more weight than those in the control condition at the 6-month assessment, and this superior weight loss was maintained through follow-up at both 12 and 18 months. The weight loss advantage was modest (approximately 2 kg of additional weight loss than was achieved with the behavioral program alone), but this advantage was present after only 2 MI sessions. Furthermore, the enhanced weight loss among those receiving MI was mediated by enhanced adherence to specific behavioral recommendations, such as greater self-monitoring and better group attendance.

Carels and colleagues¹² demonstrated a similar benefit of adding MI to a behavioral weight loss program using a stepped care model that provided the MI to individuals who encountered a weight loss plateau. Participants were randomized to receive a comprehensive group-based behavioral weight loss program or to receive the group-based program augmented with MI sessions if they began to struggle with achieving the targeted weight losses. Among participants who struggled and hit a weight loss plateau during the 20-session program, those who were offered MI ultimately lost significantly more weight than their counterparts who hit a plateau but did not receive MI. The authors suggest that this stepped care approach to MI may be particularly well-suited to those individuals who are struggling in a more traditional behavioral weight loss program.

Another small study investigated the utility of adding an MI component to a guided self-help weight loss program.¹³ All participants received a total of 8 sessions, 6 of which were self-help materials adapted from the LEARN behavioral weight loss program.¹⁴ Participants were randomized to receive either 2 additional sessions that explored motivational issues using MI techniques or 2 additional sessions that featured a more traditional persuasive approach that emphasized the benefits of weight loss. MI counseling was delivered by clinical psychology graduate students. Although the high overall attrition rates, small sample size, and very limited follow-up period preclude definitive conclusions, the addition of MI to the guided self-help seemed to confer some weight loss advantages in this study. Attrition trended ($P = .059$) toward being lower in the condition that received the MI in addition to the guided self-help compared with those who were offered the more traditional approach to motivation. Further, effect size calculations indicated a small to medium advantage in terms of body mass index reduction for the MI condition. An effect of this magnitude is consistent with other published reports of MI in weight loss.²

Not all studies investigating the addition of MI to a behavioral weight loss program have shown clear benefit. With a design similar to that of West and colleagues,⁵ Befort and colleagues¹⁵ examined the efficacy of augmenting a culturally targeted group behavioral weight loss program for African American women with MI in comparison with the group program plus a health education attention control. The authors found no MI-related advantage in terms of either program adherence or weight loss. Women in the MI group, however, did report higher satisfaction with individual sessions than participants in the health education group.

The impact of varying levels of MI exposure on weight loss outcomes was explored in a randomized trial that compared a minimal versus enhanced MI-based intervention for weight loss delivered primarily online.¹⁶ All participants in this study were provided an initial face-to-face meeting that incorporated MI strategies and then were offered a self-directed, 16-week behavioral weight loss program featuring content adapted for online use from the intervention implemented in the Diabetes Prevention Project.¹⁷ Half the participants were randomized to attend a weekly MI-based leader-facilitated online chat group (enhanced MI) while the other half of the sample did not have the option to participate in these additional chats. Both groups lost significant weight from baseline; the minimal intervention group lost 5.2 ± 4.7 kg and the enhanced group lost 3.7 ± 4.5 kg. These intervention-related weight losses were not statistically different between the groups. Use of the additional chats by the enhanced group was lower than anticipated, averaging 8 of the 16 available groups. The failure to make full use of available MI-inspired chats may have decreased the potential utility of the intervention. The MI components were delivered by a graduate student with 3 days of training in MI, which raises questions about the skill level of the treatment delivery. This issue of what constitutes adequate training to provide highest quality MI intervention is of strong interest, and definitive standards or guidance are not available at this time.¹⁸ However, the findings that both groups did equally well and that intervention engagement (as evidenced by behaviors such as completion of online self-monitoring logs, posting on message boards, and Web site visits) was related to weight loss in both conditions suggests that delivery of MI from professionals with modest training presents no harm, even if it may not offer specific additive benefit. This conclusion should be reassuring to those implementing MI in applied settings.

Inconclusive outcomes in some studies raise concerns that greater attention to the training and supervision of MI counselors is warranted. Sufficient expertise in MI methods and appropriate ongoing supervision of MI applications are likely necessary for MI to produce the maximum impact on weight loss and treatment engagement outcomes. The studies that do provide evidence for a positive effect of MI on weight loss seem to be ones in which MI was delivered by individuals with greater counseling experience and more MI training.^{5,12}

On balance, evidence to date suggests that MI is a promising, well-received intervention that may enhance weight loss among certain populations. A recent metaanalysis of the extant literature in this area reaches a similar conclusion.² Given the limited number of weight loss studies that have evaluated MI as an isolated adjunct to standard intervention as well as the lack of uniform results, more research is indicated in order to fully explore how MI may be most effective in boosting weight loss, particularly among men who are often underrepresented in the existing weight management research.

MOTIVATIONAL INTERVIEWING FOR WEIGHT MAINTENANCE

The challenges associated with weight maintenance have prompted researchers to examine MI-based strategies integrated into behavioral programs specifically targeted at weight loss maintenance. For example, the PRIDE trial randomized a cohort of overweight women with urinary incontinence who had completed a 6-month group behavioral weight loss intervention to two different group-based weight maintenance approaches as part of a larger trial.¹⁹ One group of participants was provided a 12-month comprehensive skills-focused maintenance program that is typical of the standard behavioral weight management approach; the other group was randomized to receive a novel 12-month motivation-focused intervention that offered a variety of

strategies for enhancing and maintaining motivation for sustaining behaviors associated with weight loss (eg, physical activity, self-monitoring). The motivation-focused group maintained as much weight loss over a period of 1 year as the traditional skills-focused group. These results suggest that the motivational intervention could serve as a feasible weight maintenance approach to complement the traditional skills refinement programs that are also effective. However, the motivational intervention implemented in this study does not allow the isolation of the unique and specific effects of MI per se, and the results do not indicate that the motivational approach is superior to the traditional approach.

MI may help individuals maintain weight losses achieved after gastric bypass. Stewart and colleagues²⁰ examined the efficacy of an intervention that combined MI and cognitive behavioral strategies to promote sustained weight loss in a group of patients who had undergone bariatric surgery at least 18 months prior to study enrollment and who were struggling with postsurgical weight gain. Although weight loss outcomes were not formally assessed as part of this pilot study, qualitative feedback suggested that participants learned new maintenance skills and experienced both enhanced motivation and weight loss as a result of the intervention. Future studies focusing on MI for weight maintenance in postsurgical populations would benefit from the addition of objective outcomes such as clinic-assessed weight and measures of adherence.

MI DELIVERED IN HEALTH CARE SETTINGS

One appealing aspect of MI is the potential for the intervention to be delivered by a range of health care providers in clinical settings to target weight loss among their patients. For example, in one study based in a primary care setting, the delivery of MI-based dietary counseling (in person and over the phone) was more effective for promoting weight loss among those at high risk for type 2 diabetes than was the distribution of written materials conveying comparable dietary information.²¹ After the intervention, participants in the MI-based counseling group weighed significantly less (mean difference of 1.3 kg) than those in the control group. Further, a significantly greater proportion of those participants who received MI counseling (23.6%) reached the predefined goal of 5% weight loss than did those provided with written materials (7.2%). Similarly, another study demonstrated that overweight and obese individuals who received weight loss counseling from a physician who used MI-consistent techniques were more likely to return to clinic having lost weight than those who received advice to lose weight from a primary care physician who used more MI-inconsistent behaviors.²²

In a family medicine clinic, McDoniel and colleagues²³ investigated the effects of a technology-delivered weight loss intervention provided to obese patients. In this study, all patients received 2 MI sessions delivered by exercise physiologists plus a series of automated e-mailed newsletters designed to promote weight loss. Additionally, patients were randomized to one of two groups. One group received a standard written nutrition plan and self-monitoring journal. The other group was provided with a smart phone that allowed detailed self-monitoring and provided personalized feedback with a nutrition program tailored to the patient's resting metabolic rate and individual energy expenditure. Both groups lost 3 kg or more over the 12-week intervention, but there were no significant differences between groups. The authors concluded that an MI-based intervention in and of itself is effective in inducing weight loss and that additional technology may not add benefit. However, given that all participants received both MI sessions and nutritional information, it is not possible to disentangle potential independent effects of MI in this study. Further, there was no

control group to offer more definitive evidence of a significant effect of the MI intervention alone.

Brief MI strategies also have been implemented as part of a worksite intervention. Groenveld and colleagues²⁴ used MI in an attempt to help lower the cardiovascular risk of male workers in the construction industry. Participants were randomized to either a usual care condition, which consisted of brief communication from a physician about their individual risk for cardiovascular disease, or an MI condition, in which participants were offered 7 MI contacts from a nurse or physician over 6 months. As part of the MI intervention, participants could elect to focus on smoking cessation or weight loss–enhancing behaviors (diet and physical activity). Participants who elected to focus on diet and physical activity lost weight (relative to baseline) at both 6 and 12 months, but the loss was not significantly greater than that of patients in other groups. Process evaluations indicated that although the interventionists used many MI-consistent strategies, they did not reach a level of skill that would be considered MI-proficient by standard MI quality control measures. This lesser proficiency may account for the lack of superior efficacy and points to the importance of skilled MI delivery when considering the potential magnitude of additive benefit achieved with MI.

ISSUES RELATED TO TRAINING

The amount of training necessary to ensure adequate MI skill development among practitioners seeking to promote weight loss is not clear at this time. Standard recommendations are to obtain formal MI training and receive performance feedback to cultivate adequate MI skills. Providers may find that obtaining MI training enhances their interactions with patients beyond the scope of weight loss per se, given the range of behavior change targets that seem to benefit from an MI approach. Evidence of benefits for using MI to address such common issues as smoking cessation,²⁵ medication adherence,^{26,27} and preventive screening behaviors^{28,29} argues for acquiring MI proficiency to promote adherence with a broad range of treatment recommendations.

Practitioners interested in developing proficiency in MI skills should begin by becoming familiar with MI's basic principles through participation in a workshop led by a certified trainer. Although this initial training is key for understanding the fundamentals of MI,³⁰ additional practice and supervision that includes regular feedback is critical to the development of proficiency in the delivery of MI-based interventions.³¹ This approach to training can facilitate the development and refinement of MI skills and provides the practitioner personalized feedback about strengths and areas for improvement. Although it may be impractical for practitioners to obtain this level of MI training, a more limited exposure to an MI approach can foster the collaborative, patient-centered spirit of MI and improve counseling interactions.

COST-EFFECTIVENESS

One question that remains to be thoroughly explored is whether MI strategies for the promotion of weight loss are cost-effective. Although MI has been shown to be cost-effective for addressing some other health-related behaviors such as relapse prevention for smoking among low-income pregnant women³² and alcohol-related risk behavior among adolescents,³³ no studies to date have addressed the cost-effectiveness of an isolated intervention for MI in the context of behavioral weight control. That being said, treatment packages for weight loss that incorporate MI strategies more diffusely such as the Diabetes Prevention Project have been shown

to be cost-effective because of the pronounced impact that successful weight loss has on a variety of health-related outcomes.³⁴ These encouraging findings underscore the need for well-designed research that investigates the cost-effectiveness of MI as an isolated component of behavioral weight control strategies.

TRANSLATIONAL RESEARCH

Finally, there is continued need for additional high-quality translational research to explore more fully the parameters of applied contexts in which MI is efficacious and with which populations MI may be most helpful for the long-term management of weight. Many of the relevant studies to date were designed as highly controlled efficacy trials targeting specific populations with MI delivered by highly trained individuals. As a result, additional studies focused on the feasibility and utility of MI for weight loss in more real-world settings with more representative patient populations are warranted.

SUMMARY

MI is a patient-centered directive counseling style that aims to facilitate patients' likelihood of making behavior change through the exploration and strengthening of personal motivations. Hallmarks of MI include a collaborative relationship between patient and practitioner, a focus on the elicitation and enhancement of change talk, a nonconfrontational style, and a concerted effort to minimize resistance. MI has been applied to a variety of health-related behaviors, and a growing body of research suggests that this approach may be useful in the context of behavioral weight management.

