

H.E.A.L.T.H.: Efficacy of an Internet/Population-Based Behavioral Weight Management Program for the U.S. Army

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Abstract

Background:

A significant number of soldiers exceed the maximum allowable weight standards or have body weights approaching the maximum allowable weight standards. This mandates development of scalable approaches to improve compliance with military weight standards.

Methods:

We developed an intervention that included two components: (1) an Internet-based weight management program (Web site) and (2) a promotion program designed to promote and sustain usage of the Web site. The Web site remained online for 37 months, with the Web site promotion program ending after 25 months.

Results:

Soldiers' demographics were as follows: mean age, 32 years; body mass index (BMI), 28 kg/m²; 31% female; and 58% Caucasian. Civilian demographics were as follows: mean age, 38 years; BMI, 30 kg/m²; 84% female; and 55% Caucasian. Results indicated that 2417 soldiers and 2147 civilians ($N = 4564$) registered on the Web site. In the first 25 months (phase 1) of the study, new participants enrolled on the Web site at a rate of 88 (soldiers) and 80 (civilians) per month. After the promotion program was removed (phase 2), new participants enrolled at a rate of 18 (soldiers) and 13 (civilians) per month. Utilization of the Web site was associated with self-reported weight loss ($p < .0001$). Participants who utilized the Web site more frequently lost more weight ($p < .0001$). Participants reported satisfaction with the Web site.

Conclusions:

The Web site and accompanying promotion program, when implemented at a military base, received satisfactory ratings and benefited a subset of participants in promoting weight loss. This justifies further examination of effectiveness in a randomized trial setting.

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Abbreviations: (APFT) Army Physical Fitness Test, (AWCP) Army Weight Control Program, (BMI) body mass index, (H.E.A.L.T.H.) Healthy Eating, Activity, and Lifestyle Training Headquarters, (STW) screening table weight

Keywords: Army, Internet weight management, military, obesity, obesity prevention, weight loss

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Introduction

Military personnel are not immune to the effects of overweight and obesity.¹ A significant number of soldiers exceed the maximum allowable weight and fat standards or have body weights approaching the maximum allowable weight standards as defined by Army Regulation 600-9, the Army Weight Control Program (AWCP).² Further, soldiers must also meet specified fitness standards.³ Soldiers who do not meet weight, fat, and fitness standards are referred to a brief remedial program to aid them in meeting their standards. There is often a stigma associated with failing the standards and/or being referred to a remedial weight program. Ultimately, the consequences of failing these standards include degradation of combat readiness, injury, failed promotion, and possible premature discharge from the Army.² In 2003, the Committee on Military Nutrition Research recommended the development of a program to promote weight loss and maintenance in the military population that was “portable.”⁴ The Healthy Eating, Activity, and Lifestyle Training Headquarters (H.E.A.L.T.H.) program was developed to meet this need, and the complete intervention has been described in another paper.⁵

Since 2000, scientific literature has documented many studies that have tested the use of the Internet as a means of delivering weight management programs for adults.^{6,7} Overall, these studies have reported that the Internet can be used to induce small weight losses and that their potential to prevent weight gain is viable.^{8–16} These studies have shown that tailored information given to individuals utilizing online programs and the use of cognitive behavioral strategies applied to physical fitness and nutrition are key components for successful weight management. In contrast, Internet-based education programs that simply include educational online support are not as successful for weight management.^{8,11–14} In consideration of these findings, and the need for reduced stigma related to remedial weight management in the military, the H.E.A.L.T.H. program was created to provide an anonymous weight management program for soldiers.

The H.E.A.L.T.H. program consisted to two components: (1) an interactive, personalized Internet program (Web site) designed to aid soldiers in fitness, nutrition, and combat readiness and (2) a Web site promotion program designed to prompt sustained utilization of the Web site. The H.E.A.L.T.H. program utilizes a fully automated, individualized Web site for weight management for U.S. soldiers but does not employ online Internet counseling.

