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Dissemination of the Look AHEAD Intensive Lifestyle Intervention in the United States Military: A Randomized Controlled Trial

DR. Rebecca A. Krukowski, PhD^a, Marion E. Hare, MD, MS^{a,b}, Gerald W. Talcott, PhD^{c,d}, Leslie A. Gladney, MS^{c,d}, DR. Karen C. Johnson, MD, MPH^a, Phyllis A. Richey, PhD^{a,b}, Mehmet Kocak, PhD^a, Patrick L. Keller, MD^d, Ann Hryshko-Mullen, PhD^e, and Robert C. Klesges, PhD^{a,f}

^aDepartment of Preventive Medicine, University of Tennessee Health Science Center, Memphis, TN, USA

^bDepartment of Pediatrics, University of Tennessee Health Science Center, Memphis, TN, USA

^cUniversity of Tennessee Health Science Center, Lackland AFB, TX, USA

^dUniversity of Virginia, Department of Public Health Sciences, School of Medicine, Charlottesville, VA, USA

^eDefense Institute for Medical Operations, Joint Base San Antonio-Lackland Air Force Base, San Antonio, TX, USA

^fDepartment of Mental Health, Wilford Hall Ambulatory Surgical Center, Joint Base San Antonio–Lackland AFB, San Antonio, Texas, USA

Abstract

Objective: The purpose of this study, “Fit Blue” was to compare a translation of the Look AHEAD intensive lifestyle intervention with a self-paced version of the same intervention among active duty military personnel.

Method: Active duty military personnel (N=248, 49% male, 34% racial minority) with overweight/obesity were randomized to 12-month distance-based (i.e., phone and email) parallel programs: counselor-initiated (CI) condition or self-paced (SP) condition in 2014-2016. Trained lay interventionists were retired military personnel or had extensive familiarity with the military.

Results: The CI condition had greater weight loss at 4-months (CI: $M \pm SD = -3.2 \pm 3.4$ kg, SP: -0.6 ± 2.9 kg, $p < 0.0001$) and at 12-months (CI: $M \pm SD = -1.9 \pm 4.1$ kg, SP: -0.1 ± 3.8 kg, $p < 0.001$). Participants in the CI condition also had a greater percent weight loss at both 4-months (CI: 3.5 ± 3.8 , SP: 0.6 ± 3.1 , $p < 0.0001$) and 12-months (CI: 2.1 ± 4.7 , SP: 0.0 ± 4.0 , $p < 0.001$). In addition, a greater proportion of CI participants lost 5% or more at 4-months (CI: 29.8%, SP: 10.5%, $p < 0.001$) and at 12-months (CI: 29.5%, SP: 15.6%, $p < 0.05$).

Contact Information: Rebecca A. Krukowski, Department of Preventive Medicine, University of Tennessee Health Science Center, 66 N. Pauline St., Memphis, TN 38105; 901-448-2426 (phone), rkrukows@uthsc.edu.

Clinical Trial Registration: The trial is registered on clinicaltrials.gov (NCT 02063178).

Conclusions: The CI behavioral weight loss intervention translated from Look AHEAD was well-received and is a promising approach for managing weight in an active duty military population.

Keywords

Behavioral strategies; weight loss; adults; clinical trials; community health

Introduction

Despite a persistent emphasis on fitness, 51% of military personnel are classified as overweight and 12% are classified as obese.¹ There are significant societal and personal repercussions of overweight and obesity in the military. On a societal level, excess weight among military personnel is estimated to cost approximately \$1.1 billion dollars each year in health care costs.² On the individual level, excess weight and inadequate fitness can have significant career implications, since every military member has an annual performance report that requires passing a periodic fitness test. If an individual continually fails to meet fitness standards (including waist circumference), they can be discharged from the military, losing not only their job, but all medical and retirement benefits (unless they have already served for > 20 years). Few professions have such negative consequences associated with excess weight.

Few randomized trials have examined behavioral weight management programs conducted with military personnel.^{3,4} Hunter and colleagues³ implemented a weight gain prevention-focused Internet-based program. Gambera et al.⁴ compared an exercise-focused intervention with an exercise and diet-focused intervention, in order to reduce cardiovascular risk. However, neither program focused on weight loss.^{3,4} Thus, there is a clear need for an effective behavioral weight loss program for military personnel.