Although results are not uniform, the majority of research suggests that MI delivered as an independent component in addition to a behavioral weight loss program can augment weight loss and likely exerts its beneficial effects through enhancement of treatment engagement and adherence to behavioral recommendations. Furthermore, preliminary research suggests that MI may be helpful in promoting weight maintenance after an initial loss has been achieved.

Given that behavioral weight management is a relatively new application of MI, a variety of issues merit further investigation. Of particular interest are issues related to the type and extent of provider training necessary to ensure adequate skill development, cost-effectiveness of MI, and translational research to determine the feasibility and effectiveness of incorporating MI strategies into real-world weight loss settings.

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Review



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Meets Learning Need Codes 5370, 6000, 6010, and 6030

Behavior Therapy and Cognitive-Behavioral Therapy of Obesity: Is There a Difference?

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ABSTRACT

Current practice guidelines for management of overweight and obesity recommend a program of diet, exercise, and behavior therapy for all persons with a body mass index (calculated as kg/m^2) of at least 30 (and those with body mass index ≥ 25 plus two weight-related comorbidities). In this tripartite treatment—often referred to as lifestyle modification—behavior therapy provides a structure that facilitates meeting goals for energy intake and expenditure. Although standard behavior therapy reliably induces mean weight losses of approximately 10% of initial weight, these reductions are difficult to maintain. Some authors argue that a shift in focus from behavior change to cognitive change will improve long-term results of lifestyle modification programs. This review describes, in detail, the standard behavioral treatment of obesity and compares it with an alternative treatment model that is based in a cognitive conceptualization of weight control. A review of the literature suggests that the differences between standard behavior therapy and cognitive-behavioral therapy of obesity lie more in their underlying theories than in their implementation. Empirical comparisons of the long-term effects of these approaches are needed.

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Obesity, which is defined as a body mass index (BMI; calculated as kg/m^2) ≥ 30 , has doubled in prevalence over the past 20 to 25 years (1,2) and is associated with a multitude of adverse health conditions. As excess weight increases, so do risks of developing heart disease, type 2 diabetes, sleep apnea, osteoarthritis, and several types of cancer, among other conditions (3,4). Although available weight-loss treatments are unlikely to stem the growth of the obesity epidemic at the societal level, they can play a role in reducing weight-related morbidity and mortality at the individual level.

The recommended starting point of treatment is a structured program of diet, exercise, and behavior therapy that is often referred to as lifestyle modification. Practice guidelines issued by the National Heart, Lung, and Blood Institute and the North American Association for the Study of Obesity indicate that this intervention is appropriate for all obese persons, as well as for those who are overweight (ie, BMI of 25 to 29.9) and have two or more weight-related comorbidities (see Table) (5). Lifestyle modification can be delivered in a variety of settings, including primary care (6), clinical research (7), commercial (8,9), and private dietetics practice (10). Typically, these programs induce modest weight reductions that are associated with statistically and clinically substantial improvements in weight-related health conditions (eg, sleep apnea, diabetes, hypertension, hyperlipidemia) and psychosocial outcomes (eg, mood, quality of life, body image) (3,11-13).

The Diabetes Prevention Program (DPP) provided an excellent example of the implementation and effects of lifestyle modification. The DPP was a large, multicenter, randomized controlled trial in which 3,234 overweight and obese (mean BMI \pm standard deviation of 34.0 ± 6.7) adults with impaired fasting glucose (ie, ≥ 110 mg/dL [6.1 mmol/L]) were assigned to receive placebo, metformin (850 mg, twice daily), or lifestyle modification (14). The lifestyle intervention was delivered primarily by registered dietitians and consisted of 16 individual sessions over the first 24 weeks. Sessions were then held at least once every 2 months for the remainder of the study. The lifestyle modification program induced a weight loss of 6.7 kg during the first year of treatment, compared with losses of 2.7 kg and 0.4 kg in the metformin and placebo groups, respectively. At 4 years, lifestyle, metformin, and

Table. The NHLBI^a/NAASO^b guidelines for selecting clinical weight-loss interventions for overweight and obese adults^c

Treatment	Body Mass Index Category ^{de}				
	25-26.9	27-29.9	30-34.9	35-39.9	≥40
Diet, physical activity, and behavior therapy	With comorbidities	With comorbidities	+	+	+
Pharmacotherapy		With comorbidities	+	+	+
Surgery				With comorbidities	+

^aNHLBI=National Heart, Lung, and Blood Institute.
^bNAASO=North American Association for the Study of Obesity.
^cAdapted from National Heart, Lung, and Blood Institute, North American Association for the Study of Obesity. *The Practical Guide: Identification, Evaluation, and Treatment of Overweight and Obesity in Adults*. Bethesda, MD: National Institutes of Health; 2000.
^dCalculated as kg/m².
^eThe + represents use of indicated treatment regardless of comorbidities.

placebo groups maintained losses of 3.5, 1.3, and 0.2 kg, respectively. The primary outcome of the study, however, was not weight loss, but the cumulative incidence of type 2 diabetes over 4 years. The risk of developing diabetes among those who had received lifestyle modification was 58% lower than those who had received placebo and 31% lower than participants who had received metformin. A follow-up to the DPP, called Look AHEAD (Action for Health in Diabetes), is currently being conducted to determine whether a program of diet, exercise, and behavior therapy can reduce fatal and nonfatal cardiovascular and cerebrovascular events in obese adults with type 2 diabetes (15).

This review describes the principal components of lifestyle modification for obesity. Like behavioral treatments for psychological disorders, standard behavior therapy of obesity is based primarily in learning theory (ie, behaviorism), applying the principles of classical and operant conditioning. When applied to weight control, however, standard behavioral programs also frequently include cognitive strategies to induce behavior change. Thus, some authors consider typical lifestyle modification programs to be cognitive-behavioral in nature (16). Others assert that the term *cognitive-behavioral* should be reserved for those treatments whose primary objective is cognitive change. According to Cooper and Fairburn, for example, cognitive-behavioral therapy for obesity seeks not to change eating and exercise behaviors, per se, but the cognitive processes that maintain those behaviors (17,18).

The following section describes the diet and exercise recommendations typically made in lifestyle modification programs and the behavioral and cognitive elements that comprise standard behavior therapy of obesity. The subsequent sections compare and contrast this intervention—the goal of which is behavior change—with an explicitly cognitive-behavioral therapy—the goal of which is cognitive change.

STANDARD BEHAVIOR THERAPY OF OBESITY

Historically, behavioral weight-loss programs included weekly sessions of 60 to 90 minutes each, for approximately 6 months, and induced mean weight losses of approximately 10% of initial weight (19). Without continued treatment, however, participants usually regained approximately one third of their lost weight within the

first 6 months after treatment ended and returned to their baseline weights within 5 years (20). Perri and colleagues found that weight regain could be minimized by offering “maintenance” sessions every other week for an additional 12 months (21). Although extended treatment has become the norm since publication of Perri and colleagues’ study, longer-term studies that included no-treatment follow-up periods have revealed that extended treatment is effective for delaying—not preventing—regain (22).

The behavior therapy component of lifestyle modification can be delivered in individual sessions (as in the DPP) or in groups of approximately 10 participants (as in Look AHEAD) (7,15). While both treatment modalities are efficacious, Renjilian and colleagues found that participants who were randomized to receive group-based therapy lost considerably more weight (11.0 ± 4.8 kg) after 26 weekly sessions than did those who were treated individually (9.1 ± 3.7 kg) (23).

Dietary Guidelines

The National Heart, Lung, and Blood Institute and North American Association for the Study of Obesity’s *Practical Guide: Identification, Evaluation, and Treatment of Overweight and Obesity in Adults* (hereafter referred to as *Practical Guide*) recommends a low-calorie diet of 1,000 to 1,200 kcal/day for overweight women and 1,200 to 1,600 kcal/day for overweight men and heavier (ie, >165 lb) or more active women (5). These intake goals are intended to induce a caloric deficit of 500 to 1,000 kcal/day and, thus, a weight loss of 0.5 to 1.0 kg/week. Very-low-calorie diets, of ≤ 800 kcal/day, are no longer recommended. Despite producing greater initial weight losses than more moderately restrictive diets, very-low-calorie diets require medical monitoring and nutritional supplementation. In addition, very-low-calorie diets have been shown to have no benefits over low-calorie diets for long-term weight control (24).

The *Practical Guide* recommends a low-calorie diet that provides $\geq 55\%$ of kilocalories from carbohydrate, $\leq 30\%$ from fat (8% to 10% from saturated fatty acids), and approximately 15% from protein (5). The optimal macronutrient composition for reducing diets, however, is the subject of some debate. Several randomized controlled trials found that low-carbohydrate (ie, ≤ 30 g/day)

diets produced greater initial weight reductions than the more traditional low-calorie diets described above, but that weight losses with the two diets were not significantly different 12 months after starting the diets (25-28). A recent randomized trial of popular reducing diets suggested that the macronutrient composition of the diet was not an independent predictor of weight loss (29). Modest weight losses were achieved with each diet (ie, Weight Watchers, the Zone, Atkins, and Ornish), with no significant differences between groups at 2, 6, or 12 months. The authors found that dietary adherence—regardless of group assignment—accounted for 36% of the variance in weight loss. This finding suggests that the optimal low-calorie diet for long-term weight control is the one that is most easily followed.

Increasing Dietary Adherence

Adherence to a low-calorie diet can be enhanced by increasing structure. Additional structure limits food choices, thereby reducing temptation and the potential for miscalculating energy intake. One means of increasing the structure of a low-calorie diet is by providing meal plans (ie, grocery lists, menus, and recipes). Evidence of this concept comes from Wing, Jeffrey, and colleagues, who found that providing both low-calorie food (free of charge or subsidized) and structured meal plans resulted in substantially greater weight losses than standard behavior therapy with no additional structure (30). Furthermore, there were no differences between the group that received meal plans and those that received food. The clinical implications of these findings are clear: providing patients with low-calorie meal plans is a practical means of increasing the structure of a low-calorie diet, thereby improving adherence and optimizing weight loss.

Exercise Guidelines

The amount and type of physical activity recommended in lifestyle modification varies across programs. The *Practical Guide* states that “all adults should set a long-term goal to accumulate at least 30 minutes or more of moderate-intensity physical activity on most, and preferably all, days of the week” (5). Moderate-intensity exercise is defined as that which expends 4 to 5 kcal/minute and an example is walking for 30 minutes at 4 mph. The *Practical Guide*, as well as the DPP and Look AHEAD lifestyle modification programs, recommends that the exercise regimen be implemented slowly, beginning at 10 minutes per day to avoid fatigue, muscle soreness, strains, or more serious medical consequences (5,7,15).

The *Dietary Guidelines for Americans 2005* suggests different levels of physical activity based on weight- and health-related goals (31). According to this report, all adults should accumulate at least 30 minutes of moderate-intensity activity on most days to reduce the risk of chronic disease. Adults seeking to manage weight or prevent unhealthy weight gain should get at least 60 minutes of moderately to vigorously intense exercise on most days. Those who are seeking to maintain a weight loss should engage in 60 to 90 minutes of moderate physical activity on most days.

Increasing Adherence to Activity Recommendations

Contrary to findings regarding dietary adherence, exercise adherence seems to increase with less structure. Evidence from randomized trials suggests that persons in standard behavior therapy engage in more physical activity if they are instructed to do so at home (ie, on their own) than if they attend on-site, supervised, group-based exercise sessions (32). Participants also accumulate more minutes of activity if they are encouraged to do so in multiple short sessions (of 10 minutes each), rather than in one long session (33). Other findings suggest that increasing lifestyle activity (ie, energy expended in daily tasks) produces equivalent weight loss, and can be more effective for maintaining a reduction, as compared with programmed activity (ie, a “workout”) (34). Decreasing the structure of physical activity apparently reduces barriers that inhibit exercise (eg, lack of time or financial resources).

