Published in final edited form as:

J Nutr Educ Behav. 2009 ; 41(6): 425–428. doi:10.1016/j.jneb.2009.04.006.

Is frequent self-weighing associated with poorer body satisfaction? Findings from a phone-based weight loss trial

Ericka M. Welsh, MPH^{1,§}, Nancy E. Sherwood, PhD^{1,2}, Jeffrey J. VanWormer, MS¹, Anne Marie Hotop, MS, MA¹, and Robert W. Jeffery, PhD¹

¹ University of Minnesota, Minneapolis, MN

² HealthPartners Research Foundation, Minneapolis, MN

INTRODUCTION

According to self-regulation theory, motivation for behavioral change results from self-monitoring and the comparison of its resultant information against an ideal state (1). In the context of weight control, self-monitoring one's weight is a strategy that can be used to prompt behavior change. Specifically, self-weighing can inform an individual about his or her weight status, which in turn can motivate the adoption of weight loss behaviors if current weight status exceeds one's perceived ideal weight. Observational research supports self-monitoring of weight for weight control. Specifically, greater frequency of self-weighing is associated with improved weight loss (2), reduced weight regain following weight loss (3), and weight gain prevention (2,4).

Although self-weighing appears beneficial in terms of weight control, some researchers have expressed concern about its negative effect on psychological outcomes, such as depression and body image, and the adoption of unhealthful weight control practices (5–9). One study found that frequent self-weighing predicted higher prevalence of binge eating and unhealthful weight control practices in a population-based sample of adolescent females, but not males (5). However, studies conducted in adult populations suggest that increases in self-weighing are associated with decreases in depressive symptoms and fewer binge eating episodes (6). In addition, researchers have found no association between frequent self-weighing and depression in obese women (7). One study found that frequent self-weighing was associated with worse body image in normal weight women (9); however, the effect of self-weighing on body satisfaction among obese, treatment-seeking adults has not been established (10).

The purpose of this study was two-fold: (1) to examine the effect of self-weighing frequency on weight change and (2) to examine the effect of self-weighing frequency on body satisfaction. We hypothesized that more frequent self-weighing is positively associated with better weight loss outcomes. We anticipated no negative association between self-weighing frequency and body satisfaction.

§Corresponding author: Ericka Welsh, MPH; Division of Epidemiology & Community Health, 300 West Bank Office Building, 1300 S. 2nd Street, Minneapolis, MN 55454; Telephone: (612) 624-0567; Fax: (612) 626-9505; Email: welsh@umn.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

STUDY DESCRIPTION

Participants

Participants were 63 individuals enrolled in the Drop It At Last (DIAL) study, a six-month randomized-controlled weight loss trial investigating the efficacy of 10- and 20-session telephone counseling groups compared to a self-directed program. Individuals were recruited via postcard advertisements mailed to University of Minnesota employees, as well as advertisements in local community newspapers. Informed consent was documented by signature of all study participants prior to their inclusion in the study. Mean age of participants was 49.5 (SE $\pm$ 1.4) years. Eighty-two percent of participants were White, 79% were female, 58% had at least a college degree, and 89% were currently employed. Mean weight at baseline was 95.3 (SE $\pm$ 1.5) kg, and mean BMI at baseline was 34.2 (SE $\pm$ 0.5) kg/m².