The Look AHEAD Intensive Lifestyle Intervention (ILI)⁵⁻⁷ had long-term efficacy in a diverse population with diabetes and although few military personnel have diabetes, the ILI was designed to induce weight loss in a diverse population, like the military. Therefore, the purpose of this study was to compare a translation of the Look AHEAD ILI (i.e., counselor-initiated condition) with a self-paced version of the same intervention. A secondary aim was to evaluate treatment adherence (i.e., session attendance, self-monitoring frequency, meal replacement consumption). We hypothesize the superiority of the counselor-initiated (CI) condition in weight loss and treatment participation at 4-months and 12-months post-randomization compared to the self-paced (SP) condition, with greater treatment adherence predicting greater weight loss success.

Methods

Participants

Active Duty Military Personnel (n=248) at Joint Base San Antonio, Texas who were at least 18 years old, with a BMI ≥ 25 kg/m², and with reliable phone and computer access were eligible. They were required to have at least one more year left in their duty assignment, to

facilitate retention to in-person follow-up data collection. They also had to: 1) complete a week of daily dietary and physical activity self-monitoring using the Lose It™ app/ website and 2) obtain a letter from their healthcare provider approving participation in the study. Exclusion criteria included a history of major medical or psychiatric conditions (e.g., uncontrolled cardiac arrhythmia, schizophrenia, diabetes mellitus treated with a medication that could cause hypoglycemia), inability to engage in exercise, recent substantial weight loss, use of medications known to impact weight, and a current or recent pregnancy. Individuals were also excluded if they had more than one failed military fitness test in the past 12 months, since these individuals are more likely to be interested in rapid weight loss and not a lifestyle approach. Participants were individually randomly assigned using a computerized block design designed by PAR (six blocks of four), to one of the two intervention conditions (1:1 allocation) with allocation concealment, to assure balanced assignment to both conditions throughout the study duration. Assignment was revealed by the study database, and staff notified the participant. The protocol was approved by the Institutional Review Board (IRB) of the 59th Medical Wing in San Antonio, TX and acknowledged by the IRB at the University of Tennessee Health Science Center. Further details on the Fit Blue study design have been previously reported.⁸

Screening Procedures

Interested individuals were recruited in 2014-2016 using posters, electronic bulletins, presentations on the base, emails, newspaper advertisements, and word-of-mouth. Potential participants could learn more about the study by phone or on the study website; a phone screener then determined likely eligibility. Informed consent was obtained at the first of two in-person data collection visits.

Behavioral Weight Control Conditions

The two parallel 12-month manualized comprehensive behavioral weight loss conditions varied in intervention intensity and treatment self-initiation, as described below.

Counselor-Initiated (CI) Condition

The intervention utilized distance-based modalities (phone and email) because of the high mobility of military personnel for Temporary Duty assignments, Deployments, or Permanent Changes of Station (see Table 1 for a description of key differences and similarities between the Fit Blue and Look AHEAD interventions). Participants randomized to this condition were contacted by their counselor to complete 16 weekly, 6 biweekly, and 4 monthly one-on-one weight loss-focused telephone sessions over 12 months. Based on the participant's self-reported exercise at baseline, each participant received an individualized and progressive physical activity program (based on baseline activity levels) designed to help them reach a 225-250 minute moderate-to-vigorous exercise goal. In addition, CI participants were asked to use the Lose It!™ app/website to self-monitor dietary intake and physical activity daily. Interventionists reviewed participants' diet and physical activity self-monitoring and provided weekly, biweekly, or monthly feedback (mirroring the phone session frequency). CI participants were also asked to monitor their weight daily using the BodyTrace™ e-scale, which was provided to each participant at baseline. Their weight was transmitted daily to a secure website, and the participant's personalized study webpage

where they could view a graph of their weight trajectory over time. In addition, there were four campaigns presented to the CI participants, which was designed to increase participant motivation (e.g., “Log It to Lose It”- focused on self-monitoring weight, food intake, and exercise during weeks 5-8), and participants who successfully completed the challenges received a small incentive.

To achieve study weight loss, calorie and fat goals in the first four months of the intervention,⁹ CI participants were provided with two portion-controlled meals and a snack (i.e., Healthy Choice™ or Marie Callender™ meals, Better Oats™ oatmeal, powdered Slim-Fast™, single serving Smart Pop™ popcorn). During months 5 to 8 of the intervention, participants were encouraged to replace one meal with a provided meal replacement (i.e., Healthy Choice™ or Marie Callender™ meals). CI participants were also provided detailed meal plans for their meals of conventional foods; if a participant elected not to use the meal replacements, they were encouraged to use the meal plans for all meals. Finally, CI participants also had access to the study’s toolbox, which included food scales, exercise videos, resource books and cookbooks to borrow and return before the end of the study.