Behavioral Skills

Behavior therapy provides patients with a set of principles and techniques with which to modify eating and activity habits. This treatment is distinct from traditional psychotherapy. The purpose is not to treat or eliminate a psychiatric disorder, but to change eating and exercise behaviors. In addition, this intervention seeks not to provide insight into the origins of the problem behaviors, but to teach skills for changing them.

Self-Monitoring. Self-monitoring of food and energy intake is perhaps the most important skill taught in standard behavior therapy, and can also be the most difficult to implement correctly. Persons in the general population have been found to underestimate their calorie intake by 8% to 34% (35,36). For persons seeking weight loss—especially those who report an inability to lose weight—the error in estimation can approach 50% (37). Thus, care must be taken to educate patients on the use of measurement tools (eg, cups, spoons, scales), Nutrition Facts labels, and calorie-counting guides. In-session modeling and practice are useful for this purpose. Participants in lifestyle modification are instructed to record the time, amount, preparation, and calorie content of all foods and beverages consumed, as well as a description of the item itself. By recording additional contextual information (eg, hunger ratings, emotions, and activities at the time of eating), eating-related contingencies can be identified and targeted for change.

The importance of self-monitoring was demonstrated by Baker and Kirschenbaum, who rated the self-monitoring records of participants in an 18-week standard behavior therapy program and separated participants into quartiles of monitoring consistency (38). They found that the most consistent monitors achieved a mean weight loss of approximately 15 kg, whereas those who did not keep food records gained an average of approximately 4 kg.

Energy intake is not the sole focus of self-monitoring. Physical activity is also monitored and recorded in behavior therapy. At a minimum, participants record the type and amount (in minutes) of programmed activity. They also can monitor their lifestyle activity with a pedometer. Adults in the general population take approximately 6,000 to 7,000 steps per day, with obese persons walking

nearly 2,000 fewer steps each day than persons of average weight (39,40). Using the clear and immediate feedback provided by a pedometer, participants in lifestyle modification are encouraged to increase their energy expenditure by making small increases in the number of steps they take each day. Several authors currently recommend accumulating at least 10,000 steps per day (41,42).

Goal-Setting. Participants in standard behavior therapy are instructed to set specific (ie, quantifiable) behavioral goals. Rather than setting a goal of “I’ll try harder,” for instance, participants are encouraged to describe observable behaviors that they will implement, such as, “I will prepare my dinners for the week on Sunday afternoon so that I can avoid eating out this week.” Goals also should be time-limited. Typically, the time frame is 1 week (as in the previous example) because sessions are held weekly. Finally, behavioral goals should be realistic, yet moderately challenging. Those characteristics increase the likelihood of success and engender a sense of accomplishment, which can be reinforcing. (The extent to which weight loss goals should be realistic is discussed later.)

Stimulus Control. According to the principles of operant conditioning, reinforcing stimuli are those that increase the probability that a given behavior will be repeated. Examples of stimuli that reinforce healthful eating and exercise behaviors include the weight loss itself and the resulting improvements in quality of life, body image, and health. Although those stimuli are not under the control of the behavior therapist, the therapist can assist lifestyle modification participants in establishing schedules and criteria for rewarding themselves for desirable behavior. It is essential that receipt of the reinforcer be made contingent upon the implementation of the target behavior. The promise of a pedicure for meeting all exercise goals for the month, for example, will not be motivating if the participant proceeds with the pedicure regardless of behavior.

Principles of classical conditioning also are relevant to behavioral weight control and are applied to break the associations of nonfood cues with eating. If a person habitually eats breakfast in her car during her morning commute, for instance, several nonfood cues (eg, sitting in the car, familiar sights along the drive to work) will stimulate her desire to eat. Similarly, if a person repeatedly snacks on his couch after dinner, the act of sitting on the couch (at any time), watching television (if that is a typical activity during evening snacking), or even feelings of fullness from dinner, will become cues to eat snack food in the future. Thus, participants in standard behavior therapy are taught to restrict their eating to the kitchen or dining room table, so as to reduce the number of cues that become associated with eating.

A simpler method of stimulus control involves reducing the availability of cues for undesirable behavior (eg, overeating, inactivity) and increasing cues for desirable behavior. For example, participants in lifestyle modification may be encouraged to keep tempting foods out of sight or, if possible, to purge their homes of those foods altogether. Food records should be kept in the eating area so that participants are cued to record their intake immediately after eating.

Behavioral Substitution. Carefully managing the external environment does not ensure that all cues for undesirable behavior will be eliminated. Many persons, for instance, eat in response to emotional stimuli. Through self-monitoring, participants in standard behavior therapy might learn to identify nonhunger cues to eat and substitute alternative behaviors for eating. If a person learned, for instance, that he tends to eat when anxious, he would be taught relaxation techniques and instructed to practice them (instead of eating) in response to future anxieties. It is helpful if the substitute behavior is incompatible with eating. Listening to music, for example, might not be an appropriate alternative, as persons can easily eat and listen to music simultaneously. Better options include writing, knitting, housekeeping, and exercising, because these activities inhibit eating.

Cognitive Skills

Cognitive approaches to behavior change also are used in the standard behavioral treatment of obesity. Two skills that are commonly taught are problem-solving and cognitive restructuring.

Problem-Solving. As taught in standard behavior therapy programs, problem-solving is a multistep iterative process that is based on the work of D’Zurilla and colleagues (43,44). The first step is to identify the problem in detail. It also is useful to identify the chain of events (ie, situations, behaviors) that preceded the problem behavior. One or more “links” in the chain are targeted and, in the second step, potential solutions are generated. Participants are advised to look beyond the most obvious solution to “brainstorm” a number of potential options. The third step entails listing pros and cons, then conducting a cost-benefit analysis, for each possible solution. The fourth step is to choose the most feasible solution and implement it for a given period of time. When that period elapses, the fifth step, evaluation, is undertaken. Successful solutions are continued. If the attempted solution fails, the process begins again.

Cognitive Restructuring. Negative thoughts can be obstacles to desired behavior change. Thus, patients in standard behavior therapy are taught to monitor the thoughts that interfere with their ability to meet behavioral goals, identify distortions in those thoughts, and replace the dysfunctional thoughts with more rational ones. All-or-nothing thinking—particularly with regard to success or failure—is a common cognitive distortion seen in weight-loss therapy. The example below illustrates how cognitive restructuring can be undertaken to correct this distortion within a lifestyle modification program.

A patient lost approximately 7% of her body weight in the first 20 weeks of treatment. The size of her weight losses began to decline at week 16. At her week 21 visit, she lost no weight and, at week 22, she regained a small amount of weight. The following hypothetical exchange took place during the week 22 session:

Interventionist (I): You’ve been putting forth a great deal of effort over the past 5 months and it has really been showing in your weight loss. Last week, though, the scale didn’t move for you and, this week, you had a small weight gain.

Patient (P): I was really discouraged after weighing in last week. I thought, “If I’m not going to lose weight, why am I working so hard? What am I getting out of it?” So I wasn’t as consistent as usual with my record keeping and I took a vacation from exercise. I guess that’s why I gained weight this week.

I: OK. After a week of staying weight-stable, you basically told yourself that self-monitoring and walking were wastes of your time.

P: Right.

In this exchange, the patient and interventionist identified an “ABC” sequence of activating event (ie, the lack of weight loss), belief about the event (ie, efforts are going unrewarded), and consequence (ie, a reduction in self-monitoring and physical activity). Following this ABC model, pioneered by Ellis, the interventionist examined whether the belief is based on reality or cognitive error (45).

I: I’d probably have given up, too, if I were in your situation and had the same thoughts. Let’s now examine those thoughts and see if they’re accurate. Maybe there’s another way of thinking about your weight over the past 2 weeks. Why did you start coming to these sessions in the first place?

P: I wanted to lose weight and be healthier. I had high blood pressure and my doctor told me I was prediabetic.

I: Had high blood pressure?

P: Yes. It’s under much better control now that I’ve lost some weight and started exercising. My blood sugar looks normal, too. I didn’t want to go on medications and so far I’ve been able to avoid them.

I: Those sound like benefits to me. What else has changed?

P: I find it a lot easier now to chase my 3-year-old son around the house. My knees don’t hurt as much as they used to and I’m not as exhausted as I was before. I enjoy playing with him a lot more now than I did when I was heavier.

I: Great. You’ve given me several examples of ways in which your efforts have paid off: you’ve lowered your blood pressure, avoided having to take medication, reduced your pain and fatigue, and you’re getting greater enjoyment from your time with your son. Is it fair to say that the original thought, that you were getting nothing in return for your efforts, was inaccurate?

P: Yes, that’s fair.

Once the errors in the belief are identified, the interventionist works with the patient to substitute more functional, reality-based interpretations of the activating event.

I: Now let’s imagine that you could go back to last week, when your weight didn’t change, and you could change the way you thought about the situation. Can you give me a more accurate, more productive, set of thoughts?

P: I could’ve thought, “Even though I didn’t lose weight this week, I’ve been losing weight right along. My health has improved and I’m enjoying life a little more since I started counting calories and exercising. So I guess my efforts are paying off.”

I: If those had been your thoughts last week, do you think you would have done anything differently this week?

P: I wouldn’t have been so discouraged, so I probably would have kept up with my exercise routine and my record keeping. That probably would have kept me from gaining weight this week.

Cognitive restructuring assumes that changing beliefs can alter affective and behavioral outcomes. This is one of the assumptions, in fact, that underlie all cognitive-behavioral psychotherapies (46). The nature and history of these therapies are discussed in greater detail below.

Cognitive-Behavioral Approaches to Behavior Change

The term *cognitive-behavioral therapy* (CBT) is often, mistakenly, thought to refer to a singular method of psychotherapy. There are, rather, several therapies to which the label CBT could apply. The first two cognitive-behavioral approaches to psychotherapy were developed nearly simultaneously, and in isolation, by Ellis and Beck (45,47). Both authors were trained in psychoanalysis and noticed characteristic patterns of thinking in their patients that appeared to cause, maintain, or exacerbate psychological distress. They found that psychoanalysis did little to alter dysfunctional thought patterns and, thus, was ineffective for relieving distress. In Ellis’ Rational Emotive Behavior Therapy, as well as in Beck’s Cognitive Therapy, the therapist is more active and directive than in psychoanalysis. To help patients correct their cognitive errors, these therapies include use of logic, Socratic questioning, behavioral experiments, and (in Rational Emotive Behavior Therapy) direct disputation.

All CBTs—beginning with Ellis’ and Beck’s systems and continuing through the many derivative approaches that have been developed over the last 4 decades—share three core assumptions: (a) cognitions affect behavior, (b) cognitions can be changed, and (c) cognitive change can effect behavior change (46). Several CBTs have been dubbed “empirically supported treatments” for various psychological disorders, including major depression, several anxiety disorders, and bulimia nervosa (48). Empirically supported treatments are those that can be delivered in a standardized manner and have been shown by independent investigators to be either superior to alternative or placebo treatments or equivalent to other empirically supported treatments (49).

CBT of Obesity

As shown above, standard behavior therapy of obesity includes cognitive strategies to induce changes to eating and exercise behaviors. Furthermore, standard behavioral weight-loss programs appear to share the assumptions of CBTs described above (46). Cooper, Fairburn, and Hawker, however, advanced three additional criteria for a treatment to be considered cognitive-behavioral: (a) it is based on a cognitive conceptualization of the processes that maintain the problem in question (ie, thoughts and thinking patterns are understood as central to the problem), (b) it is focused on altering the cognitive and behavioral mechanisms that maintain the problem behavior, and (c) it uses both cognitive and behavioral techniques to effect change in maintaining mechanisms (18). Standard behavior therapy of obesity meets the latter two, but not the first, of these criteria. That is, standard behavior therapy aims to change both the cog-

Differences

- Cognitive change is the primary aim of CBT, whereas behavioral change is the primary aim of standard behavior therapy.*
- CBT is delivered only in individual sessions, whereas standard behavior therapy can be delivered to individuals or groups.
- CBT is delivered in flexible modules, whereas standard behavior therapy sessions are typically delivered in a predetermined order.

