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A Review of Web-Based Weight Loss Interventions in Adults

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Abstract

Unprecedented obesity rates are changing the burden of disease worldwide and obesity-related health complications are increasing health care costs. In response, researchers, clinicians and public health practitioners are seeking new and effective tools such as the internet to effect weight loss. This review highlights peer-reviewed literature on randomized controlled trials that examine internet-delivered weight loss and maintenance programs. The scope of this review is broader than previous reviews, including more males and non-Hispanic white participants. The reviewed studies show intervention results ranging from no weight loss to an average loss of 7.6 kg. It is difficult to draw a definitive conclusion on the potential impact of internet-based weight loss as study methods are highly variable between papers, low adherence was recorded and not all studies include a control group. As the demand for low-cost, efficacious interventions that yield statistically significant and/or clinically relevant results grows, more rigorous, population-specific research is needed to determine if internet-delivered interventions may slow or reverse with weight gain and obesity and the associated health consequences.

Keywords

Internet; weight loss; obesity

Introduction

Obesity rates worldwide are unprecedented, causing notable health complications and increasing risk of death. Obesity has been linked to heart disease, certain cancers, type 2 diabetes, stroke, arthritis, breathing problems and psychological disorders.¹ National Health And Nutrition Examination Survey data from 2007–2008 show an age-adjusted overweight prevalence of 68.0%, with 32.3% of the population classified as obese.² Furthermore, a 2002 RAND report calculated that obesity leads to health care costs 36% higher than those for normal weight individuals and increases risk of chronic conditions to the same extent as 20 years of aging.³

Approaches to weight loss trials may be pharmacological, surgical, or behavioral. Behavioral interventions have the potential to be inexpensive, with fewer negative side effects than pharmaceutical or surgical approaches. Clinical trials of weight loss drugs have shown drop out rates up to 50%, calling into question the potential to disseminate trial results into practice.⁴ Behavioral intervention trials to combat obesity have shown successes in reducing weight at clinically and/or statistically significant levels over varying time periods.^{5, 6, 7, 8} In-person weight loss trials such as the Diabetes Prevention Program and

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Look AHEAD set a 6 month goal of 7% body weight loss.^{9, 10} This goal was set and met to reduce severity of diabetes and subsequent health consequences by changing lifestyle habits, which may have fewer adverse effects compared to invasive surgeries or pharmacological treatments. Although results from these trials show lifestyle changes to be highly effective, these trials have high costs and are not available to the public.

While weight loss tools have improved over the past 30 years, the obesity epidemic persists, suggesting that weight loss barriers have not been overcome. Considerations in choosing any intervention include reach, target population, expense, feasibility and duration. Internet interventions are relatively novel for weight loss, and may be less time and resource intensive than in-person interventions. Internet interventions may not have as great an impact on weight loss as gold standard in-person interventions, and lowering the 7% weight loss goal to a 5% weight loss could prove to be clinically relevant and feasible if internet interventions can mimic some of the tools and successes of the in-person trials while reaching a larger population.

Scientific evidence on weight loss can guide future research and weight loss programming. An internet-based strategy could reach those who were not able to or did not want to partake in an in-person weight loss program. This review is intended to summarize the state of the science of internet-delivered weight loss interventions and to highlight strengths and weaknesses of published studies. The discussion and conclusions of this review examine published studies in the hope that future research will strengthen methodology to provide more causal evidence of interventions on weight loss.

Methods

This review focuses on weight reduction or weight maintenance related studies delivered to adult populations via web-based programs. A PubMed search using keywords “obesity,” “Internet,” “intervention,” limited to categories Adults, English and Humans produced 39 results published between 2001 and 2009. Studies with endpoints other than weight reduction or weight maintenance were excluded. Intervention delivery through mobile technologies such as podcasting or cellular phones were also excluded so as to lessen variability in intervention tools. Studies to be included in this review were subject to the following criteria: 1) randomized controlled trials 2) adult population 3) primary endpoint of weight loss or weight maintenance 4) overweight or obese population 5) website or web-based programming as a primary focus of the intervention. Only two studies in this original search matched the criteria, so further study inclusion was based on the bibliographic references of the articles found in the original search. Two reviews published in 2006 and 2007 also discuss Internet-based interventions with obese subjects.^{11, 12} Some of the studies discussed in this review (Gold et al. 2007, Rothert et al. 2006, Tate et al. 2001, Womble et al. 2004) overlap with those discussed in the previous reviews. However, this review focuses in greater detail on intervention design and efficacy for weight loss, and includes more male and minority populations as the scope of the literature has increased. Studies of pilot testing, behavioral strategies, targeting those with a particular disease, and aspects of design and implementation apart from weight change were excluded. Variation of search terms to include “web-based,” “weight change,” or similar terms did not improve search results. Final papers included in this review (n=9) are listed in Table 1.