Self-Paced (SP) Condition

Given the pressures to pass their fitness tests, formative research participants stated they would be unwilling to accept the chance of randomization to a support and education intervention like in the original Look AHEAD study.⁸ Instead, the participants suggested the development of a self-paced intervention, in which participants could request intervention components. Thus, participants randomized to this condition received a handout listing the intervention components available to them upon request, including up to 28 one-on-one telephone sessions; the same lesson materials and meal plans through the study website (as described in detail previously⁸); and monitoring their diet, physical activity and weight daily using the Lose It!™ app/website and the BodyTrace™ e-scale. If they emailed or called the study staff, participants could request interventionist emailed feedback on dietary and physical activity self-monitoring using Lose It!™ and their weight trajectory with BodyTrace™. They were also able to view their personalized graph of their weight trajectory over time on their personalized study webpage. SP participants, however, did not have access to the challenges. Finally, they were encouraged to purchase their own meal replacements if they felt this strategy would be helpful for them.

Interventionists Training and Treatment Fidelity

Interventionists were retired military personnel or had extensive familiarity with the military. They had bachelor’s or master’s degrees in diverse areas (i.e., social work/counseling/psychology, child/family development, nursing, justice administration). Interventionists were trained in the protocol and motivational interviewing, certified when they satisfactorily completed two mock sessions, and received ongoing weekly supervision. Interventionists used a written protocol and counselor guides in order to ensure comparability. Fifteen percent of CI sessions were randomly selected, audio recorded (when the participant consented), and reviewed to verify the protocol was being implemented correctly. Feedback was provided to the interventionist on every session reviewed. As the SP sessions may or

may not occur (depending upon the participant's initiative to call for a session), it was not possible to randomly select these sessions.

Outcome Measures

All measures were obtained by unblinded data collectors at baseline, 4-months, and 12-months unless otherwise indicated. Data were collected 2014-2016 in the research office located on Joint Base San Antonio- Lackland Air Force Base.

Sociodemographic characteristics.

Self-reported sociodemographic characteristics (i.e., gender, age, race, ethnicity, education, marital status, military rank) were collected at baseline. Analyses were evaluated based on demographic categories of gender, military ranking (i.e., 3 Enlisted (E) categories: E1-E4 (i.e., enlisted), E5-E6 (i.e., non-commissioned officers), E7-E9 (i.e., senior non-commissioned officers) and 2 Officer categories (O): O1-O3 (i.e., Company Grade Officers) and O4-O6 (i.e., Field Grade Officers), BMI (overweight: 25.0- 29.9 kg/m² and obese: 30 kg/m²), ethnicity (i.e., Hispanic or Non-Hispanic), and race (i.e., Caucasian, African American, or other). The racial category of "Other" combined individuals identifying as American Indian or Alaska Native, Asian, Native Hawaiian or Pacific Islander, multiple race, and unknown race, given the infrequency of these responses.

Anthropometrics.

Weight change (kg) was the primary dependent measure. Weight was measured without shoes in physical training clothes or their uniform without their blouse, on a calibrated digital scale (Tanita BWB 800S). Height was measured in centimeters using a wall-mounted stadiometer. BMI was calculated using the standard formula. The proportion who achieved clinically significant weight loss of 5% from baseline was also examined. As an indicator of abdominal adiposity and a component of the Air Force fitness test, abdominal circumference (in centimeters) was measured using a non-distensible measuring tape and standard protocols for positioning.¹⁰

Treatment adherence and satisfaction.

Daily self-weighing frequency (coded as present or absent), daily dietary/physical activity self-monitoring frequency (coded as present or absent), meal replacement consumption, and session participation were systematically collected by the interventionists, as measures of intervention dose. For the weight loss phase, self-monitoring adherence was calculated out of 120 days and for the weight maintenance phase, adherence was calculated out of 240 days. Meal replacements consumed was totaled (for months 1-4: 2 meals and 1 snack per day for 120 days, or 360 possible; for months 5-8: 1 meal per day for 120 days, or 120 possible). Sessions attended was calculated (weight loss phase: 16 possible; weight maintenance phase: 12 possible). Treatment satisfaction was assessed at 12-months using a 11-item questionnaire with a 5-point Likert-type scale (1=Strongly Disagree, 5=Strongly Agree) or "Not Applicable" (I did not use this resource enough to evaluate): 1) The phone sessions were useful; 2) I enjoyed participating in the phone sessions; 3) I would recommend the program to a friend; 4) The lesson materials were helpful; 5) The diet and exercise self-

monitoring was helpful; 6) The electronic scale was helpful; 7) The meal replacements were helpful; 8) The meal plans were helpful; 9) The emailed feedback from my interventionist was helpful; 10) The study website was useful; and 11) The challenges were helpful to keep me motivated.