Procedure

All study procedures were approved by the University of Minnesota's Institutional Review Board. Detailed descriptions of the study design have been described elsewhere (Sherwood NE, Jeffery RW, Welsh EM, VanWormer J, Hotop AM. The Drop It At Last (DIAL) Study: Six month results of a phone-based weight loss trial. *Am J Health Promot.* In press.). Subjects were assigned to one of three treatment groups: a 10-session telephone counseling group, a 20-session telephone counseling group, or a no contact self-directed program. Participants in all three groups were provided with a lesson booklet, pedometer, and portable self-monitoring booklets. All participants were encouraged to self-weigh and record their weight daily, and individuals in the telephone groups were asked to report their weight weekly to their counselor. All participants were asked to record the time, amount and type of foods eaten; the calorie and fat content of foods eaten; the time, type, intensity, and duration of exercise done; total steps walked per day; and the calories expended from exercise. Participants obtained calorie and fat information from nutrition labels on packaged foods as well as from information provided by HealthChequesTM, a portable nutrition information booklet. Individuals calculated their calorie expenditure by multiplying time spent engaged in an activity (e.g., 30 minutes of walking) by intensity level of the activity (e.g., low intensity: 5 calories/minute). Individuals in the telephone groups were asked to mail in their self-monitoring booklets and they discussed its contents with their counselor during weekly sessions. During each session, participants reported on progress and barriers to weight loss, and the counselor discussed with the participant ways to implement behavioral changes into his or her lifestyle.

Measures

At baseline and six month clinic visits, participants reported self-weighing frequency as never, about once a year or less, every couple of months, every month, every week, every day, and more than once a day. Frequency of self-weighing was collapsed across three levels: once a month or less, weekly, and daily (no participants reported self-weighing more than once a day), which is comparable to other studies (3,7).

Demographics measured at baseline included age, gender, race, education, and employment status. At both visits, weight was measured in-person using a calibrated digital scale while participants were wearing light street clothes and their shoes were removed. Height was measured using a wall-mounted stadiometer. Body mass index (BMI) was calculated from weight and height information (kg/m²).

Body satisfaction measures included a shortened, validated version of the Body Shape Questionnaire (BSQ-16) (11,12), and the body dissatisfaction subscale of the Eating Disorder Inventory (EDI-9) (13). The BSQ-16 is a self-report measure designed to assess an individual's fear of gaining weight, feelings of low self-esteem due to their appearance, their desire to lose

weight, and body dissatisfaction. Participants were asked to rate the extent to which they felt a statement was true about them over the past four weeks (e.g., 'Have you noticed the shape of other people and felt that your own shape compared unfavorably?') Response options were 'always', 'very often', 'often', 'sometimes', 'rarely', or 'never' (possible score range: 34–204). The EDI-9 is a self-report questionnaire measuring body dissatisfaction. Participants were asked to rate the extent to which they felt a statement was true about them (e.g., 'I think that my stomach is too big.') Response options were 'always', 'usually', 'often', 'sometimes', 'rarely', or 'never' (possible score range: 0–27). Higher summary scores on both of these questionnaires indicate greater body dissatisfaction.

Statistical Analysis

All analytical procedures were conducted using SAS Version 8.2 (Cary, NC: SAS Institute Inc.). An α -level of 0.05 was used as the criterion for statistical significance. One-way analyses of variance and chi-square tests were used to compare group demographic and behavioral characteristics between levels of self-weighing frequency. Variables shown to differ between groups were considered as covariates in subsequent analyses. Treatment group and baseline values of dependent variables are included as covariates in all analyses.

General linear model regression (PROC GLM) was used to assess the effect of self-weighing frequency or change in self-weighing frequency on outcomes of interest (i.e. change in weight, BSQ-16, and EDI-9 summary scores). Least-square means show mean differences in outcomes by levels of self-weighing frequency or change in self-weighing frequency. For analyses, change in self-weighing frequency from baseline to six months was dichotomized into two groups: increased frequency of self-weighing versus self-weighing frequency which stayed the same or decreased. Missing six-month follow-up data on weight and body shape satisfaction were handled two different ways: (1) using all available data and (2) using the last observation carried forward approach where missing six-month data were imputed with baseline data. Thirteen participants did not attend the six-month follow-up clinic visit and analyses using all available data are thus limited to 50 participants. Results are using all available data unless otherwise noted.

STUDY FINDINGS

Self-weighing frequency

Table 1 shows frequency of self-weighing at baseline and six months, as well as change in self-weighing frequency over the study period.