The Web site contains tools such as a nutrition planner, fitness planner, Army Physical Fitness Test (APFT) planner, and individualized tools to track progress.⁵

The H.E.A.L.T.H. Web site automatically collects data that can be used to evaluate long-term utilization, including utilization patterns in response to events sponsored by the Web site promotion program. The program was also offered to civilians who were family members of military personnel. The rationale for opening the program to civilian use was to support soldiers in their weight management efforts and to provide a benefit to civilians; however, civilians were not the primary focal point of the study.

This article describes a pilot study designed to test the efficacy of the H.E.A.L.T.H. program conducted at Fort Bragg, NC. Specific aims of the present pilot study included (1) examination of the efficacy of an Internet-based intervention (H.E.A.L.T.H. Web site) to promote weight loss in soldiers exceeding their weight standard and weight gain prevention in soldiers approaching their weight standard, as well as assist family members (civilians) with weight management; (2) evaluation of the effectiveness of a Web site promotion program designed to promote and sustain utilization of the Web site; and (3) examination of satisfaction with the Web site by participants.

Methods

Participants

Participants in the present study included soldiers and civilians (soldiers’ family members) residing in Fort Bragg, NC. The participants were recruited via the Web site promotion program (e.g., emails, fliers, newsletters, promotional items, and events).

Soldiers must meet body weight and body fat standards to be in compliance as defined by the AWCP. The weight that a soldier cannot exceed to remain in compliance with the weight standard (weight-for-height allowance) is called the “screening table weight” (STW). In the present study, the target population was defined as any soldier who came within 5% of or exceeded their STW as defined by the AWCP.² The target civilian population was defined by anyone at or exceeding a body mass index (BMI) of 25. **Figures 1** and **2** illustrate the distributions of participants at Fort Bragg and the target populations, respectively.

Procedures

The study was approved by Pennington Biomedical Research Center's institutional review board and the institutional review board of the Army (Human Subjects Research Review Board). The H.E.A.L.T.H. Web site was offered to soldiers and their families with no possibility of researchers identifying the participants (anonymous use). Thus participants were not consented for participation in the study, and the study qualified for exempt status from the two institutional review boards.

Soldiers and civilians at Fort Bragg, NC, were given the opportunity to utilize the Web site for 3 years to aid them in losing weight, maintaining weight, and/or preventing unwanted weight gain, as well as improving their fitness (for soldiers, improvement on the APFT test). Any soldier or civilian stationed at Fort Bragg, NC, could access and use the Web site.

The promotion program for the H.E.A.L.T.H. Web site included (1) emails/newsletters that were distributed by military personnel to prompt soldiers to visit new features on the Web site, (2) emails that were sent to members of the command structure (e.g., command sergeant majors, staff sergeant majors, first sergeants) featuring new information encouraging members of the command to recommend the program to soldiers, and (3) prompting when a participant logged in. Once logged in, the Web site provided participants with individualized messages about weight, fitness, and nutrition, as well as prompts to update information (e.g., weight) and participant satisfaction questions based on the information they entered into the Web site over time.

Given the anonymity of the program, it is not known how many participants were successfully contacted and recruited via electronic emails. Furthermore, electronic email prompts to retain participants were also not possible within this study design. The design required that participants log on to the site before they could be engaged in any way. The electronic emails for recruitment were sent as blanket emails authored by the command structure of Fort Bragg. Throughout, the recipients were unknown to the researchers on the project. Details on the Web site promotion program have been described previously.⁵

Participants learned how to access the H.E.A.L.T.H. Web site through the Web site promotion program. The Web site was password protected on two levels: (1) there was a general password for participants to get into the Web site initially (this password was provided on promotional

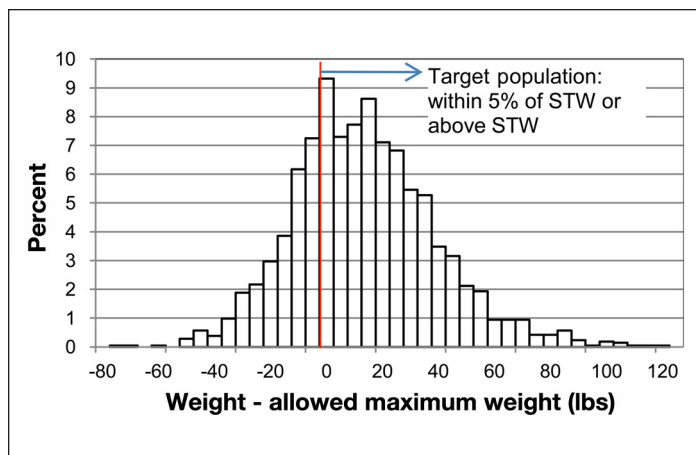


Figure 1. Weight distribution of participants: soldiers.