Statistical analysis.

This randomized clinical trial was designed to have 90% power to detect a 4% weight loss percent difference at 12-months between the two study arms. We had originally planned to recruit 204 participants; however, due to greater than expected attrition, we increased the sample size to 248 in order to retain power to detect our planned effect.

To avoid introducing bias associated with attrition due to failure to lose weight, missing weight values were imputed conservatively using baseline observation carried forward. Association of the actual weight change (in kg) and weight change percent (as continuous variables) was compared by factors of interest using Wilcoxon-Mann-Whitney test or Kruskal-Wallis test as appropriate, or described using Spearman's rank correlation for continuous predictors. Association of weight change percent (as a categorical variable of 5% weight loss or <5% weight loss) was explored using Fisher's Exact Test or Chi-square test as appropriate for categorical factors. Analyses were conducted with SAS software version 9.4 (SAS Institute, Cary, NC).

Results

Two hundred and forty-eight participants with overweight and obesity were randomized, representing 41% of those who initially indicated interest in participation (Figure 1). While no data are available for participants who were ineligible at phone screening (because they had not yet been consented), the 17 participants who were ineligible prior to the baseline visit were all due to lack of health professional clearance.

Participants were a relatively even mix between men and women and those with overweight and obesity (Table 1). Twenty percent of participants identified as African American and 23% identified as Hispanic. The majority of participants were in the Air Force. There were no baseline differences between conditions on baseline sociodemographic characteristics (Table 1). In addition, abdominal circumference at baseline was similar between the two arms (CI ($M \pm SD$): 94.4 $\pm$ 8.9 cm, SP: 95.5 $\pm$ 10.1 cm, $p=0.37$).

There was only one serious adverse event (i.e., a moderate syncopal episode after physical activity that led to hospitalization) reported by a participant that was possibly related the intervention. All other serious adverse events were deemed not related to the intervention, with a similar rate of SAEs for the two conditions.

Eighty percent of randomized participants attended the 4-month assessment (Figure 1). There was a significant difference between treatment groups in the percentage of participants completing assessments; 88% of participants in the CI condition completed the 4-month assessment and 73% in the SP condition ($p<0.05$). Seventy percent of randomized participants attended the 12-month assessment; specifically, 77% of the CI condition

completed the 12-month assessment and 62% of the SP arm ($p<0.05$). There were also a few demographic predictors of assessment completion; those younger than 30 years old were significantly less likely to complete the 4-month assessment (33%) than those who were older (30-40 years old: 13% and older than 40: 19%, $p<0.01$). In addition, those who were younger than 30 (44% vs. 28% for 30-40 year olds and 22% for older than 40, $p<0.05$) and those who had less than a college degree (40% vs. 22% with a college, $p<0.01$) were significantly less likely to complete the 12-month assessment.

In intent-to-treat analyses, weight loss and percent weight loss at 4-months differed significantly between conditions (Weight loss, CI: -3.2 ± 3.4 kg vs. SP: -0.6 ± 2.9 kg, $p<0.0001$; Percent weight loss, CI: $3.5\% \pm 3.8$ vs. SP: $0.6\% \pm 3.1$, $p<0.0001$). In addition, there was a significant difference in the proportion of participants who lost 5% or more by condition (CI: 29.8%, SP: 10.5%, $p<0.001$). Mean abdominal circumference reduction was $3.5 \text{ cm} \pm 6.0$ for the CI arm and $1.2 \text{ cm} \pm 4.1$ for the SP arm, a statistically significant difference between conditions ($p<0.0001$). In completer analyses, similar patterns were observed (data not shown).

The CI condition had greater weight loss also at 12-months (CI: -1.9 ± 4.1 kg, SP: -0.1 ± 3.8 kg, $p<0.001$), with corresponding greater percent weight loss (CI: $2.1\% \pm 4.7$, SP: $0.0\% \pm 4.0$, $p<0.001$). In addition, a greater proportion of CI participants lost 5% or more at 12-months (CI: 29.5%, SP: 15.6%, $p<0.05$). Mean abdominal circumference reduction was $2.7 \text{ cm} \pm 6.5$ for the CI arm, and $1.7 \text{ cm} \pm 8.1$ in the SP arm ($p<0.05$). Again, in completer analyses, similar patterns were detected (data not shown).