Study Population and Design

All included studies were randomized controlled trials (RCTs), as RCTs best isolate the effect of and strengthen evidence for or against the given intervention. When properly performed, RCTs provide robust evidence of an intervention’s efficacy. Still, it is important to note that results may not translate to populations different from those studied. While

previous reviews have examined internet-led weight loss, this review allows broader population-based conclusions to be drawn as the reviewed studies include more males and non-Hispanic whites. Study populations had an average age of 34 to 54. Participants were between 50 and 100% female, and average BMI measured 29 kg/m² and greater. The percentage of non-Hispanic white participants ranged from 50–95%, although 2 studies did not report race or ethnicity. Inclusion and exclusion criteria generally eliminated those with major medical problems within 5 years, recently pregnancy or planning pregnancy, recent large weight loss and those taking weight loss drugs. Study duration ranged from 3 to 18 months.

Measurements such as height, weight, blood pressure and waist circumference were taken at baseline and at various intervals. Measured data is considered to be more objective than self-report. Only Rothert et al. relied on self-report solicited via email. Womble et al. took 11 measurements in-person, whereas most other studies took baseline and either one or two follow up measurements.

Weight Loss Results

The reviewed studies suggest that internet-based interventions do not have a uniform effect on weight. Using intent to treat (ITT) methods, weight loss ranged from less than 1 kg (considered to be natural noise) to 4.9 kg. Since interventions differed considerably, results are presented individually by study. Statistical pooling was not employed due to the differences between studies in interventions. This review was conducted with a primary interest in the efficacy of internet interventions for weight loss and the magnitude of weight change. Notably, participant attrition surfaced as an issue because it attenuates weight loss results when using ITT methods and raises concern about the feasibility of promoting interventions on a larger scale. Participant characteristics and weight loss are presented in Table 2. Table 3 summarizes the percent weight loss from baseline to study completion based on ITT analysis.

In the Tate et al. study 91 participants were randomized to either internet education or internet behavioral therapy. All participants were offered a website orientation and were given weight loss resources and behavioral weight control lessons¹³. This initial lesson included advice on calorie intake and physical activity and explained self-monitoring tools and online resources. Self-monitoring was encouraged for all participants, but only the behavioral therapy group submitted weekly self-monitoring diaries to the therapist. All participants were contacted at 3 and 6 months for follow up measurements and a clinical psychologist visit. Behavioral therapy group participants received weekly emails with structured weight loss lessons and individualized feedback, and were able to submit questions to the therapist. Those who did not send a weekly log received a personalized email inquiring about progress and encouraging continued participation. Among behavioral therapy completers, average weight loss was 4.0 ± 2.8 kg at 3 months and 4.1 ± 4.5 kg at 6 months. Among the education group completers, average weight loss was 1.7 ± 2.7 kg at 3-months and 1.6 ± 3.3 kg at 6 months. This study shows significant differences between groups at both time points (p=.001, p=.04 respectively). ITT analysis also showed a statistically significant difference between groups, in addition to a significant treatment x time interaction. However, ITT weight loss among the internet group at 6 months showed a loss of only 2.9 ± 4.5 kg at 6 months. Login frequency was correlated with weight change between 0 and 6 months for behavioral therapy (r=-0.43, p=.003) and the education only group (r=-0.33, p=.03). Attrition did not vary by treatment group at either 3 or 6 months, but those who did not attend the 6 month visit were younger and had less email or Internet experience at baseline. This study shows that the personalized attention through the behavioral therapy intervention had a greater effect on weight loss than the generic internet-

based education. Still, the internet group reduced body weight by only 3.7%, less than a clinically relevant weight change.