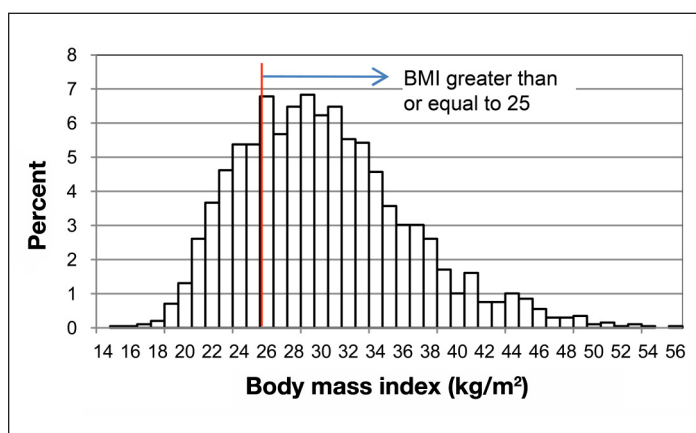


Figure 2. Body mass index distribution of participants: civilians.

materials) so that individuals surfing the Internet from other locations in the world could not have open access to the Web site, and (2) once a participant got into the Web site, they "registered" by creating an account for themselves, including a username and password by which they could access their personal account information (e.g., weight graphs, nutrition plans, fitness plans) each time they revisited the Web site.

The H.E.A.L.T.H. Web site and Web site promotion program began in July 2006. The Army H.E.A.L.T.H. intervention was deployed for 3 full years, including 25 months of the complete intervention and 12 months when the Web site could be accessed but the Web site promotion program had ended. Other reports have described programs ranging from 3 to 12 months.⁸⁻²¹

Data Collection

All data collected in this study were from the H.E.A.L.T.H. Web site. Data collected included participant demographics, utilization data, weight loss outcome data, and participant satisfaction data. Details of the data collected by the Web site were described in an earlier

paper.⁵ For the purposes of this article, utilization data included (1) cumulative record of participant registration over time, (2) record of new participant registration and logins over time in relation to the active phase (phase 1) and discontinuance of the promotion program (phase 2), and (3) usage of Web site tools. Weight loss outcome data included self-reported weight change over time in relation to number of days of use of the Web site.

Participant satisfaction data were assessed using an online survey that could be accessed throughout the 3-year study. Questions concerning the Web site were answered using Likert scales (1 = strongly disagree, 4 = neutral, and 7 = strongly agree). Qualities of the Web site that were surveyed included participant friendliness, personalization, usefulness for health improvement, confusion when using the site, feeling lost while using the site, usefulness of graphics, usefulness of creating an account, Web site organization, ease of moving around the Web site, helpfulness of links, clarity of instructions, attractiveness of graphics and charts, straightforwardness of text, and ease of reading on the Web site.

Statistical Analyses

All participants were classified by one of three categories of the utilization data. These categories were formed based on the distribution of the utilization data. These categories included (1) *low participant use* - signed in and did not return or returned one time after initial sign up on the Web site; (2) *medium participant use* - used the Web site 2–8 times on separate days after the initial sign up on the Web site; (3) *high or regular participant use* - used the Web site at least nine times on separate days after the initial sign up (registration) on the Web site. Weight loss was determined using self-reported data (post-baseline–baseline). The lowest weight and end of study weight were used to evaluate if a participant met $\geq 5\%$ of baseline weight loss for the study.