For the CI condition, there were significant differences in percent weight loss outcomes at 4-months by education level, age, and grade, such that those who had more education, were older (i.e., 40 years or older), and were higher ranking had greater percent weight losses compared to other participants (Table 3). Specifically, participants who were Grade E1-E4 achieved an average of 1.1% weight loss while the other grades achieved more than 3.3% weight loss on average. At 12-months, there were no significant sociodemographic differences in percent weight loss for the CI participants. For the SP condition, there were no significant differences in percent weight loss at either 4-months or 12-months by gender, race, ethnicity, education level, marital status, age category, BMI category, or grade (data not shown).

CI participants completed $M=12.4 \pm 3.6$ sessions (16 sessions possible) during the weight loss phase and $M=7.1 \pm 5.1$ sessions (12 sessions possible) during the weight maintenance phase. Only four SP participants requested sessions during the weight loss phase (one participant requested three sessions, and three requested one session each). No sessions were requested by SP participants during the weight maintenance phase. CI participants had greater dietary intake, physical activity and weight self-monitoring over both intervention phases (Table 4). Only one SP participant requested feedback on dietary and exercise self-monitoring during the weight loss phase; no requests were made during the weight maintenance phase.

During the weight loss phase, CI participants consumed $M=38.6\pm35.0$ of the provided meal replacements (360 meal replacements possible) or 2.4 meal replacements per week. During months 5-8, CI participants consumed $M=20.4\pm28.3$ of the provided meal replacements (120 meal replacements possible) or slightly more than one meal replacement per week.

Among the CI participants, 12-month weight loss was significantly associated with session attendance (Spearman's Rho (r_s)= -0.49 , $p<0.0001$), days of diet/physical activity self-monitoring ($r_s=-0.41$, $p<0.0001$), days of self-weighing ($r_s=-0.41$, $p<0.0001$), and meal replacement consumption ($r_s=-0.21$, $p=0.021$). Session attendance, dietary/physical activity self-monitoring, self-weighing and meal replacement consumption were highly correlated ($r_s>0.50$).

Participants in both conditions rated the e-scale as helpful (Table 5). For other treatment components, not surprisingly, the CI participants were more positive about each treatment component or greater than 50% of the SP participants indicated they did not use the resource enough to evaluate, with the exception of the study website which participants in both conditions rated as "moderately useful".

Discussion

The Fit Blue study demonstrated that trained lay interventionists can successfully implement a behavioral weight loss program adapted from Look AHEAD ILI to active duty military personnel over the phone and email. At 4- and 12-months, the CI intervention produced significantly greater weight loss than a SP version of the same intervention, consistent with smoking cessation trials indicating the benefit of proactive interventions.^{11,12} The CI intervention produced the largest weight losses, to date, in a randomized controlled trial among military personnel,^{3,4} with 30% of participants achieving clinically significant weight losses. Further, weight change outcomes with the CI intervention are comparable to those achieved in previous community-based interventions.¹³⁻¹⁵ It is also important to note that 15% of participants in the SP arm had clinically significant weight loss at 12-months and participants indicated they would moderately or strongly recommend the program to a friend, which may indicate a self-guided intervention may be sufficient for a subset of the sample, although there were no significant demographic predictors of percent weight loss. Of particular relevance to the military branches that include abdominal circumference measurement in their fitness test (i.e., Army, Navy and Air Force), there were significantly greater mean reductions in abdominal circumference in the CI group compared to the SP group.

Military personnel responded well to the phone-based CI intervention sessions. Participants took part in 70% of the 28 available phone sessions, which is similar to other weight loss program translations in community settings of similar length,^{13,16} and indicated the phone sessions were useful and enjoyable. However, attendance in the current program was slightly lower than in Look AHEAD ILI (83%),¹⁷ which may reflect the frequent work-related travel of this population. In addition, there was lower adherence to meal replacements in comparison to the original Look AHEAD ILI, 9.7 vs. 2.3 meal replacements per week,¹⁷ although the Fit Blue participants did rate the meal replacements as helpful. This may be due

to the modality of self-monitoring, in which it was difficult to determine when participants were eating the frozen meal replacements, since the entry in LoseIt™ would identify the type of food (e.g., butternut squash ravioli) but would not necessarily specify whether it was a Healthy Choice/Marie Callender meal. In addition, participants may have consumed meal replacements but not self-monitored the meal. Thus, the measure of meal replacement utilization likely contains error. However, like with the Look AHEAD ILI,¹⁷ session attendance, self-monitoring, and meal replacement consumption predicted greater weight loss.