Womble et al. offered all 47 participants baseline and quarterly meetings with a psychologist, but randomized participants either to support through an online resource (eDiets) or a weight loss manual (LEARN).¹⁴ Researchers believed that constant and continuous access to the website, in combination with a virtual visit with a dietitian, customized grocery lists, physical activity recommendations, and unlimited access to social support would lead to greater weight loss than the LEARN manual. The eDiets group lost only 0.8 ± 3.6 kg at 52 weeks, compared to the LEARN weight loss of 3.3 ± 4.1 kg ($p=.04$). Researchers found that participants used the website less than anticipated, averaging 17.7 log-ins during the first 16 weeks. Employing a median split for log-in frequency, a positive association was found with weight loss among the eDiets group. A lack of power may in part explain the null results as 34% attrition was greater than anticipated. Analysis showed that although participant attendance did not significantly differ by intervention group, attendance decreased significantly over time. The average weight loss of 0.9% among the internet intervention group is not clinically relevant.

Gold et al. compared eDiets, the commercial self-help website, with VTrim, an online therapist-led structured behavioral weight loss program among 124 individuals. VTrim entailed a 6 month weight loss phase and a 6 month weight maintenance phase¹⁵. The VTrim intervention focused on weekly behavioral and self-management strategies. Self-reported weight was discussed weekly and feedback was offered on completed assignments. In the maintenance phase feedback was offered bi-weekly and participants were encouraged to use support from the website. The eDiets group self-reported weight weekly and received automated feedback, as well as individually tailored meal plans and exercise programs. Although the eDiets website did not offer a structured behavioral plan with lessons or activities, it hosted online meetings, chat rooms, discussion boards and buddy systems. VTrim was more effective than eDiets in promoting weight loss among completers (8.3 ± 7.9 kg vs. 4.1 ± 6.2 kg at 6 months; 7.8 ± 7.5 kg vs. 3.4 ± 5.8 kg at 12 months). Baseline carried forward (BCF) analysis showed attenuated results (5.1 ± 7.1 kg vs. 2.6 ± 5.3 kg at 12 months). Attrition for VTrim was 18% at 6 months and 35% at 12 months, while eDiets attrition was 19% at 6 months and 23% at 12 months. This difference was not significant by treatment group, although within group analysis showed that VTrim completers were more highly educated than VTrim dropouts. Adjustment for log-in frequency eliminated weight loss differences between groups, showing both groups averaging a weight loss of 6.2 ± 1.0 kg ($p=0.996$ for between group differences). This study suggests that VTrim behavioral strategies were more effective than eDiets in inducing weight loss, but log-in frequency explains the difference in weight loss between groups. The eDiets group on average lost 2.9% of baseline body weight, falling short of the 5% clinically relevant standard.

The McConnon et al. study randomized 221 participants to either a website intervention or usual care. The website group was offered targeted advice, tools and information.¹⁶ Self-reported weight loss progress was stored online and automatic generic emails encouraging website usage were generated if participants did not log-in weekly. Those randomized to usual care were asked to continue with usual approaches to weight loss and were offered print information at baseline in accordance with information given in primary care. Researchers recorded a weight loss of 1.3 kg in the website-based group and 1.9 kg in the usual care group, showing no statistically significant difference between groups for weight loss at 12 months. The low change in weight may be due to extensive attrition, and also reflects the low intensity of the intervention. Since researchers anticipated and recruited to account for 22% attrition, the 41% attrition observed greatly affects the power of the study to detect a weight loss difference. Researchers therefore used both last observation carried

forward (LOCF) and BCF in the analysis, biasing results toward the null. Adjusting for age, sex, baseline weight, physical activity and baseline confidence, the internet group was heavier at 12 months than at baseline (0.5 to 0.8 kg). This study shows that internet-based weight control package developed for this study and offered to obese volunteers was not effective in causing weight loss. Average body weight was reduced by 1.3% among the internet intervention group, less than the clinically relevant goal.

The Rothert et al. study compared weight loss between an online tailored information group and an online information only group (n=2,862).¹⁷ The tailored intervention, a weight management program called Balance, was a 6 week self-help program offering tailored plans formulated by a software algorithm using baseline survey responses. Baseline guides were supplemented by tailored action plans at weeks 1, 3 and 6 delivered via email notification. The resulting 2.8 ± 0.3 kg weight loss among tailored expert system completers at 6 months is significantly greater than the 1.1 ± 0.4 kg lost by the information only group ($p=0.0007$), but is slightly less in magnitude than the commercial website results seen by Gold et al. Analysis using measurements at 3 and 6 months was performed both for completers and using LOCF, showing great attenuation using LOCF. There were no significant differences in response rates between the treatment groups, although those above age 55 and whites were most likely to respond compared with African Americans and Hispanics. Still, it is notable that 36% of study participants were African American, a population not well represented in previous internet-based weight loss studies. Researchers conducted a telephone survey of non-respondents to inquire about current weight and learned that of the 27 individuals interviewed, 11 reported not receiving email notification of the follow-up surveys. This study shows that an automated web-based intervention is more effective than information in leading to weight loss, although communication difficulties and ethnic differential responses present directions for further investigation. Body weight was reduced by an average of 3.0% among the internet intervention group, less than the clinically relevant standard.