Similarities

- Treatments are time-limited and problem-oriented.*
- Treatments are present- and future-focused.*
- Patient and therapist collaborate and share responsibility for success.*
- Patient is educated on basic nutrition (calorie sources, calorie-restriction), health effects of modest weight loss and physical activity, and healthful eating patterns.
- Behavioral skills taught include self-monitoring (of weight, intake, and physical activity) and goal-setting.
- Cognitive skills taught include problem-solving and challenging of dysfunctional thoughts.

Figure. Similarities and differences between standard behavior therapy and Cooper and colleagues' cognitive-behavioral therapy (CBT) of obesity (17,18). *As noted in reference 18.

nitive and behavioral foundations for eating and physical activity habits, and uses both cognitive and behavioral strategies to achieve those aims. However, standard behavior therapy understands the problem of obesity as primarily behavioral in nature, rather than as the product of erroneous beliefs and dysfunctional thoughts.

According to Cooper and colleagues, standard behavioral weight-loss programs have met with limited long-term success because they neglect the contribution of cognitive factors to weight regain following an initial reduction (17,18). They developed an alternative treatment of obesity, which explicitly distinguishes weight loss from weight maintenance and attempts to address what they see as a key cognitive obstacle to long-term weight control: unrealistic weight goals. Cooper and colleagues (18) stated that having unrealistic weight-loss goals “undermines the patient’s ability to acquire and use effective weight maintenance behavior.” That is, when patients discover that they are unable to meet their unrealistic weight-loss goals, they might conclude that continuing their efforts is futile. In so doing, they might ignore non-weight-related benefits that they may have achieved (eg, increased self-confidence). Patients then return to previous eating and activity habits, which creates a state of positive energy balance and causes them to regain their lost weight (18).

The principal difference between standard behavior therapy and Cooper and colleagues' CBT of obesity lies in the primary goal of each treatment—behavior change in the former and cognitive change in the latter. For Cooper and colleagues, changes in eating and exercise behaviors are seen as the consequence of altering the cognitions that underlie those behaviors. Despite this fundamental difference, there are overwhelming similarities between the treatments (see [Figure](#)).

Empirical Support for CBT of Obesity

Cooper and colleagues reported in 2003 that a study of their treatment was nearing completion (18). Results from that study had not yet been published at the time of this writing. Thus, neither the efficacy nor the effectiveness of this treatment can be evaluated.

The extent to which unrealistic weight goals are harmful, however, has been examined empirically. Foster and colleagues found that participants in lifestyle modification hoped to lose approximately one third of their body weight (50). Although a reduction of this size can be realistically expected with bariatric surgery, it is more than three times the mean weight loss achieved with diet, exercise, and behavior therapy (19,51). This finding supports the notion that unrealistic weight-loss goals are common among persons seeking lifestyle modification. In a separate study, Wadden and colleagues found that participants retained their unrealistic expectations after being informed of the average weight losses achieved in standard behavioral programs (52).

Fortunately, having unrealistic weight-loss goals does not appear to be related to negative psychological outcomes and may even be associated with greater long-term weight reductions (53,54). Linde and colleagues, for instance, found that the “dream” BMIs (ie, weight-loss goals) participants set prior to beginning an 8-week lifestyle modification program did not predict weight change at the end of treatment or at 6 months' follow-up. At 18 months' follow-up, however, dream BMI was significantly related to weight change such that those with more unrealistic goals maintained greater weight losses at the end of the study (54). These results are in direct contradiction to Cooper and colleagues' assertion that unrealistic weight-loss goals inhibit long-term weight control and, thus, should be a target of intervention (17,18).

Is There a Difference between Standard Behavior Therapy and CBT of Obesity?

Standard behavior therapy of obesity produces modest weight losses that are associated with improvements in physical and mental health. Unfortunately, however, the weight reductions achieved with this treatment are difficult to maintain. Cognitive factors, as posited by Cooper and Fairburn, likely play some role in the problem of weight regain (17). The mechanisms that account for regain, however, are extremely complex and include not only cognitive factors, but behavioral, genetic, and neuroendocrine factors as well.

The difference between Cooper and colleagues' CBT of obesity and standard behavior therapy lies largely in the theoretical foundations of the treatments. The former asserts that cognitive change is a prerequisite of long-term behavior change. The latter acknowledges that changing thoughts is helpful for altering problem behaviors, but that cognitive change is neither necessary nor sufficient for behavior change. In practice, the two treatments appear to be quite similar. Each includes similar recommendations for decreasing energy intake and increasing energy expenditure. There is also considerable overlap among the specific behavioral and cognitive techniques used in the two treatments.

CONCLUSIONS

The question of whether cognitive change precedes and causes behavior change or vice versa has been the subject of theoretical debate and empirical scrutiny for several decades. Current research methods are unlikely to settle this issue definitively in laboratory settings and much less likely to identify whether cognitive or behavioral change is primary in the successful maintenance of a weight loss achieved in lifestyle modification. Randomized controlled trials of standard and CBT-based lifestyle modification programs, however, are necessary to determine whether explicitly increasing focus on cognitive change enhances long-term outcomes of behavioral weight control therapy. Until CBT is shown to be equivalent or superior to standard behavior therapy of obesity, clinicians who wish to assist their clients with long-term weight control are encouraged to use both cognitive and behavioral strategies within the context of a standard behavioral lifestyle modification program. Nutrition professionals seeking to provide such a program can access the treatment manuals and participant handouts used in the DPP's "Lifestyle Balance" intervention (available online at <http://www.bsc.gwu.edu/dpp/manuals.htmlvdoc>). As demonstrated by the DPP, registered dietitians can efficaciously implement a standard behavioral weight-loss protocol to induce modest weight reductions and yield substantial long-term health benefits (7,14).

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Review



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State of the Evidence Regarding Behavior Change Theories and Strategies in Nutrition Counseling to Facilitate Health and Food Behavior Change

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ABSTRACT

Behavior change theories and models, validated within the field of dietetics, offer systematic explanations for nutrition-related behavior change. They are integral to the nutrition care process, guiding nutrition assessment, intervention, and outcome evaluation. The American Dietetic Association Evidence Analysis Library Nutrition Counseling Workgroup conducted a systematic review of peer-reviewed literature related to behavior change theories and strategies used in nutrition counseling. Two hundred fourteen articles were reviewed between July 2007 and March 2008, and 87 studies met the inclusion criteria. The workgroup systematically evaluated these

articles and formulated conclusion statements and grades based upon the available evidence. Strong evidence exists to support the use of a combination of behavioral theory and cognitive behavioral theory, the foundation for cognitive behavioral therapy (CBT), in facilitating modification of targeted dietary habits, weight, and cardiovascular and diabetes risk factors. Evidence is particularly strong in patients with type 2 diabetes receiving intensive, intermediate-duration (6 to 12 months) CBT, and long-term (>12 months duration) CBT targeting prevention or delay in onset of type 2 diabetes and hypertension. Few studies have assessed the application of the transtheoretical model on nutrition-related behavior change. Little research was available documenting the effectiveness of nutrition counseling utilizing social cognitive theory. Motivational interviewing was shown to be a highly effective counseling strategy, particularly when combined with CBT. Strong evidence substantiates the effectiveness of self-monitoring and meal replacements and/or structured meal plans. Compelling evidence exists to demonstrate that financial reward strategies are not effective. Goal setting, problem solving, and social support are effective strategies, but additional research is needed in more diverse populations. Routine documentation and evaluation of the effectiveness of behavior change theories and models applied to nutrition care interventions are recommended.

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Evidence-based medicine is the dominant trend in health care, and dietitians are on the leading edge, demonstrating how nutrition interventions are measurably effective. Use of theoretical foundations for interventions is key for understanding and measuring effectiveness. Hypotheses and randomized controlled trials (RCTs) can be designed around the theories that drive

Theory or model	Key developers	Underlying philosophy	Nutrition counseling strategies
Cognitive Behavioral Theory ^a	Albert Skinner, Aaron Beck, Albert Ellis	Utilizes a directive, action-oriented approach that teaches a person to explore, identify, and analyze dysfunctional patterns of thinking and acting. How we act (behavior), think (cognition), and how we feel (emotion) all interact. Both cognitive and behavior change strategies are used to effect change (2-5).	<ul style="list-style-type: none"> ● Self-monitoring (eg, thoughts, emotions, food intake, behavior) ● Problem solving ● Goal setting ● Rewards and contingency management ● Cognitive restructuring ● Social support ● Stress management ● Stimulus control ● Relapse prevention
Transtheoretical model	James O. Prochaska	Describes a sequence of cognitive (attitudes and intentions) and behavioral steps people take to change behavior. The model offers specific strategies found effective at various points in the change process and suggests outcome measures including decision balance and self-efficacy (6).	<p>Appropriate application of strategies is dependent upon the client's stage of change</p> <ul style="list-style-type: none"> ● Motivational interviewing ● Skill development training and coaching ● Demonstration and modeling ● Reinforcement ● Self-monitoring ● Goal setting and behavioral contracting ● Social support ● Stimulus control
Social cognitive theory (also called social learning theory)	Albert Bandura (7)	Based on the idea that people learn by observing other's social interactions, experiences, and outside media influences. Provides structure for understanding, predicting, and changing behavior. Changes are based on four conditions: attention, retention, motor reproduction, and motivation (7).	<ul style="list-style-type: none"> ● Demonstration and modeling ● Skill development and coaching ● Social support ● Reinforcement ● Goal setting ● Stimulus control ● Motivational interviewing

Figure 1. Summary of behavior change theories evaluated by the American Dietetic Association Evidence Analysis Library Nutrition Counseling Workgroup and associated nutrition counseling strategies. ^aA combination of behavioral theory and cognitive behavioral theory, which are the foundation for behavioral therapy or cognitive behavioral therapy interventions.

selection of specific counseling methods or strategies based on a client's targeted changes.

Nutrition counseling is a supportive process to set priorities, establish goals, and create individualized action plans that acknowledges and fosters responsibility for self-care (1). Registered dietitians (RDs) and dietetics practitioners frequently conduct nutrition counseling with clients to facilitate behavior change. To be effective, dietetics practitioners must be knowledgeable in nutrition and food science, diverse ethnic and regional culinary cuisines, and have practical experience with theory-based behavior change strategies. Theories and models, validated within the field of dietetics, are frameworks for helping practitioners understand external and internal issues, and the dynamics that lead to behavioral changes. Use of these frameworks provides a rationale for selection of specific counseling strategies to achieve a counseling objective (Figure 1).

Behavioral theory and cognitive behavioral theory are based on the assumption that all behavior is learned and that environmental and internal factors are related to one's behavior (2-5). The theories endorse strategies such as self-monitoring and problem solving, which make peo-

ple more aware of internal and external cues and their response. Clients may be taught a variety of strategies to promote behavior change, including self-monitoring, problem solving, goal setting, contingency management, cognitive restructuring, social support, stimulus control, stress management, and relapse prevention. The transtheoretical model describes behavior change as a series of stages and provides a rationale for matching counseling strategies to different stages of change (6). Social cognitive theory introduces a construct called self-efficacy (confidence in one's ability to do a specific task), which influences the effort a client is willing to expend to achieve a goal (7). Peer modeling, skill development training, and goal setting are some strategies endorsed by social cognitive theory to be effective in enhancing self-efficacy and a client's persistence in behavior change efforts.

Use of behavior change theories and models when designing and implementing nutrition counseling programs and protocols enables dietetics practitioners to leverage proven strategies to enhance counseling effectiveness. Behavior change theories provide the framework or rationale for individualizing nutrition counseling interventions to meet the needs of clients who may demonstrate

varying degrees of motivation, confidence, environmental support, and skills. Regular documentation of the theoretical framework and strategies used in nutrition counseling as part of the Nutrition Care Process will prompt dietetics practitioners to deliberately apply specific counseling strategies to address documented nutrition problems linked to specific desired outcomes. Broad adoption of electronic medical records or systems will enable practitioners to evaluate the success of various counseling strategies in achieving intermediate treatment goals (eg, increase self-efficacy or move a client from the precontemplation to the action stage of change) and ultimate treatment goals (eg, weight loss of 5% body weight sustained for 1 year) across the populations they serve.