There are substantive differences between the original Look AHEAD ILI and the Fit Blue intervention which should be noted. This community-based translation was developed with considerations of dissemination throughout the military and therefore contained fewer weekly sessions, all sessions were individual sessions rather than mostly group sessions to accommodate the changing schedules and frequent work-related travel of this population, and utilized a distance-based intervention modality. The use of lay professionals with military experience or expertise rather than dietitians, psychologists, etc. and the lack of group support between participants may account for, in part, the smaller weight losses observed in the current study than achieved in the original Look AHEAD study. In addition, military IRB prohibited replicating the \$100 check/gift card data collection incentive from Look AHEAD, instead Fit Blue participants received a pedometer and a water bottle (worth \$20) for the two data collection visits, which likely impacted our retention rates. Fit Blue participant characteristics were also quite different from the Look AHEAD sample; specifically, the Look AHEAD sample was considerably older (mean: 58 years old in Look AHEAD vs. mean: 35 years old in Fit Blue) and more likely to be classified as obese (85.1% obese in Look AHEAD vs. 56.5% obese in Fit Blue) and all Look AHEAD participants had type II diabetes..⁷ Similar to Look AHEAD, we found greater weight loss among older participants, consistent with the significant differences in the Look AHEAD ILI.¹⁷ Unlike the Look AHEAD findings, we found significant greater weight loss at 4-months among those with a college education; however, these differences did not persist at the 12-month assessment. In addition, we found higher ranking individuals had greater percent weight loss at 4-months compared to lower ranking participants, which may be explained by the fact that higher ranking individuals are expected to be role models and may feel even greater pressure to control their weight prior to retirement or that these individuals have greater access to resources due to higher income; however, again, these differences did not persist at 12-months.

This study has numerous strengths, including the randomized design, the objective measure of weight, and gender, race, and ethnicity diversity of the sample. The nearly even split of male and female participants in this sample is also notable, given the persistent predominance of men among active duty military personnel (i.e., 84.5% men)¹⁸ and the predominance of women in behavioral weight management programs.¹⁹ Finally, we implemented a protocol-based intervention that established treatment goals and behavioral strategies to achieve the same goals across both conditions, allowing the difference in self-initiation to be the primary distinguishing component between conditions.

There are also limitations that merit consideration. First, there was not a no-treatment control group, so it is not clear how weight may have changed without any treatment in this population within a 12-month period; however, most Americans gain weight each year.²⁰ In addition, mean percent weight loss achieved at 12-months (2.1%) in the CI condition was lower than the 8.6% weight loss achieved at 1 year in the Look AHEAD ILI.⁷ Furthermore, 94% of the sample was in the Air Force, so the effectiveness in other military branches is yet to be determined. Finally, another limitation of the trial was differential retention which may have affected the results in unknown directions. Due to lower retention among those in the self-paced condition, those who had lower educational attainment, and those who were younger than 30, future studies may need to try a different comparison condition and may need to tailor military-focused interventions to those who have less education and who are younger.

Conclusions

This study demonstrated not only the feasibility of a distance-based weight loss intervention for military personnel but its effectiveness as well in terms of reducing weight and abdominal circumference. Future analyses will be required to estimate the costs of implementing such a program.

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What is already known about this subject?

- Despite a persistent emphasis on fitness, 51% of military personnel are classified as overweight and 12% are classified as obese.
- There are significant societal and personal repercussions of overweight and obesity in the military.
- There have been few randomized trials focused on behavioral weight loss conducted with military personnel.

What does this study add?

- The Counselor Initiated intervention translated from Look AHEAD induced significantly greater weight loss and abdominal circumference reduction in an active duty military population as compared to the Self-Paced intervention.
- A significantly greater proportion of participants in the Counselor Initiated intervention lost 5% or more at 12-months as compared to the Self-Paced intervention (29.5% vs.15.6%, $p<0.05$)
- Lay interventionists were able to implement a well-received behavioral weight loss intervention among active duty military personnel.

Figure 1:
CONSORT Diagram

Table 1.

Similarities and Differences between the Fit Blue Counselor-Initiated Condition and the Look AHEAD Intensive Lifestyle Intervention