All analyses were performed using commercially available software (SAS, version 9.1; SAS Institute, Inc., Cary, NC). All tests were two sided, and the statistical significance was defined at 0.05. The analyses of variance and Chi-square tests were used to test if there were differences in characteristics among low-, medium-, and high-use participants. The Poisson regression model was used to test if there was a significant drop on new enrollment and returning log-ins after the prompting program was removed. A Mantel–Haenszel Chi-square test was used to examine the linear relationship between the usage of the Web site and weight loss.

Results

Demographic Data

Participants in the study cohort included 2417 soldiers and 2147 civilians. The demographic characteristics of the study cohort are shown in **Table 1** and are representative of the population with regard to sex, age, and race at Fort Bragg.²² The mean age of the soldiers was 32 years. Civilians were slightly older (mean age, 38 years). The study cohort was comprised of more men in the soldier group and more women in the civilian group. The majority of the participants were Caucasian (soldier and civilian groups). The majority of soldier participants had greater than 10 years experience in the military.

Web Site Utilization

The H.E.A.L.T.H. Web site was initiated during July 2006 and ran through July 2009. The promotion program began July 2006 and ended July 2008 (phase 1). In **Figure 3**, the line denotes the ending of the Web site promotion program (phase 2). On average, during the Web site promotion program (phase 1), 88 new soldier and

Table 1.
Participant Demographics^a

		Soldier		Civilian	
		<i>n</i>	Mean (SD) ^b	<i>n</i>	Mean (SD)
Age	Women	755	30.9 (8.5)	1798	36.5 (11.0)
	Men	1662	32.3 (8.1)	349	45.0 (12.1)
BMI	Women	677	26.8 (4.0)	1677	29.6 (6.5)
	Men	1473	28.9 (3.7)	313	30.4 (4.8)
		<i>n</i>	Percentage	<i>n</i>	Percentage
Sex	Women	755	31.2%	1798	83.7%
	Men	1662	68.8%	349	16.3%
Race	Caucasian	1401	58.0%	1186	55.2%
	African American	534	22.1%	626	29.2%
	Other	482	19.9%	335	15.6%
Years in military	Less than 5	664	27.5%	—	—
	5 to 10	544	22.5%	—	—
	More than 10	944	39.1%	—	—
	Not entered	265	11.0%	—	—

^a The reader should note that there are unequal numbers of participants for each of the demographic variables in **Table 1**. The discrepant numbers are caused by the registration of some individuals who completed select demographic fields but omitted others.

^b SD, standard deviation.

80 civilian participants enrolled in the program per month. After the removal of the Web site promotion program (phase 2), 18 new soldier and 13 new civilian participants enrolled per month (see **Figure 4**). The Poisson regression model predicted decreasing enrollment after the removal of the promotion program, and new registration activity was reduced significantly for both soldiers and civilians (soldier: $\chi^2(1) = 805$, $p < 0.0001$; civilian: $\chi^2(1) = 706$, $p < .0001$).

Figure 5 illustrates the quantity of returning logins by all participants pre and post implementation of the promotion program. On average, during phase 1, there were 57 returning logins made by soldiers and 61 returning logins made by civilians per month. After the removal of the promotion program (phase 2), the number decreased to 15 and 14, respectively (soldier: $\chi^2(1) = 409$, $p < .0001$; civilian: $\chi^2(1) = 481$, $p < .0001$).

Overall, there were more low-use participants ($n = 2260$, soldiers; $n = 1948$, civilians) than medium- ($n = 135$, soldiers; $n = 163$, civilians) and high-use participants ($n = 22$, soldiers; $n = 36$, civilians) on the Web site (see **Table 2**). There were no differences in age or BMI among

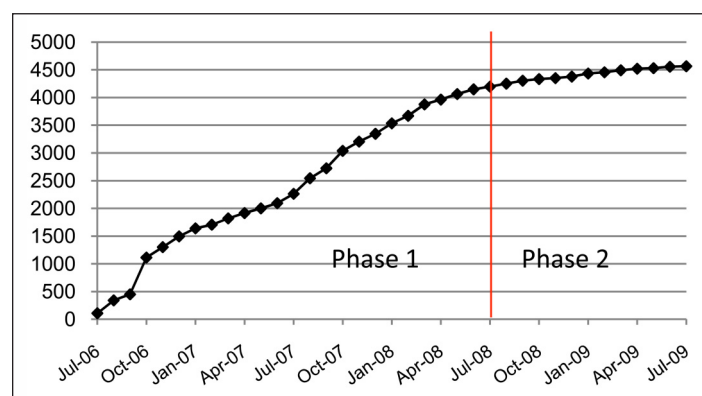


Figure 3. Cumulative graph of participant enrollment over time (soldiers and civilians): phases 1 and 2.