METHODS

The American Dietetic Association Evidence Analysis Library Nutrition Counseling Workgroup was formed to conduct a systematic review of literature related to behavior change theories and strategies used in nutrition counseling. The workgroup, appointed by the American Dietetic Association Evidence-Based Practice Committee, consisted of seven highly accomplished experts in the area of counseling who are researchers, practitioners, or work in industry. These experts posed a series of questions related to the most commonly used behavior change theories, models, and strategies used in nutrition counseling in the outpatient setting, since these are the foundation of evidence-based counseling. Nutrition counseling strategies included in the *International Dietetics & Nutrition Terminology (IDNT) Reference Manual: Standardized Language for the Nutrition Care Process* (8) were evaluated. Numerous cognitive behavioral therapy (CBT) studies reviewed incorporated either meal replacements and/or structured meal plans as an intervention strategy, so a question was added to address this strategy.

A comprehensive literature search was conducted using PubMed MEDLINE, bibliographies of recent review articles, and hand searches of primary article references. The literature search was limited to adult human subjects who received nutrition counseling (provider type such as RD, nurse, or physician not specified) in an outpatient or clinic setting and English language articles published between 1986 and 2007. Articles were excluded if the sample size was <10 in each treatment group, individuals were diagnosed with eating disorders, or the dropout rate was >30%. Drop-out rate criteria was not used if drop-out rate was a dependent variable in the study or there was so little available research that there was no alternative but to examine studies with higher dropout rates. Use of weight-loss medications was excluded except when incorporated into a theoretically based counseling intervention protocol.

Two hundred fourteen articles were reviewed by the workgroup, and 87 met the inclusion criteria. The workgroup members evaluated the evidence and graded the strength of the evidence based on the quality, consistency, quantity, impact, and generalizability. The following grades were applied: Grades I, II, and III, for strong, fair, and weak evidence, respectively; Grade IV designated expert opinion; and Grade V indicated no evidence that directly supports or refutes the question (9).

RESULTS

This section includes the findings from the 86 primary studies and one systematic review related to one or a combination of three behavior change theories and 10 nutrition counseling strategies.

Behavior Change Theories

Questions related to a combination of behavioral theory and cognitive behavioral theory, social cognitive theory and transtheoretical model, and length of treatment were addressed in this comprehensive review and all can be found in [Figure 2](#), along with the grade assigned the research evidence and the conclusion statement.

Cognitive Behavioral Theory and Therapy. Behavioral theory and cognitive behavioral theory are the oldest and most tested behavior-change theories used in nutrition counseling (2-5). These two theories provide the theoretical basis of most structured diet, exercise, and behavioral therapy programs, commonly referred to as CBT, behavioral therapy, behavior modification, or lifestyle modification. The National Heart, Lung, and Blood Institute and the American Diabetes Association both recommend behavioral therapy for overweight clients (10,11). CBT assumes that behavior is learned and can be unlearned by using a variety of cognitive and behavioral strategies that are taught to clients for use throughout their lifetimes (2-5). CBT focuses on both the external factors (eg, environmental stimulus and reinforcement) and the internal factors (eg, thoughts and thinking). RDs typically apply strategies targeting both internal and external factors in an effort to disrupt undesirable eating patterns and behaviors.

More than 27 studies (23 RCTs) provide evidence that CBT is beneficial in facilitating modification of targeted dietary habits (eg, decreased energy from fat, increased intake of fruits and vegetables), weight, and cardiovascular and diabetes risk factors.

CBT Targeting Diabetes Prevention and Treatment. Particularly impressive are results achieved from intensive, intermediate-duration (6 to 12 months duration) CBT involving patients with type 2 diabetes. The Look Ahead research group (12) in a large RCT (N=5,145) and Kim and colleagues (13) in a smaller RCT (N=58) both implemented an intensive lifestyle intervention program and showed significant improvements in fasting blood sugar, glycated hemoglobin (HbA1C), and weight. After 1 year, the Look Ahead research group showed nutrition counseling resulted in highly significant improvements in high-density lipoproteins; reduced use of glucose, lipid lowering, and hypertension medications as compared to the controls; reduced triglyceride levels; increased fitness levels; decreased prevalence of urine albumin-to-creatinine ratios >30 µg/mg; and a decrease in the number of patients meeting criteria for metabolic syndrome. At 1 year, Kim and colleagues (13) showed improvements in systolic blood pressure and carotid mean media thickness progression. Mayer-Davis and colleagues (14) assessed the effect of intensive CBT compared to reimbursable care and usual care and found intensive care produced significantly more weight loss. Less intense and shorter (<6 months) application of CBT with clients with type 2 diabetes or impaired glucose tolerance achieved significant

Theory and target	Grade ^a	Conclusion statement
Cognitive Behavioral Theory		
Short duration (<6 mo)	I	Four + ^b quality randomized controlled trials (RCTs), one ∅ ^c quality RCT, and one ∅ quality nonrandomized trial provide evidence that short-term cognitive behavioral therapy (CBT) results in positive lifestyle change, yielding a reduction in weight, lipid levels, fat intake, and improved glucose control.
Targeted to reduce cardiovascular disease (CVD) risk factors only	III	In two small research studies, one RCT and one nonrandomized trial of ∅ quality, CBT of short duration (8 wks) targeted to reduce CVD risk factors was shown to produce modest, but significant, ↓ ^d in a variety of CVD risk factors. In one study, researchers found CBT significantly ↓ weight, body fat, and changed regional body composition in both men and women, and ↓ leptin level in women, and serum cholesterol in men. In the other study, researchers found CBT ↓ serum cholesterol levels in both men and women.
Targeted to diabetic management only	II	Two + quality RCTs involving adult subjects aged approximately 60 y with type 2 diabetes, provide evidence that short-term CBT facilitates + lifestyle changes. One traditional CBT program targeting African Americans significantly ↓ weight, body mass index, lipid levels, and improved glucose control beyond that of usual care. One individually tailored CBT intervention significantly ↓ self-reported fat intake and ↑ ^e physical activity as compared to a usual care group.
Targeted to weight loss only	III	Two small + quality RCTs provide evidence that short-term (10 wk) CBT is an effective method of overweight and obesity treatment.
Effects on weight maintenance	II	One meta-analysis (29 RCTs), four RCTs, and three observational studies provide strong evidence that weight management treatment with diet and cognitive-behavioral therapy in a 6-mo initial intervention period results in modest weight loss after follow-up of at least 18-mo posttreatment. Attrition rates increased the longer the follow-up was conducted. This is a common weakness of these studies that may result in outcome bias.
Intermediate duration (6-12 mo)	I	Five + quality RCTs, three ∅ quality RCTs, and two ∅ quality quasi-experimental non-randomized trials provide evidence that intermediate-length CBT, compared to standard treatment results in significant improvements in weight management, cardiovascular risk factors and type 2 diabetes. Evidence is strongest among patients with type 2 diabetes, due to the number, size and quality of studies.
Targeted to reduce CVD risk factors only	III	Two RCTs, + quality and one of ∅ quality, evaluated the effect of weight-reduction programs with a behavioral component on reducing CVD risk factors in middle-aged subjects. These researchers found CBT was significantly more effective in facilitating weight loss, beneficial change in diet and exercise habits, ↓ triglyceride levels, ↑ high-density lipoprotein cholesterol in men and women, and ↓ systolic blood pressure in women. Additional studies with more intense, validated behavioral components should be conducted to assess optimal outcomes achievable.
Targeted to diabetes management only	I	Three + quality RCTs, and three ∅ quality, one RCT, and two quasi-experimental-nonrandomized trials provide evidence that CBT, targeted to people with type 2 diabetes, resulted in significant improvements in glycated hemoglobin, fasting blood sugar, weight, and numerous CVD risk factors. Additional research is needed to determine whether these positive outcomes can be sustained over time.
Targeted to weight loss only	III	One ∅ quality 6-mo RCT (86 obese adults) provides evidence that intermediate duration CBT and behavioral therapy combined with a personalized system of skill acquisition targeting weight loss is more effective than weight-loss education alone in facilitating weight loss, ↓ both total energy intake and percent energy from fat, and ↑ physical activity.
Long duration (>12 mo)	I	Nine + quality RCTs, one ∅ quality RCT, one ∅ quality nonrandomized trial, and one ∅ quality quasi-experimental study provide evidence that long-term CBT (>12 mo), facilitates positive lifestyle change, which may result in significant reductions in weight, lipid levels, blood pressure, and incidence of hypertension. Interventions targeting prevention of type 2 diabetes were highly successful, but those targeting diabetes management indicated difficulty sustaining most outcomes over the long term.

(continued)

Figure 2. Graded conclusion statements related to the evidence that theory-based counseling results in health and food behavior change in adults counseled in an outpatient or clinic setting.

Theory and target	Grade ^a	Conclusion statement
Targeted to reduce CVD risk factors only	I	Four large, + quality RCTs provide evidence that CBT of greater than 18-mo duration is beneficial in facilitating modification of dietary habits, weight, and CVD risk factors.
Targeted to diabetic management only	III	One + RCT and one ∅ quality nonrandomized trial assessed the effect of CBT added to usual care, on diabetic management over a 2-y period. Clinically significant outcomes reported at 6 mo were generally not sustained at the 2-y point, with the exception of a significant ↓ in total cholesterol. A third + quality study demonstrated sustainment of positive behavioral and psychosocial change well maintained at 2 y, but clinical outcomes beyond 6 mo are not available. Additional research is needed on the effect of CBT of >12-mo duration on patients with diabetes, using a research design which controls for pharmacotherapy
Targeted to prevention or delayed onset of diabetes	I	Three large, + quality RCTs provide evidence that CBT of greater than 2-y duration is beneficial in preventing and/or delaying onset of diabetes mellitus.
Targeted to weight loss	II	Two + RCTs (65 participants received CBT and a very-low-energy diet [VLCD]) and one ∅ quasi-experimental study (84 participants received CBT) evaluated CBT as a component of a weight-loss program of long-term duration. CBT was not always the variable of randomization. Participants receiving behavior therapy lost weight at the conclusion of treatments. Upon follow-up, there was some weight regain, but participants remained at a lower weight than baseline. Studies that included a VLCD to initiate rapid initial weight-loss, combined with CBT, also appeared to produce long-term weight loss. [Note: This is not a statement recommending VLCDs or suggesting that VLCDs are more beneficial than low-calorie diets.]
Transtheoretical model	III	One + quality intervention study strongly supported application of the transtheoretical model/stages of change in improving health and food behavior change. Much research has been accomplished to validate instruments to use to measure stage of change in the dietary context. Additional research is needed to support its effective application in nutrition counseling.
Social Learning Theory		
Targeted to reduce CVD risk factors	III	One + quality RCT, evaluated the effect of six telephone-delivered counseling sessions targeting ↑ self-efficacy and outcome expectancy, social learning theory constructs, in 65 hyperlipidemic patients not adherent to their cholesterol-lowering diet. The intervention involved goal setting, self-monitoring, self-reinforcement and verbal persuasion. The intervention group significantly reduced saturated fat and cholesterol intake and had significantly ↓ low-density lipoprotein cholesterol levels relative to the control group. There was no ↑ in perceived self-efficacy in the intervention group vs the usual care group; outcome expectancy significantly ↑ in the intervention group, but was not correlated to the improvements in dietary adherence or ↓ low-density lipoprotein cholesterol levels. Despite positive behavioral and clinical outcomes, researchers failed to show a specific relationship between self-efficacy or outcome expectancy and change in behavior.
Targeted to diabetes management	III	One randomized controlled trial of ∅ quality evaluated a 5-wk nutrition education and a nutrition education plus social learning intervention in 78 patients with type 2 diabetes. In addition to nutrition education, the social learning intervention group received information on goal setting based on individual barriers to adherence, modeling of strategies used successfully by other individuals with type 2 diabetes, and was taught a problem-solving method. This 5-wk study failed to show a significant advantage of social learning intervention over nutrition education alone. RCTs of longer duration are needed to further explore the effect of social learning theory on diabetes management.
^a Grade is assigned by the workgroup, based upon the quality, quantity, consistency, clinical impact and generalizability of the evidence supporting the conclusion. Grade I means good/strong evidence; Grade II means fair evidence; Grade III means limited/weak evidence. ^b + = positive. ^c ∅ = neutral. ^d ↓ = decrease. ^e ↑ = increase.		

