The role of self-monitoring in the maintenance of weight loss success

Melissa H. Laitner *, Samantha A. Minski, Michael G. Perri

University of Florida, Department of Clinical and Health Psychology, P.O. Box 100165, Gainesville, FL 32610, United States

A B S T R A C T

Introduction: Self-monitoring has been shown to be a crucial part of initial weight loss success in behavioral interventions. However, little is known about the impact of self-monitoring during the period following initial treatment.
Methods: The current study examined the role of self-monitoring on weight loss during an initial 6-month intervention period (Phase 1) and a 12-month extended care period (Phase 2) in a group of 167 obese women ($M \pm SD$: BMI = 37.0 ± 5.1 kg/m^2, age = 59.9 ± 6.2 years) enrolled in a behavioral weight loss program.
Results: Cluster analysis identified three groups of participants with low, moderate, and high rates of weight loss success during Phase 1 and Phase 2. A one-way ANOVA revealed no significant differences in self-monitoring frequency between groups during Phase 1 ($p = .645$), but significant differences between all three groups during Phase 2 ($p = .001$). High success participants completed the most self-monitoring records, followed by the moderate group. The low success group completed the least number of records. Furthermore, self-monitoring during Phase 2 significantly mediated the relationship between extended-care session attendance and percent weight change during that time (95% CI [−.004, −.001], $p < .001$).
Conclusion: These results highlight the importance of continuing self-monitoring after the initial phase of treatment to maintain lost weight.

© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

Self-monitoring, the recording of one's behavior, has been identified as the cornerstone of behavioral weight loss interventions. Kanfer and Karoly (1972) posited that self-monitoring serves as the initial step in a feedback loop that includes (1) the observation and recording of target behaviors; (2) self-evaluation; and (3) self-reinforcement, during which the individual decides to continue with or adjust behaviors in order to align them with their goals. The process allows individuals the opportunity to both establish goals for behavior change and track progress in achieving these goals (Febbraro & Clum, 1998).

In the context of behavioral weight-loss interventions, self-monitoring typically involves the tracking of food and beverage intake. Participants enrolled in behavioral programs commonly lose 8–10% of initial body weight (Butryn, Webb, & Wadden, 2011). Such results are considered favorable based on findings indicating that losses of ≥5% can produce positive changes in health such as reductions in triglycerides, blood glucose, and blood pressure, improved blood lipid levels, and reductions in an individual's risk for developing type 2 diabetes (Jensen, Ryan, Donato, Apovian, Ard, Comuzzie, et al. 2013).

The relationship between self-monitoring and weight change within behavioral weight-loss interventions has been explored extensively

within the literature. A systematic review (Burke, Wang, & Sevick, 2011) of 15 studies showed dietary self-monitoring was significantly associated with weight loss, and that weight loss was significantly greater among individuals who returned self-monitoring logs on a more consistent basis. Similarly, individuals who returned complete logs lost significantly more weight than those who had logs judged to be incomplete.

While research consistently identifies self-monitoring as a strategy associated with weight loss, the majority of studies evaluate this relationship during an initial intervention period (Burke et al., 2011). Long-term weight reductions achieved through behavioral treatment are difficult to maintain and a different set of skills may be required for success following interventions. Research findings indicate that at one year post-intervention, about one quarter of participants have maintained weight loss ≥10% of baseline weight, another quarter of participants maintained weight loss of 5–9.9% below their baseline weight, and almost 40% have only maintained weight loss of ≤4.9% below baseline. The remaining participants lost no weight or gained weight (Christian, Tsai, & Bessesen, 2010). Approximately half of participants will have returned to their baseline weight by five years, while the majority of others regain at least some of the initial weight lost (Perri & Corsica, 2002).

The findings of many typical weight loss studies are limited because they do not identify subgroups of participants with distinct response patterns. The previously mentioned review by Christian et al. (2010) sought to overcome this limitation by requesting categorical weight loss data from investigators who had conducted a 12-month behavioral

* Corresponding author.
E-mail addresses: laitner@phhp.ufl.edu (M.H. Laitner), sminski@phhp.ufl.edu (S.A. Minski), mperri@phhp.ufl.edu (M.G. Perri).

weight-loss intervention for adults. However, the authors noted the review was limited by the small number of studies ($n = 11$) providing categorical data. The absence of studies evaluating changes in weight beyond the mean and between-group significance level represents a barrier to identifying components of treatment associated with higher rates of success. Furthermore, it limits the ability to identify behaviors associated with larger weight losses as well as maintenance of lost weight.

