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Shorter communication

Self-help and long-term behavior therapy for obesity

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Abstract

The Trevose Behavior Modification Program, a self-help group offering continuing care for obesity, has recently been shown to produce large long-term weight losses. The present study aimed to replicate this finding across different settings and participants, assessing the weight losses and attrition rates of 128 participants in three Trevose program satellite groups that used the same treatment procedures and manual as the central Trevose group. The satellite groups' results closely paralleled those of the Central Group. Mean intent-to-treat weight loss, or final losses recorded for all participants regardless of their treatment termination date, was 13.7±0.7% of initial body weight (11.8±0.7 kg). At two years, 43.8% of participants remained in treatment, having lost a mean of 19.0±0.8% of their body weight (16.2±1.0 kg); at five years, 23.4% remained, having lost 18.4±1.1% of body weight (15.6±1.5 kg). These results demonstrate that the Trevose model of weight control, combining self-help and continuing care, can be extended and disseminated to other settings, with potentially significant public health consequences. © 2002 Published by Elsevier Science Ltd.

Keywords: Obesity; Weight reduction; Weight maintenance; Behavior modification; Continuing care

1. Introduction

The increasing prevalence of obesity in the United States (National Heart, Lung, and Blood Institute, 1998) has been accompanied by a failure of treatment programs to effect long-term weight loss (Jeffery et al., 2000). An exception to the general trend of unsuccessful long-term weight loss is the Trevose Behavior Modification Program. This volunteer-run self-help group

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that enrolls approximately 1000 persons presents what may be the first affordable and disseminable model of continuing care for obesity. Our recent study of this program found that 47.4% of members remained in treatment at two years and had lost 19.3% of their body weight (17.9 kg). At five years, the 21.6% who remained had lost 17.3% of body weight (15.7 kg) (Latner et al., 2000).

With the possible exception of one Swedish study (Bjorvell & Rössner, 1985), these results are superior to those reported for any other treatment program for obesity. They surpass those of the recent studies of pharmacotherapy (Bray et al., 1999; Davidson et al., 1999; Rossner, Sjostrom, Noack, Meinders, & Noseda, 2000). For example, a recent large randomized trial of the lipase inhibitor Orlistat, one of the few studies providing treatment of two years duration, found that although a comparable proportion of patients remained in treatment after two years, they had lost only 7.6% of their body weight (Davidson et al., 1999). Commercial programs have been disappointing. Although they produce small losses in the short term (Lowe, Miller-Kovach, Frye, & Phelan, 1999), there is a striking absence of long-term outcome data published on these programs (Cormillot, 1995). Attrition rates for behavioral programs such as Weight Watchers are extremely high (50% at 6 weeks and 70% at 12 weeks) (Volkmar, Stunkard, Woolston, & Bailey, 1981). In the absence of more direct weight loss data, these attrition rates may indicate poor longer-term outcomes.

Until recently there have been few reports of long-term weight losses. The National Weight Control Registry, which contains self-reports from individuals all over the country, lists over 1000 persons who have maintained average weight losses of 30 kg for 5.5 years (Klem, Wing, McGuire, Seagle, & Hill, 1997). An intensive 4-year behavioral treatment study in Sweden found that the 56 out of 68 patients who had remained in treatment had lost an average of 12.6 kg at four years (Bjorvell & Rössner, 1985). A German study of meal replacements over a 4-year period found that weight losses of 9.5 kg at four years improved blood glucose, insulin, triacylglycerol and systolic blood pressure (Flechtner-Mors, Ditschuneit, Johnson, Suchard, & Alder, 2000). Limited evidence suggests that long-term weight losses are extremely rare across the population of overweight adults. Estimates range from 2% (the proportion of women in the US maintaining losses of at least 10% for 20 or more years; French, Jeffery, Folsom, McGovern, & Williamson, 1996) to 6% (the proportion of Finnish men and women maintaining losses of at least 5% for nine years; Sarlio-Lahteenkorva, Rissanen, & Kaprio, 2000).

If the Trevose model of treatment could be replicated and disseminated, it would provide low-cost, long-term treatment to large numbers of obese persons and make a significant public health impact. Because the Trevose program's Central Group in Trevose, Pennsylvania has been oversubscribed for some years, 63 small (10–40 participants at any given point in time) groups that employ the same methods as the Central Group have formed. These satellite groups provided an opportunity to determine whether the results of the Central Group can be replicated and extended. To this end, we report the outcome of 128 participants in three satellite groups and compare these groups' results with those of the Central Group.

2. Methods

2.1. Participants

Participants included all persons who had joined three satellite groups prior to 1995 (i.e. five years prior to the time of data collection). These participants had entered the satellite groups on

a continuous basis over the years examined. These satellite groups were randomly selected from among those that had existed since at least 1994 and had retained their records.