Similarities	Differences
Lesson materials (minimally adapted to military personnel)	Weekly sessions for 4 months (Fit Blue) vs. Weekly sessions for 6 months (Look AHEAD)
Emphasis on dietary and physical activity self-monitoring	Two sessions per month for 4 months then 1 session per month for 4 months (Fit Blue) vs. Three sessions per month for 6 months (Look AHEAD)
Interventionist feedback on self-monitoring	All individual sessions (Fit Blue) vs. Mostly group sessions (Look AHEAD)
Provision of meal replacements (although provided meals and snacks were frozen meals, oatmeal, popcorn, and liquid shakes in Fit Blue, rather than liquid shakes and bars like in Look AHEAD)	Using distance-based modalities (Fit Blue) vs. Mostly in-person contact (Look AHEAD)
Meal plan (minimally adapted to current nutrition standards (e.g., replacing margarine in the original meal plan with whipped butter))	Lay interventionists (Fit Blue) vs. Professional interventionists with related degrees (Look AHEAD)
Challenges with prizes	Electronic dietary and exercise self-monitoring (Fit Blue) vs. paper and pencil for dietary and exercise self-monitoring (Look AHEAD)
Toolbox (although the items were loaned in Fit Blue rather than given like in Look AHEAD)	Electronic daily self-weighing is encouraged vs. Analog weekly self-weighing (at least) is encouraged
Calorie and <30% fat goals (although Fit Blue participants were given a specific calorie goal rather than a range like Look AHEAD participants)	225-250 minute exercise goal (Fit Blue) vs. 175 minute exercise goal (Look AHEAD)
Weight loss goal of 10%	No provision of weight loss medication (Fit Blue) vs. provision of Orlistat (Look AHEAD)
	Data collection incentive of items worth \$20 (i.e., pedometer and water bottle) (Fit Blue) vs. Data collection incentive of \$100 in the form of check or gift card

Table 2.

Sociodemographic Characteristics of Study Participants

	All (N=248)	Counselor Initiated Condition (N=124)	Self-Paced Condition (N=124)
Baseline Weight, mean ($\pm$ SD) kg	89.0 ($\pm$ 14.3)	88.0 ($\pm$ 12.9)	90.0 ($\pm$ 15.5)
BMI Category N(%)			
Overweight	108 (43.5%)	56 (45.2%)	52 (41.9%)
Obese	140 (56.5%)	68 (54.8%)	72 (58.1%)
Gender N(%)			
Male	122 (49.2%)	61 (49.2%)	61 (49.2%)
Female	126 (50.8%)	63 (50.8%)	63 (50.8%)
Race N(%)			
African American	49 (19.8%)	26 (21.0%)	23 (18.5%)
Caucasian	163 (65.7%)	79 (63.7%)	84 (67.7%)
Other	36 (14.5%)	19 (15.3%)	17 (13.7%)
Ethnicity N(%)			
Hispanic	192 (77.4%)	99 (79.8%)	93 (75.0%)
Non-Hispanic	56 (22.6%)	25 (20.2%)	31 (25.0%)
Education N(%)			
High School or GED	7 (2.8%)	7 (5.6%)	0 (0%)
Vocational or Training School	3 (1.2%)	1 (0.8%)	2 (1.6%)
Some College/Associate Degree	113 (45.6%)	48 (38.7%)	65 (52.4%)
College Degree	73 (29.4%)	39 (31.5%)	34 (27.4%)
Masters or Doctoral Degree	52 (21.0%)	29 (23.4%)	23 (18.5%)
Marital Status N(%)			
Single/Never Married	40 (16.1%)	21 (16.9%)	19 (15.3%)
Married/Living as Married	169 (68.1%)	87 (70.2%)	82 (66.1%)
Separated/Divorced	39 (15.7%)	16 (12.9%)	23 (18.5%)
Age Category N(%)			
18-29 years old	66 (26.6%)	32 (25.8%)	34 (27.4%)
30-39 years old	123 (49.6%)	59 (47.6%)	64 (51.6%)
40+ years old	59 (23.8%)	33 (26.6%)	26 (21.0%)
Age, mean ($\pm$ SD) years	34.6 ($\pm$ 7.5)	35.3 ($\pm$ 8.2)	33.8 ($\pm$ 6.8)
Branch N(%)			
Army	4 (1.6%)	3 (2.4%)	1 (0.8%)
Air Force	234 (94.4%)	115 (92.7%)	119 (96%)
Marine Corps	2 (0.8%)	2 (1.6%)	0 (0.0%)
Navy	8 (3.2%)	4 (3.2%)	4 (3.2%)
Grade N(%)			
E1-E4	34 (13.7%)	17 (13.7%)	17 (13.7%)
E5-E6	105 (42.3%)	49 (39.5%)	56 (45.2%)

	All (N=248)	Counselor Initiated Condition (N=124)	Self-Paced Condition (N=124)
E7-E9	52 (21.0%)	27 (21.8%)	25 (20.2%)
O1-O3	17 (6.9%)	10 (8.1%)	7 (5.6%)
O4-O6	39 (15.7%)	21 (16.9%)	18 (14.5%)

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Table 3.