The Behavioral Intervention Therapy delivered through the Hunter et al. study incorporated aspects of the previously discussed interventions, but at a higher intensity dose. The 446 participants were active-duty military personnel recruited through a military medical research center. After attending in-person orientation, participants were offered behavioral, dietary and exercise plans¹⁸. Researchers instructed participants to log-in 5 times per week to complete self-monitoring food and exercise diaries. Weekly lessons included behavioral modification strategies and interactive quizzes lasting 20–30 minutes. Participants also received the LEARN Program for Weight Management Manual and were assigned weekly reading. In addition, participants received 15-minute motivational interviewing telephone calls at weeks 4 and 8. Feedback and phone calls were offered by a single counselor. Researchers reported a 1.3 ± 4.1 kg weight loss among the intervention group and a weight gain of 0.6 ± 3.4 kg among the usual care group at 6 months using BCF. Although there was only a small difference between groups for weight loss, researchers noted a significant positive association between weight change and site use as measured by logins or self-report. Furthermore, 22.6% of intervention participants lost 5% or more of body weight as compared to only 6.8% of usual care participants. Almost 83% of the sample was evaluated at 6 months, despite the fact that there was no run-in phase or incentives for participation. Researchers did not find any significant interactions between treatment group assignment and BMI, race or gender. This study demonstrates the need for a weight loss intervention that is more effective among this young and ethnically diverse study population. The reported 1.5% average reduction in body weight does not meet the goal for clinical relevance.

Bennett et al. (2009) compared usual care (individual providers offering advice as they liked and “Aim for a Healthy Weight” print materials) with an interactive web-based intervention among 101 individuals.¹⁹ The intervention group was offered tailored obesogenic behavior change goals. Intervention participants worked with a health coach to establish goals. Given earlier evidence that adherence wanes over time, researchers created a dynamic self-monitoring tool comparing individual progress with average changes of other participants and reassessed goals at 6 weeks. Participants were encouraged to use the website at least 3 times per week, earning a raffle ticket with each log-in and/or tracked behavior so as to create further incentive for participation. A coach was available via messaging, and social networking forums and recipes were offered online. In addition, a health coach initiated two, 20-minute motivation-coaching sessions in person at baseline and 6 weeks and two 20-minute biweekly sessions over the phone at weeks 3 and 9. Researchers found a greater between group difference in weight loss analyzing the completers (-3.05 kg) than using BCF (-2.56 kg). Total mean weight loss among the completers was 2.71 ± 3.34 kg among the intervention group and 0.34 ± 2.04 kg gain among the control group. Of clinical relevance is the finding that 25.6% of intervention participants and no control participants lost $>5\%$ of initial body weight at 12 weeks. While more men than women were lost to 3 month follow up, other demographic differences between completers and non-completers were not statistically significant. This study shows a statistically significant difference in weight loss between the intervention and control groups and good adherence to log-in goals, but the magnitude of weight loss is less than comparable trials. The 2.3% average body weight reduction reported is less than the clinically relevant standard.

The Harvey-Berino et al. intervention differed from the above reviewed studies in that it included an intensive 6 month interactive TV-delivered component and then utilized the internet for a weight maintenance program among 255 participants. This interactive portion of the intervention entailed weekly one hour discussions, print outs, instructions on calorie reduction, and encouragement of physical activity, in addition to dietary and physical activity logs²⁰. After the intervention, weight maintenance was tracked through 3 support arms: Internet-based (IS), minimal in-person (M-IPS) and frequent in-person (F-IPS). Final measurements of weight maintenance from baseline were greater in the IS group (-4.7 ± 6.9 kg) than in the in-person support groups (-3.9 ± 5.9 kg for M-IPS, and -4.2 ± 7.9 kg for F-IPS). The reported ITT analysis attenuates weight loss results, and completer analysis showed a greater magnitude of weight loss as shown in Table 3. Higher attrition rates in the IS group were associated with less education and less weight loss during the first 6 months of treatment. The clinically relevant weight loss and maintenance of 5.2% of body weight shows promise for internet maintenance interventions and should be evaluated in future studies.