2.2. Program protocol

Both the Central Group and the satellite locations closely follow a manualized protocol summarized briefly in this section (Trevose Behavior Modification Program, 1990). To be accepted into the Trevose program, applicants must be between 25 and 100 pounds above insurance industry standards for normal weight (Metropolitan Life Insurance Company, 1983), they must have no history of diabetes, and, significantly, they must never previously have been members of the Trevose program. (In satellite groups, applicants must be between 20 and 80 pounds above normal weight.) Members meet weekly in groups of ten and learn traditional principles of behavior modification for weight reduction: self-monitoring of caloric intake, increasing physical activity, and modifying eating habits (e.g. Stunkard, 1972). Groups are led by experienced members who are trained by the program's director. The organization is run entirely by volunteers who are themselves members.

In addition to offering lifelong treatment at no cost, the program extends traditional behavior therapy by enforcing a number of specific rules that provide external contingencies for goal achievement. First, the initial 5 weeks in the program constitute a screening phase requiring individuals to submit their food records, attend all weekly meetings, and lose 15% of their total assigned weight loss goals. (However, persons with total weight loss goals of 80 or more pounds are required to lose exactly 12 pounds during the screening phase.) Individuals who pass these requirements are accepted as 'members' and are permitted to continue their participation in the program. Those who do not meet these requirements are permanently dismissed from the group.

The requirements for continued membership are equally strict and include consistent attendance, self-monitoring of food intake, and specific weight loss goals each month. During vacations, which require two weeks advanced written notice, members are required to weigh themselves and mail a record of their weight to their group leader on the day of their usual meeting. Members who fail to meet these requirements are 'terminated' from the group and are not permitted to rejoin. More experienced members who do not meet requirements are penalized merely by being placed on 'Parole', which gives them an extra two months in which to meet their goals. Qualifying members are reinforced for their continued success by being graduated to increasingly high 'maintenance levels' at specified time points after maintaining at least 90% of their weight loss goals. They are also invited and encouraged to volunteer as group leaders, assistant leaders, or office workers. When weight loss goals are maintained for 12 months, meeting attendance is no longer mandatory, but members at this level ('independence level') are still required to mail in weight records monthly.

2.3. Measures

Data were collected from the weight loss records of each satellite participant from the date of entry for the following five years. Each participant's record contained data on age, height, weekly weights measured by program staff on balance beam scales from the time of entry through the following five years, and the date of termination for dropouts.

2.4. Statistical procedures

For all individuals who entered treatment, the authors identified the weight loss recorded at the last meeting attended, regardless of treatment length, in order to compute the intent-to-treat (or endpoint) mean weight change. Regression analyses explored predictors of weight loss and duration of treatment. ANOVA compared initial BMI and age among the three satellite groups. ANCOVA, with baseline BMI as a covariate, compared treatment length and intent-to-treat weight loss among the groups. The attrition rates and weight losses of the satellite groups were then compared with those of the Central Group, using ANCOVA with baseline BMI included as a covariate. These procedures were approved by the Rutgers University Institutional Review Board.

3. Results

Of the 128 individuals who entered the satellite groups, 96.9% were women. At the time of entry (between 1986 and 1994), their mean age was 47.1±1.1 years and their mean BMI was 31.8±0.4 (*M*±S.E.). Participants' records did not provide additional information on their demographic characteristics. A total of 89.8% of entering individuals continued beyond the initial 5-week screening phase.

Mean duration of treatment was 27.9±2.0 months for all entering individuals and 31.0±2.0 months for the 115 members who passed the screening phase. (These values are conservative because they were computed with 60 months as a maximum, even though some individuals stayed in treatment for longer than 60 months.) At one year, 69.5% of all entering individuals remained in the program; at two years 43.8%, and at five years 23.4% remained. Fig. 1 shows the attrition rate and weight loss of participants in the satellite groups and the Central Group.

Mean intent-to-treat (endpoint) weight loss for all entering individuals at their last meeting