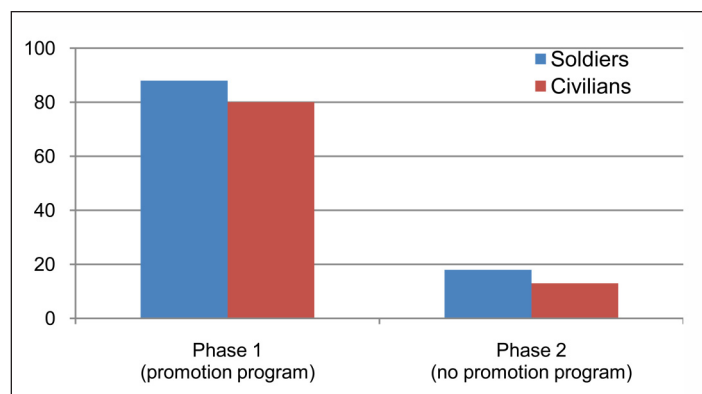


Figure 4. Enrollment of new participants (soldiers and civilians).

the participant use types ($p > .50$ for all). Similarly, there were no differences in sex, race, or years served in the military (for soldiers) detected ($p > .15$ for all). Participant-use groups for soldiers were predominantly male and Caucasian. Participant use groups for civilians were predominantly female and Caucasian.

With regard to specific parts of the Web site used most frequently, the most frequently utilized tool was the nutrition/meal planner tool followed closely by the fitness/exercise planner for both medium- and high-participant-use groups (see **Table 3**). Time spent utilizing the food planner was greater than that of the exercise planner or lifestyle planner. This finding is consistent for soldiers and civilians.

Self-Reported Changes in Body Weight

Table 4 illustrates the relationship between achieving a weight loss of $\geq 5\%$ of body weight and the participant use type for phase 1 (first 25 months of the study) only. The 5% weight loss could be achieved at any time during the study period. Increased Web site use was associated with increases in achieving a 5% weight loss goal ($X^2 = 23.6$, $p < .0001$). The same conclusion was obtained using the last weight entry of participant use for the study ($X^2 = 15.6$, $p < .0001$). The finding is consistent for soldiers and civilians. [The participant use types low, medium, and high were defined based on the frequency of Web usage. It is of note that low-use participants should not be confused with participants who enrolled into the study later. Judging from the time distance in days between the date enrolled to the time the study ended, there is no difference among three participant use groups (low use, 468 ± 209 ; medium use, 454 ± 209 ; high use, 438 ± 209). Lower use participants chose not to return or returned only once after the initial enrollment for other reasons than late enrollment along the study. Participants were enrolled at different time

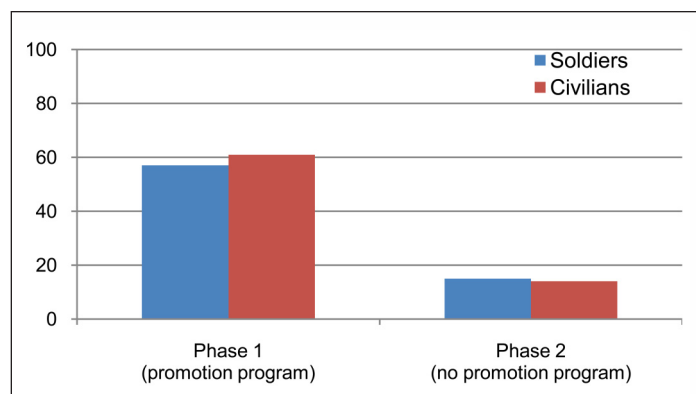


Figure 5. Returning participant logins (soldiers and civilians).