Figure 2. Continued

improvements in multiple lifestyle variables, including blood sugar control, weight, and lipid levels (15-19).

The Diabetes Prevention Program and the Finnish Diabetes Prevention Study achieved impressive results with CBT in preventing or delaying the onset of diabetes (20-27). The Diabetes Prevention Program research team found a significant 58% reduction in incidence of type 2 diabetes over a 4-year period, and the Finnish Diabetes Prevention Study research team reported identical results.

Sustaining clinically significant outcomes was more problematic in CBT-treated clients with a diagnosis of diabetes (28-31). In these clients, there were no significant differences between the treatment and control groups on measures such as fasting plasma glucose, low-density lipoprotein cholesterol, triglycerides, and systolic blood pressure beyond 6 months. Additional research is needed in the area of long-term CBT targeting diabetes management.

CBT Targeting Cardiovascular Disease. CBT of greater than 18 months' duration facilitated modification of dietary habits and weight to lower cardiovascular risk as found in four large high-quality RCTs (32-35). Both the Trials of Hypertension Prevention, Phase II and the PREMIER trial demonstrated that CBT applied to middle-aged men and women with pre-hypertension or stage 1 hypertension produced significant and positive effects improving dietary habits, weight, and risk for hypertension, as compared to an advice-only group (32,33). The Women's Health Initiative Randomized Controlled Dietary Modification Trial and the Women's Healthy Lifestyle Project both assessed the effect of long-term (8 and 5 years, respectively) CBT on perimenopausal or postmenopausal women and found significant benefits in dietary intake, weight, waist circumference measures, and lipid levels compared with a control group (34,35). CBT of shorter duration (≤ 12 months), involving clients with cardiovascular disease, also achieved significant reductions in cardiovascular risk factors, including weight, body composition, and lipid levels (36-40).

CBT Targeting Weight Management. Six studies (five RCTs) met the inclusion criteria for weight management. Interventions targeting weight loss for control or prevention of diabetes or cardiovascular disease were reported separately. All studies reported significantly improved weight loss with behavioral therapy (41-46). One meta-analysis (including 29 RCTs), four RCTs, and three observational studies provided strong evidence that weight loss achieved with CBT of 6 months or less duration resulted in sustained weight loss and prevention of further weight gain at least 18 months posttreatment (47-54).

CBT Treatment Duration. The Nutrition Counseling Workgroup analyzed CBT both by health condition and duration of therapy. Since insurance companies typically provide coverage for only short-term treatment (< 6 months), the work group looked at the long-term (> 18 months) sustainment of short-term therapy. Evidence strongly supported the effectiveness of CBT at all treatment durations. Short-term CBT produced moderately good long-term results, but high study attrition rates were a common problem in these studies (47-54). Figure 2 presents

conclusions reached by the work group for each duration question.

Transtheoretical Model in Nutrition Counseling. The transtheoretical model, with its core concept of stages of change, describes the sequence of cognitive (attitudes and intentions) and behavioral steps people use over time to make successful changes in health behavior. The model recommends tailored intervention strategies for each stage (ie, precontemplation, contemplation, preparation, action, and maintenance) to move an individual forward through the stages of change (55,56).

Much research has been accomplished to validate instruments used to measure stage of change in the diet context (57-68); however, only one high-quality randomized controlled trial assessed dietary outcome measures relevant to the use of the transtheoretical model/stages of change (69).

Jones and colleagues (69) applied the transtheoretical model to 1,029 individuals with type 1 or type 2 diabetes who were in one of three pre-action stages for either self-monitoring of blood glucose, healthy eating, or smoking (69). A significant treatment effect was found for the transtheoretical model intervention targeting healthy eating vs usual intervention. The following significant results were reported: An improved stage of change (movement to the action or maintenance stage), a decrease of energy intake from fat, higher daily vegetable and fruit intake, and decreased HbA1C for those in the action stage. Additional intervention studies of strong design are needed to validate the efficacy of the transtheoretical model in nutrition counseling.

Social Cognitive Theory/Social Learning Theory. Social cognitive theory, built upon the foundations of social learning theory, is rooted in the belief that people learn from watching one another and use an internal thought process influenced by the person (eg, beliefs), the environment (eg, how supportive) and behavior, (eg, ease of the task). The following strategies facilitate the learning process: Observational learning (eg, testimonials and demonstrations), sequential goal setting, task breakdown, and skill development training. Social cognitive theory is most commonly used in group settings (4). Only two small RCTs documented use of the social cognitive theory as the theoretical framework for nutrition intervention. These studies failed to show clear effect (70,71). Additional RCTs of increased intensity and duration are needed to better explore application of this theory in nutrition counseling.

Nutrition Counseling Strategies

Nutrition counseling strategies are evidence-based methods or plans of action designed to achieve behavior change toward a particular client goal (8). Each behavior change theory offers constructs or concepts that attempt to explain behavior change and integrate data or information about the behavior change process (eg, self-efficacy, stage of change) that may influence behavior change. Theories and models frequently suggest strategies that leverage components of the change process to promote desired behavior change. There is overlap in that some strategies are used across numerous theories and models. Goal setting is a strategy endorsed by both CBT and social cog-

nitive theory. Dietetics practitioners apply different strategies based on client goals and the dietetics practitioner's personal counseling style and skill set. When using the Nutrition Care Process, practitioners document the strategies used in nutrition counseling and monitor the effectiveness of the nutrition counseling process (eg, readiness to change, self-monitoring frequency, and weight lost). The Nutrition Counseling Workgroup reviewed evidence related to the following nutrition counseling strategies: motivational interviewing, self-monitoring, use of meal replacements and/or structured meal plans, reward strategies, problem-solving, social support, goal setting, cognitive restructuring, stress management, and stimulus control. Eleven questions related to counseling strategies were addressed in this comprehensive review, and all can be found in [Figure 3](#), along with the grade given the research evidence and the conclusion. Full descriptions of these grades and conclusions are available on the American Dietetic Association Evidence Analysis Library Web site (9).

Motivational Interviewing. Motivational interviewing is a client-centered strategy designed to elicit behavior change by assisting clients to explore and resolve ambivalence to change (72,73). Dietetics practitioners frequently use motivational interviewing when they utilize the transtheoretical model with clients who are in the precontemplative, contemplative, and preparation stages and require intervention targeting motivation. When applying this strategy, an RD partners with the client to determine the agenda using empathetic, nonjudgmental, supportive, encouraging, and active listening behaviors. Open-ended questions, reflective listening, affirmations, and summarization are used to help a client explore and resolve ambivalence and barriers to behavior change. Training in motivational interviewing is highly encouraged for working with clients who are not in the action stage of change (72,73).

Researchers in four RCTs of high quality assessed the effect of motivational interviewing as an added component to a cognitive-behavioral program (three studies) or a self-help intervention (one study) (74-77). Strong evidence indicates that motivational interviewing significantly enhanced adherence to program recommendations and improved targeted diet-related outcomes, including glycemic control, percentage of energy intake from fat, fruit and vegetable intake, and weight loss. Two studies employed motivational interviewing as the sole style of intervention (without a behavioral component) with little added effect, when compared to a control group that received diet counseling from RDs not trained in motivational interviewing (78,79).

Self-Monitoring. Self-monitoring is used in CBT and social cognitive theory and involves a client keeping a record of thoughts, emotions, dietary behaviors, physical activities, and/or health measurements (eg, blood sugar, blood pressure). The record is reviewed with the client for triggers and patterns and used to assist with problem solving and goal setting. Three RCTs were reviewed and provided strong evidence that self-monitoring of food intake improves nutrition-related outcomes related to weight loss and compliance with renal diets (80-82). Three observational studies demonstrated that clients enrolled in cognitive behavioral weight-loss programs who were more

consistent with self-monitoring were significantly more successful in losing weight (83-85).

Meal Replacements and Structured Meal Plans. Meal replacements and structured meal plans are considered nutrition counseling strategies because meal replacements help participants control their food intake by focusing on portion control as they attempt to modify their eating habits (86). Meal replacements can be over-the-counter shakes and bars or portion-controlled frozen meals. Structured meal plans are detailed meal plans listing exactly the type of food and portion size to be eaten. Meal replacements provide many advantages to participants involved in weight-loss programs. Using meal replacements reduces amount of time thinking about food selection and meal preparation for one or two meals per day, reduces exposure to foods that might tempt participants to overeat, and avoids problems of underestimating portion sizes (87).

Structured meal plans simplify food choices and increase adherence to a daily energy goal. Four RCTs were reviewed that assessed the efficacy of various types of structured meal plans and/or meal replacement strategies as compared to self-selected diets in middle-aged adults (88-91). Strong evidence was provided that various types of meal replacements and/or structured meal plans were helpful strategies in achieving health and food behavior change goals such as weight loss and decreased fat intake in middle-aged adults.

Ashley and colleagues in a high-quality RCT (88,92) evaluated the use of meal replacements with a behavioral program called the Lifestyle, Exercise, Attitude, Relationships and Nutrition (LEARN) Program. The authors found a 1-year RD-led behavioral program incorporating meal replacements significantly more effective than both the behavioral program without meal replacements and individual counseling by a physician and nurse along with meal replacements (88). Two studies incorporated both meal replacements and structured meal plans (89,90). Wing and colleagues (89), in a high-quality RCT, found actual food provision (both provided free and cost-shared with clients) and a structured meal plan with corresponding grocery lists equally beneficial components of a 26-week behavioral weight-loss program and superior to a standard behavioral treatment without added food. Metz and colleagues (90) instructed participants to follow a total meal replacement intervention or a traditional meal plan using food exchanges and both based on the National Cholesterol Education Program/American Heart Association Step 1 and 2 diets. The investigators found that the 10-week total meal replacement intervention was superior to following a traditional meal plan (90). The total meal replacement intervention achieved dietary compliance and cardiovascular risk factor reduction. Ditschuneit and colleagues (91,93,94) followed overweight subjects consuming meal replacements and those following a self-selected diet for 4 years and found meal replacements significantly enhanced long-term weight loss.