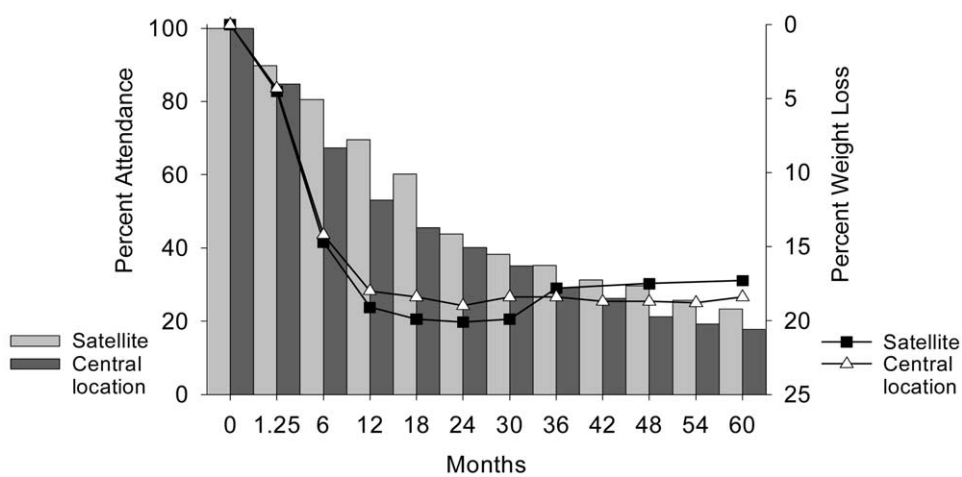

Fig. 1. Percent attendance (bars) and percent of initial weight lost in treatment (lines) for participants in Trevose satellite groups and the central location group from 0 to 60 months of attendance (including those who did not pass the screening phase).

attended was 13.7±0.7% of initial weight (11.8±0.7 kg). At one year, individuals still in treatment had lost an average of 18.0±0.6% of initial weight (15.4±0.7 kg); at two years, those still in treatment had lost 19.0±0.8% (16.2±1.0 kg); at five years, those still in treatment had lost 18.4±1.1% (15.6±1.5 kg). As shown in Fig. 1, those individuals remaining in treatment maintained their reduced weight throughout their participation. Table 1 shows the weight losses of satellite participants and Central Group participants at 6, 12, 24, 36, 48 and 60 months and the proportion of participants achieving weight losses of at least 5% and at least 10% of initial body weight.

ANOVA revealed no differences among the three satellite groups in BMI at the time of entry into the program ($F(2,120)=1.9$, n.s.). Mean ages for groups #1, #2, and #3, respectively, were 45.8, 52.1, and 47.1 years. The groups differed significantly in age ($F(2,110)=6.7$, $p<0.005$), with significant contrasts between groups #1 and #2 ($p<0.01$) and #2 and #3 ($p<0.001$). Controlling for baseline BMI, ANCOVA revealed no differences among the three satellite groups examined for the percent of initial weight lost in treatment ($F(2,119)=0.1$, n.s.) or the length of time spent in treatment ($F(2,119)=1.1$, n.s.).

Data from the present study were compared with those collected previously from the Central Group (data from all entering individuals, including those who did not pass the screening phase). Satellite participants did not differ in age from Central Group participants ($F(1,312)=2.7$, n.s.) but were 2 BMI points lower at baseline ($M=31.8$) than Central Group participants ($M=33.8$; $F(1,323)=16.1$, $p<0.001$). Controlling for baseline BMI, ANCOVA revealed that treatment length was similar between the satellite groups and the Central Group ($F(1,315)=2.42$, n.s.). Satellite participants had lost 1% more of their initial weight than Central Group participants at their last meeting attended (*M*s=13.7% and 12.7%; $F(1,308)=5.5$, $p<0.05$). This small but significant difference may have been associated with the slightly higher dropout rate within the initial 5-week screening phase at the Central Group (15.4%) than at the satellites (10.2%). However, this difference in dropout rate was not statistically significant ($\chi^2(1, N=330) =1.83$, n.s.).

Three factors accounted for 57% of the variance in the percent of body weight lost in treatment ($F(3,106)=46.6$; $p<0.001$): weight lost in the first month of participation ($\beta=0.41$; $p<0.001$), months spent in the program ($\beta=0.40$; $p<0.001$), and BMI at the time of program entry ($\beta=0.31$;

Table 1
Mean weight loss of participants (including those who did not pass the screening phase) in Trevose satellite locations and the Central Group at 6, 12, 24, 36, 48 and 60 months and proportions of participants (%) achieving weight losses of 5% or more and 10% or more of their initial body weight

	n		Mean % loss		5% Loss		10% Loss	
Months	S[a]	C	S	C	S	C	S	C
0	128	202	–	–	–	–	–	–
6	103	136	14.2	14.4	100.0	98.4	89.1	85.3
12	89	107	18.0	18.5	100.0	99.1	92.8	97.1
24	56	81	19.0	19.3	100.0	100.0	94.3	93.8
36	45	59	18.4	17.8	97.7	100.0	93.0	83.3
48	38	43	18.7	17.5	100.0	100.0	94.6	89.4
60	30	36	18.4	17.3	97.56	97.0	96.4	87.9

[a] S= Trevose satellite groups, C= Trevose Central Group.