Table 2.
Profiles of Participant Use Types^a

	User	N	Age	BMI	Gender % female	Race % white	Military services % ≥10
Soldiers	Low	2260	31.9 ± 8.3	28.2 ± 3.9	31.1	57.9	44.2
	Medium	135	31.6 ± 8.2	28.3 ± 3.8	36.3	56.3	39.3
	High	22	31.2 ± 6.0	28.9 ± 3.8	18.2	72.7	40.9
	P values		0.86	0.68	0.18	0.35	0.15
Civilians	Low	1948	37.8 ± 11.6	29.7 ± 6.3	83.3	54.6	
	Medium	163	38.6 ± 11.5	30.1 ± 6.3	89.0	61.4	
	High	36	37.7 ± 11.5	29.8 ± 5.4	83.3	63.9	
	P values		0.70	0.71	0.17	0.14	

^a Participant use types are as follows: *low use*, signed in and did not return or returned one time after initial sign up on the Web site; *medium use*, used the Web site 2–8 times on separate days after the initial sign up on the Web site; and *high use* or *regular use*, used the Web site at least nine times on separate days after the initial sign up on the Web site.

Table 3.
Participant Usage of Web Site Tools: Returning Logins by Participant Use Type^a

		Logins from medium users (# users = 135; # logins = 439)		Logins from high users (# users = 22; # logins = 723)	
		Logins used tool (%)	Minutes spent mean (SD) ^b	Logins used tool (%)	Minutes spent mean (SD)
Soldiers	Food planner	54.2%	11.8 (22.8)	56.3%	11.8 (30.6)
	Exercise planner	49.2%	3.4 (6.3)	49.7%	4.2 (11.0)
	Lifestyle planner	10.0%	1.3 (2.7)	6.4%	0.7 (0.8)
	Average time spent per session	—	19.6 (32.6)	—	18.4 (41.9)
		Logins from medium users (# users = 163; # logins = 546)		Logins from high users (# users = 36; # logins = 766)	
Civilians	Food planner	60.4%	20.6 (39.4)	55.6%	25.4 (43.7)
	Exercise planner	48.2%	6.2 (12.8)	44.3%	5.3 (11.3)
	Lifestyle planner	8.2%	2.8 (7.8)	6.9%	0.9 (1.0)
	Average time spent per session	—	29.1 (50.2)	—	24.4 (47.8)

^a Participant use types are as follows: *medium use*, used the Web site 2–8 times on separate days after the initial sign up on the Web site; and *high use* or *regular use*, used the Web site at least nine times on separate days after the initial sign up on the Web site.

^b SD, standard deviation.

Table 4.
Relationship between the Participant Use Type and Weight Loss: Soldiers and Civilians^a

	Weight loss (at some point during study) met 5% weight loss goal?		Last weight entry weight loss met 5% weight loss goal?	
	Yes	No	Yes	No
Low use (n = 181)	11 (6%)	170	11 (6%)	170
Medium use (n = 212)	25 (12%)	187	19 (9%)	193
High use (n = 54)	18 (33%)	36	15 (28%)	39
Total	54 (12%)	393	45 (10%)	402

^a *p* values were from Mantel–Haenszel Chi-square tests. The number of Web site visits was log transformed before conducting correlation analyses. No significant correlations were detected between the Web site visits and age, BMI, and body weight at baseline with all *p* values greater than 0.11. However, the correlation between Web site visits and weight change (%) at the end of the study was found to be significant ($r = -.21$, $p < .0001$).

points along the study, and participants who enrolled later on had less time to reach their weight loss goals. To address this concern, we conducted the same analyses including last weight entries occurring after 180 days of the enrollment only, assuming that 6 months is adequate for them to lose 5% of their baseline body weight. The same conclusion was reached with p values of 0.0097 ($X^2 = 9.3$).] In order to investigate this relationship further, correlations between the frequency of Web site visits and percentage of weight loss was computed. Because the number of visits was highly skewed toward low frequencies, the number of Web site visits was log transformed before conducting correlation analyses. No significant correlations were detected between the Web site visits and age, BMI, and body weight at baseline with all p values greater than 0.11. However, the correlation between Web site visits and self-reported weight change (%) at the end of the study was found to be significant ($r = -.21$, $p < .0001$). This finding is consistent with the findings from the comparisons of percentage of weight loss in the three categories of Web site utilization that are summarized in **Table 4**.