Reward Strategies. Reward strategies involve a systematic process by which a practitioner or client uses rewards as an incentive for a specific behavior change. In nutrition counseling, rewards may be used for attendance, completion of food records, weight loss, or may be predetermined

Counseling strategy	Grade ^a	Conclusion statement
Motivational interviewing	I	Four randomized controlled trials (RCTs) of + ^b quality assessed the effect of motivational interviewing as an added component to cognitive-behavioral programs (three studies) or a self-help intervention (one study) and found motivational interviewing significantly enhanced adherence to program recommendations and improved targeted diet-related outcomes including glycemic control, percentage of energy intake from fat, fruit and vegetable intake, and weight loss.
Motivational interviewing	III	Two studies (one + and one \emptyset ^c quality) employed motivational interviewing as the sole style of intervention with little added effect, compared to standard therapy. Further research is warranted with larger sample sizes, longer follow-up periods, and measurement of readiness to change diet behaviors.
Self-monitoring	I	Three RCTs, two + quality and one \emptyset quality, provide evidence that self-monitoring of food intake improves nutrition-related outcomes related to weight loss and compliance with renal diets. Three observational studies of \emptyset quality revealed that clients, enrolled in cognitive behavioral weight-loss programs that were successful in losing weight, were significantly more consistent with self-monitoring.
Meal replacements and/or structured meal plans	I	Four RCTs, three + quality and one \emptyset quality, assessed the efficacy of various types of meal replacement and/or structured meal plan strategies as compared to self-selected diets in middle-aged adults, and found the use of various types of meal replacements and/or structured meal plans helpful strategies in achieving health and food behavior change in middle-aged adults. Additional research is needed to determine whether benefits derived from temporary use of these behavioral strategies can be sustained over time.
Reward strategies	I	Two + quality (one RCT and one meta-analysis of seven RCTs) and one \emptyset quality RCT found monetary rewards or reinforcement had no treatment effect.
Problem solving	II	Two + quality RCTs, one in overweight and obese women and the other in postmenopausal women with diabetes, utilized interventions that incorporated problem-solving strategies. In both studies, use of problem-solving strategies resulted in improvements in key outcome measures including maintenance of weight loss and in subjects with diabetes, was linked to improvements in fat consumption, self-efficacy and physical activity.
Social support	II	One highly intense lifestyle change study found social support was helpful and four traditional lifestyle change programs did not find it helpful. The definition of social support has evolved to include multiple dimensions of social support measured pre- and posttreatment. Two RCTs, conducted in the 1990s, manipulated social support and found no significant treatment effect. In an RCT published in 2006, multiple dimensions of social support were measured pre- and post-treatment and use of social resources was shown to mediate intervention effects on physical activity, fat consumption, and glycated hemoglobin change. Additional studies are needed to measure impact of social support interventions on outcomes.
Goal setting	II	One + quality RCT found a 30-min motivational interviewing session, based on self-selected diabetic self-management goals, followed by three, 10-min telephone calls at 1, 3 and 7 wks, was significantly more effective than usual care in reducing dietary fat intake and increasing physical activity at 1 y in 100 adults with type 2 diabetes. A + quality RCT showed similar results regarding the value of client self-selected behavior change goals, and demonstrated the effectiveness of goal-attainment training in realizing dietary improvements. One \emptyset quality observational study found 422 clients with diabetes who used computer technology to self-select a behavior-change goal in an area of diet or exercise, and received brief (8 to 10 mins) counseling related to the goal, were successful in reducing fat intake 2 mo later. Clients' active participation in selecting and setting goals led to the selection of a goal from the area that could use the most improvement and the goal that was most personally appropriate.
Cognitive restructuring	III	One \emptyset quality RCT assessed the additive effect of a cognitive restructuring component to a 10-wk strictly behavioral weight-loss program in 63 middle-aged, overweight subjects and found no significant difference between the treatment and control group in any physiological, behavioral, or cognitive measures at baseline, posttreatment, and at 3-month follow-up. Additional research is needed on the isolated effect of cognitive restructuring as part of a behavioral intervention on nutrition-related outcomes.
Stress management	V	No new literature was found published in the past 20 years that provided evidence related to the use of stress management on nutrition-related outcomes.
Stimulus control	V	No new literature was found published in the past 20 years that provided evidence related to the use of stimulus control on nutrition-related outcomes.

^aGrade is assigned by the workgroup, based on the quality, quantity, consistency, clinical impact, and generalizability of the evidence supporting the conclusion. Grade I means good/strong evidence, Grade II means fair evidence, Grade III means limited/weak evidence, and Grade V means no available evidence.

^b+ = positive.

^c \emptyset = neutral.

Figure 3. Graded conclusion statements related to the evidence that application of theory-based nutrition counseling strategies results in health and food behavior change in adults counseled in an outpatient or clinic setting. NOTE: Information from this figure is available online at www.adajournal.org as part of a PowerPoint presentation.

by the client for reaching a defined goal. Financial incentives given for skill acquisition or weight lost had no treatment effect as found in two RCTs and one systematic review (including seven RCTs) (95-97).

Problem Solving. Problem solving techniques are frequently used collaboratively with clients and involve identification of barriers to goal achievement, brainstorming solutions, weighing the pros and cons of potential solutions, implementing solutions, evaluating solutions for effectiveness, and adjusting strategies (5). Two positive quality RCTs, one in overweight and obese women and the other in postmenopausal women with diabetes, utilized interventions that incorporated problem-solving strategies. In both studies, use of problem-solving strategies resulted in maintenance of weight loss. In subjects with diabetes, use of problem-solving strategies was associated with improvements in fat consumption, self-efficacy, and physical activity (98,99).

Social Support. Social support may be defined as the ability to build and utilize a network of family, friends, colleagues, and health professionals for information, encouragement, emotional support, and enhancing the environment to support behavior change (8). Dietetics practitioners may assist clients using this strategy by establishing a collaborative relationship with a client, helping a client identify potential family and community support, and coaching a client on how to effectively elicit this support. Assessment of the effect of social support on nutrition-related behavior varies widely and includes multiple dimensions of social support measured by using vastly different tools and criteria.

In two studies conducted in the 1990s, researchers assessed the effect of spouse and friend inclusion in behavioral therapy and found no significant treatment effect (100,101). One highly intense lifestyle change study found social support was helpful to mediate intervention effects on physical activity, fat consumption, and HbA1C change (31,102). Additional research is needed to measure the effect of varying types of social support (eg, perceived social support, quality and size of social network, or emotional support) on specific types of behavior change goals within varying populations (eg, elderly or children).

Goal Setting. Goal setting is a collaborative activity between a client and a dietetics practitioner in which a client determines from a number of potential courses of action what he or she is willing to expend energy to achieve (8). It is an important strategy in CBT, social cognitive theory, and motivational interviewing and frequently a key component of the Nutrition Care Process. It is appropriate for clients who are ready to make behavior change. A client may need coaching on setting realistic, timely, and measurable goals, and require assistance in gaining the required knowledge and skills for goal attainment. It is essential to monitor and document client progress toward long- and short-term goals, providing opportunity for problem solving and celebrating success.

Clark and colleagues (16), in a well-designed RCT, tested the effect of goal setting as the independent variable. A 30-minute goal setting session employing a motivational interviewing style, based on self-selected diabetic self-management goals, was used. Follow-up was

provided via three, 10-minute telephone calls at week 1, week 3, and week 7. This relatively low-resource-intensive protocol was significantly more effective than what was described as usual care in reducing dietary fat intake and increasing physical activity at 1 year in 100 adults with type 2 diabetes. Unfortunately, the authors did not define the components of usual care. Berry and colleagues (103), in another RCT, showed similar results regarding the value of client self-selected behavior change goals and demonstrated the effectiveness of goal attainment training in realizing dietary improvements. In a third study, 422 clients with diabetes who used computer technology to self-select a behavior change goal and received brief (8 to 10 minutes) counseling related to that goal were successful in reducing fat intake 2 months later (104). Clients' active participation in selecting and setting goals led to the selection of a goal that was personally appropriate and valued by the client (104).

Cognitive Restructuring. Cognitive restructuring is a strategy frequently used by nutrition counselors to increase clients' awareness of their perceptions of themselves and their beliefs related to diet, weight, and weight-loss expectations (8). Because use of cognitive restructuring targeted to patients with eating disorders was excluded from review, cognitive restructuring as an independent variable was found in only one study. In this RCT, the additive effect of a cognitive restructuring component to a 10-week strictly behavioral weight-loss program was tested in 63 middle-aged, overweight subjects (105). No significant differences were found between the treatment and control group in any physiological, behavioral, and/or cognitive measures at baseline, posttreatment, and at 3-month follow-up. Additional research is needed to isolate the effect of cognitive restructuring as part of a behavioral intervention on nutrition-related behaviors.

Stress Management. Stress management guidance targeting environmental stress (eg, guidance to plan ahead or use of time management skills) and emotional stress (eg, use of positive self-talk or relaxation exercises) are sometimes utilized in nutrition counseling situations (8). No literature published in the 1986-2007 timeframe was found that assessed the effect of stress management strategies on nutrition-related outcomes.

Stimulus Control. Stimulus control is a core strategy used in behavioral therapy that involves modifying social or environmental cues or triggers that encourage undesirable behaviors related to diet and exercise (8). In accordance with strict behavioral theory, attention is given to reinforcement and rewards for successfully modifying environmental triggers. No new literature that provided evidence related to the use of stimulus control on nutrition-related outcomes has been published in the past 20 years.

Individual vs Group Counseling. Few articles assessed the independent effect of group vs individual counseling on nutrition-related outcomes. Three high-quality RCTs evaluated individual vs group counseling targeted to weight or diabetes management in middle-aged subjects (88,106,107). Group counseling was significantly more effective than individual counseling. Attrition rate in two of the studies was >30%. Further research is needed to support these findings.

Commission on Dietetic Registration <ul style="list-style-type: none"> ● Certificate of Training in Adult Weight Management ● Certificate of Training in Childhood and Adolescent Weight Management American Association of Diabetes Educators American Diabetes Association Institute for Healthcare Communication Motivational interviewing	www.cdrnet.org www.diabeteseducator.org www.diabetes.org/professional www.healthcarecomm.org www.motivationalinterviewing.org
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Figure 4. Resources for nutrition counseling training.

CONCLUSIONS

The nutrition care process incorporating client-centered counseling techniques is an important component of effective chronic disease prevention and management. Nutrition counseling delivered by dietetics practitioners has been demonstrated to improve weight loss and maintenance, blood glucose levels for persons with type 2 diabetes, and cardiovascular disease risk factors. A plethora of evidence exists to support the use of CBT to facilitate behavior change targeted to the reduction of cardiovascular disease risk, prevention and treatment of diabetes, and weight loss. Evidence related to the use of the transtheoretical model in the context of diet change is emerging. This theory offers not only validated stage-appropriate strategies to enhance behavior change, but suggests meaningful outcome measures (eg, diet readiness to change) to assess progress of clients not in the action stage of change.

Constructs, variables, and strategies central to social cognitive theory (or social learning theory) are frequently used as a part of effective diet counseling—demonstrations, skill training, and testimonials, for example. Numerous tools have been validated that measure core constructs of this theory (eg, self-efficacy and outcome expectation), but few nutrition counseling intervention studies have been published that use this theoretical framework. Improved documentation relevant to this theory will help determine its potential value in facilitating nutrition-related behavior change.

Strong evidence supports the effectiveness of self-monitoring, motivational interviewing (particularly when used in combination with CBT), and meal replacements and structured meal plans as strategies in nutrition counseling. Current research does not support the use of financial rewards as an effective strategy to instigate nutrition-related change. Good evidence supports the use of goal setting, problem solving, and social support strategies, but further research is needed to assess effectiveness in a broader range of populations and over a broader spectrum of nutrition-related goals. Research also supports group vs individual counseling, indicating that dietetics practitioners should be encouraged to develop effective group facilitation skills.

Dietetics educators who teach nutrition counseling courses can use the results of this systematic review to explain the evidence supporting specific theories that provide the framework for helping clients change their dietary and activity behaviors. In addition, educators can guide students to acquire the skills required to make effective use of the strategies that have a sound scientific basis.

Based on this analysis, further research is needed to validate the effectiveness of the transtheoretical model and social cognitive theory as a framework for nutrition counseling. Additional research is also needed to determine the optimal application of goal setting, problem solving, and social support behavior change counseling strategies.

Dietetics practitioners are encouraged to use behavior change theories and strategies to plan effective nutrition counseling interventions. Advanced training in use of theory-based strategies is available and recommended for those who wish to enhance their counseling effectiveness. Good sources of nutrition counseling training are listed in Figure 4. Routine use and documentation of evidence-based interventions will enable members of our profession to better understand the intricacies of nutrition-related behavior change and strategies that are effective in aiding clients in achieving behavior change goals.

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Eating Disorders and Obesity

Albert J. Stunkard, MD

KEYWORDS

- Obesity
- Night eating syndrome
- Binge eating disorder
- Comorbidity

An understanding of the relationship between obesity and eating disorders has grown in recent years. Obesity is characterized by an excessive amount of fat in tissues of the body. Body fat typically is estimated by the body mass index, calculated as weight in kilograms divided by height in meters squared. Persons with a body mass index of 30 kg/m² or greater are considered obese.¹ In 2007 and 2008, the prevalence of obesity among US adult men was 32.2% and among adult women was 35.5%, although the rate of increase in prevalence of adult obesity has slowed over the past 10 years.² In the past, obesity had itself been considered to be an eating disorder. We have learned, however, that most overweight and obese persons do not overeat in any distinctive pattern. For a smaller number, however, 2 clear patterns of overeating have been identified: Binge eating disorder (BED) and night eating syndrome (NES). Both disorders are more prevalent among overweight and obese persons than among persons of normal weight, and they contribute to the overweight of such persons.