$p<0.001$). Treatment length was predicted by percent of weight lost in the first month of treatment ($\beta=0.48$ $p<0.001$) and by age at the time of entry ($\beta=0.28$; $p<0.003$); initial BMI was inversely associated with treatment length ($r=-0.19$, $p<0.001$) and was also marginally significant in predicting treatment length ($\beta=-0.15$; $p=0.08$). These factors accounted for 29% of the variance in treatment length ($F(3,95)=12.8$; $p<0.001$).

These analyses included only those individuals who began their participation at a satellite group. However, 21 additional persons had begun their participation at the Central Group and later transferred to a satellite group. The mean weight loss of these individuals (13.9% of initial weight) was nearly identical to that of other satellite participants, but their treatment length was nearly twice that of other participants (52.8 months, with 24.2 months spent at the Central Group).

4. Discussion

Individuals who entered three satellite groups of the Trevose Behavior Modification Program achieved substantial weight losses, as large as those in the parent program, and these losses were maintained throughout the individuals' participation in these groups. Participation in treatment averaged 2.3 years, with over a fifth of participants still in the program at five years. Individuals who lost more weight early in treatment, who stayed longer in treatment, and who started with more weight to lose, achieved higher weight losses. However, lower initial BMI was associated with longer treatment duration. It may be that heavier individuals with larger weight loss goals had more difficulty passing the 5-week screening phase, which required participants to lose 15% of their goal, but those heavier participants who passed the screening phase ultimately lost more weight than participants with less to lose. Participants who lost more weight in the first month, and those who were older, also remained longer in treatment. Participants' ages ranged from 17 to 75, and the three groups' mean ages differed significantly, unlike initial BMI, weight loss, or treatment length. However, age did not correlate with or predict weight loss, suggesting that the Trevose program is effective among a wide range of ages.

In the satellite groups weight loss was slightly higher, and baseline BMI was slightly lower, than in the Central Group. The difference in BMI probably resulted from satellite groups' acceptance of participants who are between 20 and 80 pounds above normal weight, whereas the central location seeks participants who are between 25 and 100 pounds above normal weight.

In the Central Group, participants had achieved their maximum mean weight loss after 30 months of treatment, in contrast to previous reports that the maximum weight loss in behavioral programs typically occurs at 6 months (Jeffery et al., 2000). In the satellite groups, the largest percent of initial weight loss (19%) occurred at 24 months, an observation more consistent with the Trevose Central Group data than with other previous reports. This finding, together with the finding that greater weight loss was predicted by longer treatment duration, emphasizes the importance of continuing care.

These results compare favorably with other treatment programs and traditional (short-term) university weight loss programs. Studies with 5-year follow up periods are relatively rare, but in six studies with follow-up periods of at least four years (treatments lasting from 10 to 26 weeks), mean weights at 5-year follow-up were 1.9 kg lower than baseline weight (Graham, Taylor, Hovell, & Siegal, 1983; Murphy, Bruce, & Williamson, 1985; Stalonas, Perri, & Kerzner, 1984;

Stunkard & Penick, 1979; Wadden & Frey, 1997; Wadden, Sternberg, Letizia, Stunkard, & Foster, 1989). High attrition rates are a common problem in treatment studies of obesity, but the attrition rates found here are comparable to those reported in a large controlled trial of the lipase-inhibitor Orlistat (68.6% at one year; Davidson et al., 1999) and are superior to rates reported in a number of other studies. For example, 44% of patients dropped out of a university-based behavioral treatment program by 6 months (Wadden, Foster, Letizia, & Stunkard, 1992), and 70% dropped out of several commercial behavioral programs by 6 months (Volkmar et al., 1981), compared with 19.5% who dropped out by 6 months in the present study.

Several unique features of the Trevose program may account for its effectiveness. In addition to teaching traditional principles of behavior modification (e.g. recording and reducing caloric intake, eating more slowly, increasing exercise), contingencies such as the 5-week screening procedure and the policy that individuals may join the group only once may help to increase motivation in certain members, by providing them with concrete incentives for meeting their goals. The program's emphasis on the maintenance of weight loss and permanent, lifelong change is accompanied by group support available throughout the member's lifetime at no cost. Individuals attempting to maintain weight losses report that what they feel they need most are maintenance programs that include low- or no-cost ongoing support (DePue, Clark, Ruggiero, Medeiros, & Pera, 1995).

A major limitation of the present study is that the sample comprised groups of self-selected participants. In the absence of randomized controlled trials it is impossible to draw conclusions about the specific efficacy of the Trevose program. The findings are also limited to predominantly women. The applicability of the program to men and minority group populations in the US remains to be tested. Despite these limitations, this replication and extension of promising results from a long-term treatment of obesity argues for future research on the effectiveness of the Trevose treatment model.

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