Weight change

As outlined in Table 2, self-weighing frequency at six months was associated with six-month weight change, after controlling for baseline weight, treatment group, age, gender, and self-monitoring of amount/type of food and calories consumed ($F=3.60$, $p=0.04$). Specifically, participants who reported daily self-weighing at six months lost significantly more weight than participants who reported self-weighing weekly or less. In addition, participants who increased their frequency of self-weighing over the six-month period demonstrated significantly better weight loss outcomes than those who maintained or decreased their frequency of self-weighing (-6.8 kg vs. -3.1 kg, $F=8.59$, $p=0.006$). Results were similar using the last observation carried forward approach.

Body shape satisfaction

Baseline and six-month summary scores for body satisfaction outcomes are outlined in Table 1. No significant associations were found for self-weighing frequency and body satisfaction at

six months ($F=0.55$, $p=0.58$). When using all available data, change in self-weighing frequency was not associated with body satisfaction as measured by the BSQ-16 (-27.3 vs. -17.8 , $F=2.04$, $p=0.16$). However, in the last observation carried forward analysis, change in self-weighing frequency was significantly associated with improved body satisfaction during the six-month study period, after controlling for weight change, gender, treatment group, and baseline body satisfaction score. Specifically, participants who increased their frequency of self-weighing from baseline to six-month follow-up had greater decreases in BSQ-16 summary scores compared to those who maintained or decreased their frequency of self-weighing (-25.1 vs. -10.4 , $F= 5.87$, $p=0.02$). Self-weighing frequency at six months was not significantly associated with EDI-9 scores at six months ($F=0.66$, $p=0.52$). Similar non-significant results were found for change in self-weighing frequency and change in EDI-9 scores ($F=0.12$, $p=0.73$).

DISCUSSION

Our results support previous findings that regular self-weighing is associated with better weight loss outcomes (2,3). Study participants who increased their frequency of self-weighing from baseline to six months lost twice as much weight as participants who maintained or decreased their frequency of self-weighing over the same time period.

In addition, our findings seem to refute some of the conclusions drawn by Dionne and Yeudall who suggest that feedback about body size may result in psychological distress (8). They suggest that self-weighing may worsen body image or mood status by continuously reinforcing that one's current body size is not appropriate or ideal. If this were true, we would have expected differential body shape satisfaction scores by level of frequency of self-weighing. Our findings, however, indicate that frequent self-weighing does not worsen body satisfaction and may slightly improve it. One possible explanation for this finding is that frequent self-weighing improves self-efficacy for weight loss, which in turn has a positive impact on body image. This possibility is echoed by one study which found that, among obese adults following weight loss treatment, body image improved independent of actual weight lost (14).

IMPLICATIONS FOR RESEARCH AND PRACTICE

As with previous studies, our findings are observational, and we are thus limited in our ability to assert that more frequent self-monitoring of weight or diet and exercise behaviors causes or contributes to improved weight loss. Instead, it could be that certain individuals who are more likely to be successful in weight loss treatment are also more apt to self-monitor their weight on a regular basis. This particular research question is ideally answered by a randomized controlled trial whereby the frequency of self-weighing is manipulated in the context of behavioral weight loss treatment (e.g., comparing daily vs. weekly self-weighing).

Despite claims that frequent self-monitoring may potentially cause psychological harm and subsequent failure of weight loss efforts (8), no evidence of such phenomena were observed in our study of obese, treatment-seeking adults. It is important to keep in mind that our participants were enrolled in a weight loss study which provided materials, including a lesson book, and the majority received support by telephone counselors. Thus, it is possible that any potential negative impacts of self-weighing were attenuated by receiving educational materials and/or support. More research needs to be conducted to replicate these findings across a larger, more diverse population of overweight adults. Overall, frequent self-weighing appears to be a reasonable, and perhaps necessary, component of a successful behavioral weight loss program.

Acknowledgments

The project described was supported by Grant Number P30 DK050456 from the National Institute of Diabetes and Digestive and Kidney Diseases. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institute of Diabetes and Digestive and Kidney Diseases or the National Institutes of Health.