BINGE EATING DISORDER

Binge eating was first described by Hippocrates, who viewed it as a “sick form of hunger.”³ The first proposal of binge eating as a syndrome occurred in 1959 when it was proposed as “BED.”⁴ Since then, formal diagnostic criteria have been proposed and appear with a provisional diagnosis in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM-IV-TR, 2000). These criteria were based on 2 large studies (of 1984 and 1785 persons, respectively) conducted at 12 eating disorder programs.^{4,5} Two core features and several associated features have been identified.

Diagnostic Features

The first of 2 “core features” of the diagnosis of BED are “eating within a discreet period of time . . . an amount that is definitely larger than most individuals would eat under similar circumstances.”⁶ The second “core feature” of BED is experiencing a

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loss of control over eating during this period of time, as if one cannot stop eating or limit the quantity eaten. BED is to be distinguished from bulimia nervosa by the absence of compensatory behaviors such as vomiting, laxative abuse, or compulsive exercising. A sense of shame and disgust with oneself is associated with episodes of BED that cause significant distress. Compared with control (non-BED) obese persons, those with BED suffer from more severe obesity; earlier onset of overweight; earlier onset of, and more frequent, dieting; and greater psychopathology.^{4,5}

Prevalence

Estimates of the prevalence of BED vary widely, depending on the method of assessment (eg, survey vs interview) and the definition of a binge. In 2 community surveys, the prevalence was as low as 1.8%⁷ and 2.0%.³ Interview-based studies of treatment-seeking obese persons found higher rates (8.9%⁸ and 18.8%⁹). The prevalence of BED is greater the more severe the obesity; thus, rates of BED among severely obese persons undergoing bariatric surgery were 27%,¹⁰ 38%,¹¹ and 47%.¹² Equal numbers of white men and women are afflicted with BED, whereas black men report the disorder less often than black women.^{13–15}

Psychiatric Comorbidity

Two risk factors for BED have been documented: Psychiatric disorders and obesity. Psychopathology, especially depression, has been consistently reported among people with BED.^{16–25} Axis II disorders, particularly clusters B (dramatic–emotional) and C (anxious–fearful),^{17,19,21} also occur frequently in binge eaters (**Table 1**). In a community study, binge eaters showed several more vulnerabilities than the healthy control subjects, including frequent parental depression; greater susceptibility to obesity; more exposure to negative comments about shape, weight, and eating; morbid perfectionism; and negative self-evaluation.²⁶ Compared with subjects with other psychiatric disorders, binge eaters were distinctive only by more frequent reports of childhood obesity and awareness of negative comments about shape, weight, and eating.²⁷ Persons with BED reported less exposure to risk factors for general psychopathology than did those persons with bulimia nervosa.²⁶

Study	Major Depression	Any Substance Abuse or Dependence	Any Anxiety Disorder	Any Axis I Disorder	Personality Disorder
Yanovski et al, 1993	51	12		60	35
Specker et al, 1994	47	72	11.6	72.1	33
Mussel et al, 1996	47	23	18.8	70	
Telch & Stice, 1998	49	9		59	20

Data from Stunkard AJ, Allison KC. Binge eating disorder: disorder or marker? *Int J Eat Disord* 2003;34:5107–16.

Risk Factors

The influence of genetics on BED is unclear. A latent analysis of a large number of twins²⁸ revealed that one of the generated classes approximated the features of BED, and that monozygotic twin pairs more often fell into the same class than did dizygotic pairs. On the other hand, Lee and co-workers²⁹ did not find any familial tendency for BED.

A once-popular theory for the cause of BED has been put to rest in recent years; the theory is that dieting causes BED. Spitzer and colleagues^{4,5} reported that dieting occurred after the onset of binge eating, a finding that has been confirmed by 5 subsequent studies.^{30–35} The National Task Force on the Prevention and Treatment of Obesity concluded that empirical studies do not support the belief that dieting induces binge eating in obese adults.^{36,37}

NIGHT EATING SYNDROME

NES is an eating disorder characterized by a phase delay in the circadian pattern of food intake. It is manifested by (1) evening hyperphagia, or (2) awakenings accompanied by nocturnal ingestions, or (3) both.³⁸ NES was originally described in 1955, based on a single patient and on the subsequent treatment of 25 obese persons referred to a special study clinic because of difficulty in the management of their obesity.³⁹ The criteria noted in this original study were the consumption of 25% of caloric intake after the evening meal, initial insomnia at least half of the time, and morning anorexia. A revision of the required criteria was proposed in a study by Birketvedt and associates.⁴⁰ It reported nighttime awakenings, which were very often the occasion for the consumption of food. At present, provisional criteria for NES include morning anorexia, evening hyperphagia, and awakening accompanied by frequent nocturnal ingestion.⁴⁰

More recently, an item response theory analysis, using data from 1479 Night Eating Questionnaires, examined the symptoms of NES described.⁴¹ Item response theory revealed that evening hyperphagia, defined as eating 25% or more of the daily caloric intake after the evening meal, and/or the presence of nocturnal ingestions, more than half of the time upon awakening, were almost predictive of a diagnosis of NES. Morning anorexia and delayed ingestion of the first meal did not add enough information to be considered essential in diagnosing NES.

Prevalence

NES is uncommon in the general population (1.5%).⁴² As in the case of BED, prevalence of NES increases with increasing weight, from 8.9%⁴³ to 15%⁴⁴ in obesity clinics and from 10%⁴³ to 27%⁴² and 42%¹² among obese persons undergoing assessment for bariatric surgery.

A recent discovery has been the occurrence of NES in persons of normal weight. This fact came to light through responses to the NES Web site, which provided the Night Eating Questionnaire.⁴¹ The results showed one major difference between the responses of 40 obese night eaters and 40 nonobese night eaters: The normal weight night eaters were 7 years younger (33.1 ± 10.7 years vs 40.0 ± 14.3 years for the obese night eaters). The younger age of the nonobese subjects suggests that NES may contribute to the later development of obesity. This suggestion is supported by the fact that more than half of obese night eaters reported that their night eating began before their obesity.

Features

Four studies have confirmed aspects of the NES. Gluck and co-workers⁴³ reported that NES subjects consumed more of their food intake than did controls during the latter part of the day, and that a test meal at this time was larger in night eaters than in control subjects. This study also found elevated levels of depression in NES subjects. Aronoff and colleagues⁴⁴ reported that 70% of the 24-hour food intake of night eaters was consumed after 7 pm. Allison and associates⁴⁵ found that NES subjects awakened 1.7 times per night, and 73% of these awakenings were associated with snacking. Manni and co-workers⁴⁶ found NES (confirmed by polysomnography) in 10 patients who ate during half of these occasions.

Stress plays a strong role in the development and maintenance of NES. In the author's experience, approximately 75% of NES sufferers linked the onset of their disorder to a specific stress-related event. Those who reported a stress-related onset were nearly 15 years older at the age of onset than the 25% of respondents who did not experience such an event (34.2 vs 19.6 years; $P = .001$), suggesting a particular vulnerability to NES among persons with younger age of onset (Allison KC, Stunkard AJ, unpublished data, 2004).

Psychiatric Comorbidity

As in the case of BED, psychiatric comorbidity is common among people with NES.^{27,38} More than 75% of NES participants in one study had a lifetime history of an axis I disorder.³⁸ Specifically, night eaters met *DSM-IV* criteria significantly more often than control subjects for a history of major depressive disorder (47%), any anxiety disorder (37%), and any substance abuse and dependence (24%). Beck Depression Inventory scores were moderately elevated among people with NES.⁴⁷ Napolitano and colleagues⁴⁷ also reported even higher levels of state and trait anxiety and disinhibition of food intake among obesity clinic patients with NES than among those with BED or with no eating disorder.

Risk Factors

There is a strong familial link in NES. Lundgren and co-workers⁴⁸ found that 36% of NES participants reported at least 1 first degree relative with night eating behaviors compared with significantly fewer (16%) matched controls ($P = .03$). This comparison is biased in favor of a higher prevalence among family members of night eaters, because they are far more aware of night eating than are persons without a relative with NES.

Eating Versus Sleep Disorder

The disturbed sleep with frequent ingestions has led to the view that NES is a combined sleeping and eating disorder. The 2004 study by O'Reardon and colleagues,⁴⁹ however, revealed no significant differences between night eaters and controls for sleep onset (23:31 \pm 1:40 vs 23:32 \pm 1:06) and sleep offset (07:24 \pm 1:07 vs 6:59 \pm 1:12). This finding suggests that, among night eaters, it is the eating pattern that is disturbed and that the sleeping pattern remains undisturbed. NES thus seems to be a disorder of biological rhythm, characterized by a delayed onset of eating (**Fig. 1**). This view encompasses the continuation of overeating into the night and the delay in onset of appetite in the morning.

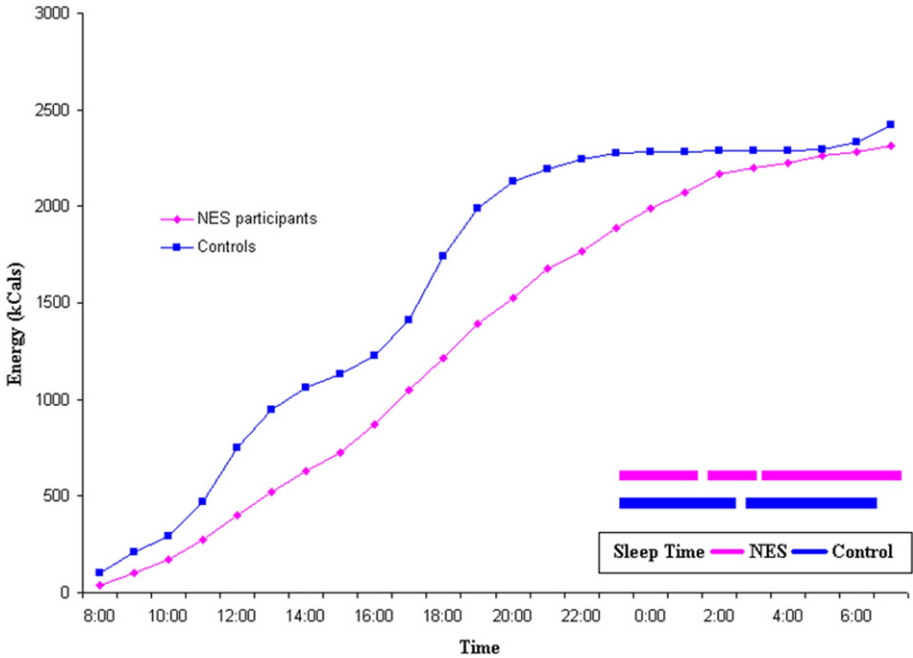


Fig. 1. Cumulative caloric intake for persons with NES. Note that persons with NES have more frequent awakenings than the control group. Note also a delayed circadian shift relative to matched control participants. (From O'Reardon JO, Ringel BL, Dinges DF, et al. Circadian eating and sleeping patterns in the night eating syndrome. *Obes Res* 2004;12:1789–96.)

SUMMARY

In conclusion, 2 types of disordered eating behaviors affect some overweight and obese persons. BED and NES present an excellent opportunity to recognize, treat, and prevent these disorders that, at the least, maintain, and at worst, promote, overweight and obesity. Articles in this volume by Wilson and co-workers and Allison and colleagues discuss current treatment options for BED and NES, respectively. Clinicians are encouraged to evaluate the presence of BED and NES in all patients who seek treatment for their obesity. Although the prevalence of these 2 eating disorders is relatively low, both are associated with significant distress and dysfunction that can be ameliorated with effective treatment.

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