1.1. Current study

The current study explored patterns of weight loss as well as the short- and long-term impact of dietary self-monitoring on weight change among adults enrolled in a behavioral weight-loss intervention. It was hypothesized that participants would fall into unique clusters based on their percent weight change over time, with some participants demonstrating the pattern of weight change most commonly reported in the literature (i.e., clinically significant weight loss followed by a regain during extended care of one-third to one-half the amount initially lost), and other groups of participants showing results that are noticeably different from what is typically reported. We expected that participants in groups demonstrating greater success would also have completed more records of food and beverage intake. We hypothesized that self-monitoring would explain the relationship between treatment attendance and weight change from 0–6 months (during the intervention or Phase 1) and 6–18 months (during the extended-care phase or Phase 2).

2. Method

2.1. Lifestyle intervention

Data for the current study was collected as part of the Treatment of Obesity in Underserved Rural Settings study, a randomized controlled trial designed to explore the effectiveness of three extended-care programs on sustained weight loss. Study design and recruitment methods, including inclusion/exclusion criteria, screening procedures, and attrition, have been previously reported (Perri et al., 2008). All included participants completed an initial 6-month lifestyle intervention for obesity (Phase 1) consisting of a low-calorie eating prescription, increased physical activity, and training in behavior modification strategies such as daily self-monitoring of food intake. After phase 1, participants were randomly assigned to one of the following three extended-care programs each lasting 12 months (Phase 2): a face-to-face maintenance program, a telephone maintenance program, or an educational control group. The face-to-face condition continued to meet in their initial weight loss groups twice per month, whereas participants in the telephone-based condition received individual telephone sessions with the same frequency. Participants assigned to the education control condition received 26 biweekly newsletters

focused on tips for maintaining weight-loss but had no personal contact with the interventionists. Across each extended-care program, participants were encouraged to continue self-monitoring on three or more days per week.

2.2. Participants

Participants were women living in medically underserved rural counties in north central Florida, aged 50–75 ($M \pm SD$ age $= 59.9 \pm 6.2$ years) with BMIs between 30 and 50 kg/m^2 (BMI at baseline $M \pm SD = 37.0 \pm 5.1$ kg/m^2). The study was limited to women as prior feedback from focus groups suggested that women in rural communities would feel most comfortable in groups that (a) included women only and (b) addressed issues of particular concern to women (e.g., physical appearance). Furthermore, initial recruitment response rate from men was less than 5% of potential participants.

A total of 234 women completed Phase 1 of the initial study and were randomized to Phase 2. Participants randomized to the face-to-face and telephone-based condition did not demonstrate significantly different rates of weight loss in Phase 2 ($p < .05$). As a result, they were evaluated as one sample in the current study. The 79 participants randomized to the educational control group displayed significantly different weight change patterns from those in the other groups during Phase 2 and were not included the current study. During Phase 2, two participants did not attend group sessions and one participant was medically withdrawn. A total of 152 participants were included in the current analysis, and 145 participants completed the eighteen month assessment visit (95.4%; see Fig. 2.1). For the seven participants who declined to participate in the 18 month assessment, we assumed that on average they regained 0.3 kg per month after leaving the study (Wadden, Berkowitz, Sarwer, Prus-Wisniewski, & Steinberg, 2001). Baseline characteristics of the sample are summarized in Table 2.1.

2.3. Measures

2.3.1. Height and weight

Height was taken without shoes and measured by a stadiometer to the nearest 0.1 cm. Weight was measured without shoes, in light indoor clothing, and with pockets emptied, to the nearest 0.1 kg using a calibrated and certified balance beam scale. Percent change in weight over time was then calculated based on measured weights at months 0, 6, and 18.

2.3.2. Dietary self-monitoring records

Participants were provided with standardized paper self-monitoring logs and instructed to record daily food and beverage consumption. During Phase 1, participants were instructed to self-monitor on a daily basis. Records were returned to group leaders and reviewed at weekly group meetings. For Phase 2, participants were asked to complete records for at least two weekdays and one weekend day every week.
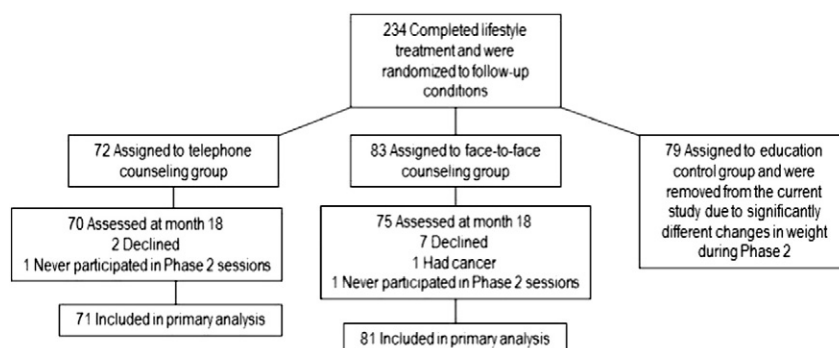

Fig. 2.1. Flowchart of enrollment, randomization, and follow-up.