Like the previously discussed study, Cussler et al. offered weight loss treatment followed by an internet delivered weight maintenance program. The 4 month in-person treatment entailed a weekly session to focus on physical activity, nutrition and healthy eating, social support and mind/body wellness skills. After 4 months, participants were cluster randomized to either internet-based or self-directed weight maintenance. The internet group had a mean weight loss of 5.3 ± 3.6 kg, while the self-directed group had a mean loss of 5.2 ± 3.8 kg. Over the following 12 months participants in the internet-based group had access to tools for communication, progress monitoring logs, curriculum materials including dietary and activity information and links to relevant websites. Using BCF analysis, the difference in weight maintenance between groups were not statistically significant. Women in the internet group regained 0.4 ± 5.0 kg compared to a regain of 0.6 ± 4.0 kg in the control group. Authors noted a higher attrition rate of 21.2% in the internet group than the 14.5% attrition in the control group, citing discomfort with the internet as a possible explanation. Also, self-directed participants organized groups with peers from the weight treatment sessions to

compete with the internet group (the “Avis” effect), which may bias results toward the null. Researchers tried to isolate the type of internet use by associating logs of diet, weekly weight, physical activity, and frequency of contact with 4–16 month weight change. Diet log completers were significantly and negatively correlated with change in body weight ($\rho = -0.29$, $p < 0.05$). Changes in exercise energy expenditure were positively correlated with multiple internet log entries (diet log, $\rho = 0.41$; weekly weight, $\rho = 0.41$; physical activity, $\rho = 0.33$; total, $\rho = 0.38$, $p < 0.01$). While the internet group maintained a clinically relevant 5.8% body weight loss to study completion, there was no statistically significant difference between groups, calling into question the specific impact of the internet intervention.

Discussion

While the above results are presented individually to better understand the nature of the interventions and the results and interpretations, this discussion will attempt to relate methods and findings across studies. Still, when interpreting results it is important to note that only some of the interventions included a control group, and interventions varied greatly in terms of contact with participants, sample size and study duration.

Nearly all of the studies noted weak adherence through minimal use of Internet resources and high rates of attrition. In some studies, less education and less initial weight loss were associated with drop out rates.^{15, 20} High attrition rates bring into question the feasibility of widespread utilization of internet-based programs, but it is important to note that drop out rates are lower than those observed in some drug trials for weight loss.⁴ Also, various studies showed a positive association between log-in frequency and weight loss.^{13, 14} This finding implied that frequent engagement with weight loss resources may increase magnitude of weight loss and guided the design of subsequent studies, but must be tested in a randomized trial to generate conclusive evidence. Bennett et al., for instance, attempted to address issues of log-in frequency by including incentives in the form of a raffle and measures of individual versus group comparison to motivate participants. Despite high website utilization and the 84% retention rate, the Bennett et al. study did not show a clinically relevant weight loss.

Between study comparison of the commercial-style websites further sheds light on successful tools for weight loss. Gold et al. suggested that the differences in magnitude of weight loss when comparing eDiets trials may be due to upgrades in the website with increased diet, fitness and support options. The Rothert et al. Balance website offered weight loss tools similar to those on eDiets, but unlike the other studies it was completely automated and delivered to nearly 3,000 members of health care delivery system Kaiser Permanente, with few exclusion criteria and no in-person measurements. These factors suggest that weight loss websites should be regularly evaluated and updated to meet the needs of users, incentives may be needed to promote website usage and that the exclusionary criteria might be considered in future trials to better understand generalizability of findings.

Internet-delivered weight maintenance after an intervention showed clinically relevant weight loss, but studies have drawn different conclusions. The Harvey-Berino et al. study results suggest that an interactive TV program followed by Internet support for weight maintenance was more successful than in-person support over 18 months. However, Cussler et al. found that those who had access to internet support after a 4 month weight loss intervention did not keep more weight off than those who had self-directed weight maintenance goals, although the reported “Avis” effect that may have lessened between group differences. The magnitude of weight loss in the maintenance studies stands out in comparison to other trials and approaches the in-person gold standard weight loss of 7%, but

cannot be attributed to the internet intervention as there was no statistically significant difference between groups.

Studies with greater gender equality did not show clinically relevant weight loss, calling for future research to target males. The racially diverse studies also did not show clinically relevant weight loss, and noted lower response rates among African Americans and Hispanics as compared to Whites.¹⁷ The lack of weight change among these populations excluded from previous studies raises new research questions about tailoring and population-specific interventions.