Percent Weight Change by Sociodemographic Characteristics among Counselor Initiated Participants (Intent-to-Treat Analyses) (Mean $\pm$ SD)

	Baseline to 4-Month Visit		Baseline to 12-Month Visit	
	Counselor Initiated Condition (N=124)	P-value	Counselor Initiated Condition (N=124)	P-value
Gender				
Male	-4.0 $\pm$ 3.6	0.12	-2.0 $\pm$ 3.9	0.67
Female	-3.1 $\pm$ 4.0		-2.2 $\pm$ 5.4	
Race				
African American	-2.2 $\pm$ 3.7	0.069	-1.7 $\pm$ 4.9	0.40
Caucasian	-4.1 $\pm$ 3.7		-2.4 $\pm$ 4.3	
Other	-3 $\pm$ 3.9		-1.5 $\pm$ 6.2	
Ethnicity				
Hispanic	-2.3 $\pm$ 2.6	0.064	-2.3 $\pm$ 4.5	0.20
Non-Hispanic	-3.8 $\pm$ 4.0		-1.6 $\pm$ 5.5	
Education				
Less than College Degree	-2.9 $\pm$ 4.1	0.026	-1.4 $\pm$ 3.6	0.12
College Degree and Above	-4.1 $\pm$ 3.5		-2.7 $\pm$ 5.5	
Marital Status				
Single/Never Married	-2.6 $\pm$ 3.9	0.36	-0.6 $\pm$ 4.0	0.41
Married/Living as Married	-3.8 $\pm$ 3.8		-2.3 $\pm$ 4.4	
Separated/Divorced	-3.1 $\pm$ 3.7		-3.3 $\pm$ 6.9	
Age Category				
18-29 years old	-2.2 $\pm$ 3.9	0.0057	-1.6 $\pm$ 4.6	0.077
30-39 years old	-3.6 $\pm$ 3.6		-1.3 $\pm$ 4.2	
40+ years old	-4.7 $\pm$ 3.6		-4.0 $\pm$ 5.4	
Grade				
E1-E4	-1.1 $\pm$ 2.4	0.038	-1.2 $\pm$ 4.5	0.59
E5-E6	-3.4 $\pm$ 3.8		-1.7 $\pm$ 4.0	
E7-E9	-4.0 $\pm$ 4.9		-2.2 $\pm$ 6.2	
O1-O3	-3.3 $\pm$ 3.1		-2.9 $\pm$ 4.9	
O4-O6	-5.1 $\pm$ 2.4		-3.3 $\pm$ 4.4	

Table 4.Self-Monitoring Adherence Across Intervention Phases and Treatment Condition (Mean $\pm$ SD)

	Counselor-Initiated Condition	Self-Paced Condition	p-value
Dietary and Physical Activity Self-Monitoring			
Weight Loss Phase (out of 120 days)	66.7 $\pm$ 26.5	21.3 $\pm$ 40.2	p<0.0001
Weight Maintenance Phase (out of 240 days)	34.6 $\pm$ 30.2	22.7 $\pm$ 57.2	p<0.0001
Self-Weighing			
Weight Loss Phase (out of 120 days)	88.5 $\pm$ 27.8	55.3 $\pm$ 33.0	p<0.0001
Weight Maintenance Phase (out of 240 days)	97.5 $\pm$ 69.2	59.4 $\pm$ 61.2	p<0.0001

Table 5.Treatment Satisfaction by Treatment Condition (Mean $\pm$ SD)

	N	Counselor-Initiated Condition	N	Self-Paced Condition
The phone sessions were useful.	91	4.6 $\pm$ 0.8		N/A *
I enjoyed participating in the phone sessions	92	4.5 $\pm$ 0.9		N/A
I would recommend the program to a friend.	91	4.7 $\pm$ 0.6	73	4.0 $\pm$ 1.1
The lesson materials were helpful.	90	4.1 $\pm$ 1.0	44	3.8 $\pm$ 0.8
The electronic scale was helpful.	86	4.7 $\pm$ 0.5	71	4.4 $\pm$ 1.0
The diet and exercise self-monitoring was helpful.	86	4.6 $\pm$ 0.7	73	3.6 $\pm$ 1.3
The meal replacements were helpful.	87	4.6 $\pm$ 0.8		N/A
The meal plans were helpful.	79	4.1 $\pm$ 1.0		N/A
The emailed feedback from my interventionist was helpful.	86	4.3 $\pm$ 1.0		N/A
The study website was useful.	72	3.8 $\pm$ 1.1	45	3.8 $\pm$ 0.9
The challenges were helpful to keep me motivated.	81	3.5 $\pm$ 1.3		N/A

* Not Applicable (N/A) is indicated for questions where greater than 50% of the sample indicated that they did not use the resource enough to evaluate.