Participant Satisfaction

Questions regarding the Web site were answered using Likert scales (1 = strongly disagree, 4 = neutral, and 7 = strongly agree). Participant satisfaction ratings were

favorable and are summarized in **Table 5**. A total of 12% of soldier participants and 8% civilian participants completed the satisfaction questionnaire on the Web site. As can be seen in **Table 5**, mean ratings for all 14 items for 469 participants [soldiers ($n = 292$) and civilians ($n = 177$)] were between 5.05 and 6.08, which suggests that most respondents perceived the Web site as having a variety of positive features.

Discussion

Internet-based programs have been shown to help individuals lose and maintain weight when they provide a structured, individualized program with fitness, diet, and cognitive-behavioral components.⁶ The H.E.A.L.T.H. program contained structured and individualized diet, fitness, and cognitive behavioral components and was designed to aid soldiers in losing and/or maintaining weight/fat as well as improving fitness. This study found that some soldiers and their family members used an anonymous, fully automated, Internet-based intervention for prevention of weight gain and/or weight management on a regular basis.

Most Internet-based weight management studies have enrolled weight-loss-treatment-seeking individuals. In this study, some soldiers who were either above or near the

Table 5.
Participant Satisfaction Ratings

Question #	Question	Average soldier score	Average civilian score
1	The Web site was easy to use ("user-friendly").	5.68	5.99
2	The Web site was personalized. It provided customized feedback to me.	5.6	5.97
3	The Web site was useful and helped me in my attempts to improve my health.	5.61	5.97
4 ^a	I felt confused while using the Web site.	2.72	2.42
5 ^a	I felt lost while looking for information.	2.6	2.32
6	The use of graphics on the Web site helped me track my progress at changing my habits.	5.05	5.17
7	Did you find that creating an account on the Web site was helpful?	5.49	5.65
8	The Web site was well organized.	5.65	5.96
9	The Web site was easy to move around in.	5.58	5.89
10	The links were helpful.	5.61	5.87
11	The instructions on the Web site were clear.	5.67	5.9
12	Graphics and charts were attractive and visually pleasing.	5.68	5.91
13	Text was presented in a simple and straightforward way.	5.79	6.08
14	The Web site was easy to read.	5.86	6.07

^a Indicates reverse-scored items.

STW criterion had an interest in weight loss and weight maintenance to facilitate meeting their fatness and fitness standards and therefore can be considered to be similar to treatment-seeking participants in other studies. However, it is important to note that the present study (no control group, population-based study) differs from a randomized controlled trial (clinic-based study, participants choose to be a volunteer). Such that, in the present study, there is some ambiguity with regard to the motivation of the soldiers to use the Web site. For example, soldiers may have been curious about the program once hearing about it, and/or the program may have been recommended or even mandated by their superiors. In this study, use of the H.E.A.L.T.H. Web site was associated with self-reported weight loss in soldiers and civilians. Further, like other Internet studies addressing weight management in adults, increases in Web site usage were associated with increases in achieving weight loss.^{8,13,15} The weight loss reported in this study (12% of participants lost $\geq 5\%$ at some point during the study, and 10% of participants lost $\geq 5\%$ as their last weight entry) was less than reported in a similar Internet weight loss intervention for individuals in the military (Air Force tailored Internet intervention, 22.6% lost at least 5% of baseline weight).¹⁶ However, our study included no human contact with participants, while the comparable study included in-person orientation sessions and counselor phone calls over the course of the study.