References

1. Kanfer, FH.; Goldstein, AP., editors. *Helping People Change*. Vol. 4. New York: Pergamon Press; 1990.
2. Linde JA, Jeffery RW, French SA, Pronk NP, Boyle RG. Self-weighing in weight gain prevention and weight loss trials. *Ann Behav Med* 2005;30:210–216. [PubMed: 16336072]
3. Butryn ML, Phelan S, Hill JO, Wing RR. Consistent self-monitoring of weight: a key component of successful weight loss maintenance. *Obesity* 2007;15:3091–3096. [PubMed: 18198319]
4. Levitsky DA, Garay J, Nausbaum M, Neighbors L, DellaValle DM. Monitoring weight daily blocks the freshman weight gain: a model for combating the epidemic of obesity. *Int J Obes* 2006;30:1003–1010.
5. Neumark-Sztainer D, van den Berg P, Hannan PJ, Story M. Self-weighing in adolescents: helpful or harmful? Longitudinal associations with body weight changes and disordered eating. *J Adolesc Health* 2006;39:811–818. [PubMed: 17116510]
6. Wing RR, Tate DF, Gorin AA, Raynor HA, Fava JL. “STOP Regain”: are there negative effects of daily weighing? *J Consult Clin Psychol* 2007;75:652–656. [PubMed: 17663619]
7. Linde JA, Jeffery RW, Finch EA, Simon GE, Ludman EJ, Operskalski BH, Ichikawa L, Rohde P. Relation of body mass index to depression and weighing frequency in overweight women. *Prev Med* 2007;45:75–79. [PubMed: 17467785]
8. Dionne MM, Yeudall F. Monitoring of weight in weight loss programs: a double-edged sword? *J Nutr Educ Behav* 2005;37:315–318. [PubMed: 16242063]
9. Ogden J, Whyman C. The effect of repeated weighing on psychological state. *Eur Eat Disord Rev* 1997;5:121–130.
10. O’Neil PM, Brown JD. Weighing the evidence: benefits of regular weight monitoring for weight control. *J Nutr Educ Behav* 2005;37:319–322. [PubMed: 16242064]
11. Cooper PJ, Taylor MJ, Cooper Z, Fairburn CG. The development and validation of the Body Shape Questionnaire. *Int J Eat Disorder* 1986;6:485–494.
12. Evans C, Dolan B. Body Shape Questionnaire: derivation of shortened “alternate forms”. *Int J Eat Disorder* 1993;13:315–321.
13. Garner DM, Olmsted MP, Polivy J. Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *Int J Eat Disord* 1983;2:15–34.
14. Foster GD, Wadden TA, Vogt RA. Body image in obese women before, during, and after weight loss treatment. *Health Psych* 1997;16:226–229.

Table 1

Participants' body satisfaction and self-weighing frequency at baseline and six months

Frequency (%) and Raw Mean Scores (SE)		
	Baseline	6 months
N	63	50
BSQ-16	118.0 (4.2)	96.1 (4.8)
EDI-9	17.6 (0.9)	13.0 (1.1)
Self-weighing frequency:		
Daily	10 (15.9)	19 (38.0)
Weekly	24 (38.1)	22 (44.0)
≤Once a month	29 (46.0)	9 (18.0)
Increase	n/a	24 (48.0)
Stayed the same	n/a	23 (46.0)
Decrease	n/a	3 (6.0)

Table 2

Six-month change outcomes by frequency of self-weighing at six months (all available data)

Self-weighing frequency	Mean change (SE)			
	Daily	Weekly	≤ Once a month	<i>p</i>
Weight (kg)	−6.8 (1.3) ^a	−3.5 (1.2) ^b	−1.7 (2.0) ^b	<i>0.04</i>
BSQ-16 score	−25.1 (6.2)	−22.3 (5.1)	−20.7 (9.2)	<i>0.90</i>
EDI-9 score	−5.0 (1.5)	−3.5 (1.4)	−5.3 (2.1)	<i>0.62</i>

NOTE: superscripts indicate statistically significant between-group mean differences