Conclusions

Those interventions including an active weight loss component followed by online dynamic, tailored material and self-reporting showed greater retention and may have more promise for inducing significant weight loss. The in-person or intensive weight loss programs followed by internet-based maintenance were the only studies that met weight loss goals of 5%. Still, greater percentages of those in the intervention groups consistently achieved a clinically relevant 5% weight loss than those in the education groups.

It is not clear whether Internet weight loss programs will impact the obesity epidemic. As noted above, attrition rates present one of the challenges of this type of intervention, and strategies to better retain participants should be developed and replicated in future studies. Although recent studies include more males and minority populations, future studies might explore how specific groups may have greater benefit from this type of program and may expand sample sizes to increase power. Future studies on internet-based weight loss should weigh feasibility and cost against the record of success for in-person program components. Since general trends show a weight increase over time, even maintenance of current weight may delay or prevent negative consequences that accompany weight gain.

Abbreviations

RCT	Randomized Controlled Trial
ITT	Intent to Treat
BCF	Baseline Carried Forward
LOCF	Last Observation Carried Forward
IS	Internet-based support
M-IPS	minimal in-person support
F-IPS	frequent in-person support

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Table 1

Studies Included in the Review

Study authors	Title
Bennett et al. (2009) ¹⁹	Web-based Weight Loss in Primary Care: A Randomized Controlled Trial
Cussler et al. (2007) ²¹	Maintenance of Weight Loss in Overweight Middle-Aged Women Through the Internet
Gold et al. (2007) ¹⁵	Weight Loss on the Web: A Pilot Study Comparing a Structured Behavioral Intervention to a Commercial Program
Harvey-Berino et al. (2004) ²⁰	Effect of Internet support on the long-term maintenance of weight loss
Hunter et al. (2008) ¹⁸	Weight management using the Internet a randomized controlled trial.
McConnon et al. (2007) ¹⁶	The Internet for weight control in an obese sample: results of a randomised controlled trial
Rothert et al. (2006) ¹⁷	Web-based weight management programs in an integrated health care setting: a randomized, controlled trial.
Tate et al. (2001) ¹³	Using Internet technology to deliver a behavioral weight loss program
Womble et al. (2004) ¹⁴	A randomized controlled trial of a Commercial Internet Weight Loss Program

The above table lists the studies included in this review.

Table 2

Study Populations

Study	Sample Size	Age in years (mean \pm s.d.)	Female	Baseline BMI in kg/m ² (mean \pm s.d.)	White
Bennett et al.	101	54.4 \pm 8.1	46.5%	34.6 \pm 3.2	49.5%
Cussler et al.	135	47.7 \pm 10.3	100%	31.1 \pm 3.8	88.2%
Gold et al.	124	47.7 \pm 10.3	81.4%	32.4 \pm 4.1	61%
Harvey-Berino et al.	255	45.8 \pm 8.9	82%	31.8 \pm 4.1	not reported
Hunter et al.	446	34	50%	29	55.61%
McCommon et al.	221	45.8 \pm 10.6	77%	34.5 \pm 6.8	95%
Rothert et al.	2862	45.4 \pm 12	82.8%	32.1 \pm 3.8	56.6%
Tate et al.	91	40.9 \pm 10.9	89%	29 \pm 3.0	83%
Womble et al.	47	43.7 \pm 10.2	100%	33.5 \pm 3.1	not reported

This table provides background information on participants.

Table 3
Clinical Relevance of Weight Change Among Internet Groups at Study Completion

Study	Average baseline weight (kg)	Average weight loss using intent to treat data (kg)	Weight loss based on intent to treat data (%)	Average weight loss using completer data (kg)	Weight loss based on completer data (%)
Bennett	101	2.3	2.3%	2.7	2.7%
Cussler*	84.6	4.9	5.8%	4.6	5.4%
Gold	90.2	2.6	2.9%	3.4	3.8%
Harvey-Berino*	91.1	4.7	5.2%	7.6	8.3%
Hunter**	87.4			1.3	1.5%
McCommon**	97.5			1.3	1.3%
Rothert**	92.2			2.8	3.0%
Tate	77.4	2.9	3.7%	4.1	5.3%
Womble	93.4	0.8	0.9%	1.9	2.0%

* Weight maintenance studies; reported data is from before the intervention until end of follow up

** Intent to treat data was not provided

This table summarizes the weight loss in kilograms and in terms of percentage body weight for the internet intervention groups only.