In the absence of human contact in the present study (no counseling sessions or individualized emails), the Web site promotion program was designed to prompt enrollment and utilization of the Web site. It was observed that enrollment on the Web site was reduced significantly in phase 2 (promotion program removed) of the study. Individuals continued to enroll on the Web site after the promotion program ended but at a significantly reduced rate. Based on significantly reduced enrollment and utilization of the Web site in phase 2 of the study, we have concluded that a Web site promotion program is necessary to promote enrollment and utilization of an Internet-based weight management program over time. Other Internet studies for weight management have concluded that strategies to improve engagement in online programs are needed.^{17,18} Thus, we believe marketing of the Web site is critical to the overall success of this type of Internet-based program. Anecdotally, we recommend that, in order for programs of this kind to gain any traction in the soldier population, the program should receive support from the command structure and medical services.

Overall, the Web site received favorable participant satisfaction ratings; however, the usage of the site appears lower than what one would expect of a positively reviewed product. Possible explanations for this apparent discrepancy include (1) time constraints due to job responsibilities and family obligations impacting utilization and (2) some soldiers reporting that they used the Web site a few times, got the information they needed, and then used it to fashion personal plans for themselves, never needing to log on more than a few times to get results. In sum, participants rated the Web site positively; however, we suspect that high frequency utilization was hindered by other factors. Future Internet-based studies are needed to identify methods of sustaining Web site usage. For example, the use of personalized prompts (participants would have to sign consent) via the Web site or other mediums, e.g., mobile technology such as smart phones (this technology is currently being developed for the H.E.A.L.T.H. program) or other mobile applications (such as the iPad), may aid in improving enrollment and sustaining Web site utilization over time.

This study is unique in that the Internet-based program was used with active-duty soldiers, it was anonymous (participants were not required to sign informed consent), and the program was fully automated (no human contact). Also, to our knowledge, this 37-month investigation is the longest intervention to date that examined the efficacy and feasibility of an online weight management program with adults.

There are several advantages with the use of an Internet-based approach with soldiers. Some of these advantages are that (1) soldiers have a vested interest in meeting weight, fatness, and fitness standards; (2) the study cohort had an established communication system for advertising the program; and (3) promotion of the program took advantage of a number of preexisting resources, e.g., local publications, weight loss groups on base, and family groups. Finally, an active-duty military base lends itself to successful coordination of promotional campaign events because it is fairly localized versus populations that are spread across large geographical areas.

All of the results and conclusions presented in this article should be interpreted within the context of several limitations. Limitations of the study included (1) the absence of a control group (this study was not a randomized controlled trial), (2) exclusive use of self-reported information concerning body weight changes, and (3) anonymity of participants precluded the ability

to prompt or monitor utilization. Furthermore, because of anonymity, the H.E.A.L.T.H. Web site could not store personal information of the participants, and we could not provide personalized feedback via email from the Web site. All emails designed to prompt Web site usage were sent by military personnel (not the research group or the Web site itself). These emails were for the overall promotion of the program and not personalized for the individual soldier's (or civilian's) needs. This particular feature of the study did not allow the Web site to prompt individual participants to come back to the Web site. However, when the participants visited the site and logged in, the Web site was able to provide individualized information as well as prompts to engage on the Web site. Given this limitation, more traditional forms of prompting had to be used, e.g., local publications, programs, and promotional items (T-shirts).

In conclusion, novel interventions are needed to increase health risk communication and to promote healthy body weight/fatness, physical performance, and combat readiness among military personnel. Like other studies investigating Internet programs for weight loss with adults and military personnel,⁸⁻¹⁶ these results suggest that use of a weight management and weight gain prevention Web site may promote weight loss in soldiers. We believe that an anonymous, fully automated, individualized Internet program such as the H.E.A.L.T.H. Web site can be used to assist both soldiers and civilians in their weight management efforts, especially if those individuals are provided information on its availability and usefulness. Further, because such programs could be used anonymously by soldiers, there would be a significantly reduced likelihood of stigma attached to participating in a weight management program. Still, it is likely that the efficacy of the Web site would be enhanced if individuals gave permission for individual prompts and communications. Finally, additional research is needed to determine how to further encourage usage and how to enhance weight loss and healthy behaviors promoted by the Web site through individualized automation and/or inclusion of person contact. Evaluation of the H.E.A.L.T.H. program using a randomized controlled trial is currently in progress to determine its efficacy in comparison to no treatment.

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