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Original Research Article

Effectiveness of the ACE Mover Method to Elicit Positive Healthy Behavior and Lifestyle Changes in Vulnerable Groups

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ABSTRACT

Aim: The purpose of this study was to examine the effectiveness of the ACE Mover Method educational model at modifying healthy lifestyle behaviors in a cohort comprised of various minority groups (Hispanic/Latino, Black, and Asian/Pacific Islander) and older adults. **Methods:** Participants were randomized to one of the following groups: 1. The treatment group (N=32) received a 10wk ACE Mover Method intervention consisting of weekly, client-centered educational sessions in addition to performing their 10wk personalized exercise program, and 2) The second group (N=32) performed their 10wk personalized exercise program and served as the controls. **Results:** After 10wk, cardiometabolic health and cardiorespiratory fitness improved ($p < 0.05$) in both control and Mover Method groups. With the exception of waist circumference and LDL cholesterol ($p < 0.05$), the changes from baseline to 10wk across various cardiometabolic health variables and cardiorespiratory fitness were similar for both groups ($p > 0.05$). Healthy behavior and lifestyle scores were similar at baseline between groups. In the control group, there were no significant ($p > 0.05$) changes between baseline and 10wk in any healthy behavior and lifestyle scores. In contrast, in the Mover Method group, there were significant improvements ($p < 0.05$) from baseline to 10wk within all healthy behavior and lifestyle change categories. **Conclusions:** Our current findings provide critical translational evidence demonstrating personalized exercise programming based upon the ACE IFT model guidelines, including the ACE Mover Method paradigm, can be successfully implemented within vulnerable groups of clients to improve cardiometabolic health and facilitate healthy lifestyle changes.

KEYWORDS: Cardiometabolic Health, Health Coaching, Personalized Exercise, Stress.

Introduction

A key element of using the ACE Integrated Fitness Training (IFT) Model to empower clients to make behavioral changes to improve their health, fitness, and overall quality of life is the adoption of the ACE

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Mover Method, which is founded on the following tenets: 1) Each professional interaction is client-centered, with a recognition that clients are the foremost experts on themselves, 2) Powerful open-ended questions and active listening are utilized in every session with clients, and 3) Clients are genuinely viewed as resourceful and capable of change.

The way in which health and exercise professionals apply the ACE Mover Method is through the ACE ABC Approach: A) Ask open-ended questions, B) Break down barriers, and C) Collaborate.

Every client–personal trainer interaction offers an opportunity to utilize coaching skills to help build rapport while positioning the client as an active partner in his or her behavior-change journey. Asking questions leads to the identification of goals and options for breaking down barriers, which in turn leads to collaborating on next steps.

Preliminary research on the ACE Mover Method has been encouraging. Our group[1] randomized participants to one of the following groups: 1) the treatment group (N=14) received a 12wk ACE Mover Method intervention consisting of weekly, client-centered educational sessions in addition to performing their 12wk personalized IFT-guided exercise program, and 2) the second group (N=14) performed their 12wk personalized IFT-guided exercise program and served as the controls. After 12wk, cardiometabolic health and cardiorespiratory fitness improved ($p < 0.05$) in both control and Mover Method groups. With the exception of waist circumference ($p < 0.05$), the changes from baseline to 12wk across various cardiometabolic health variables and cardiorespiratory fitness were similar for both groups ($p > 0.05$). Healthy behavior and lifestyle scores were similar at baseline between groups. In the control group, there were no significant ($p > 0.05$) changes between baseline and 12wk in any healthy behavior and lifestyle scores. In contrast, in the Mover Method group, there were significant improvements ($p < 0.05$) from baseline to 12wk within all healthy behavior and lifestyle change categories.

Our previous findings provided preliminary evidence that exercise programming founded upon the ACE IFT model guidelines, including the ACE Mover Method paradigm, is effective at facilitating healthy lifestyle changes and improving cardiometabolic health. Nevertheless, further research is needed. Studies examining the impact of community-wide initiatives aimed at increasing healthy behaviors and physical activity in vulnerable populations remain limited. In particular, during COVID-19, there was a critical need to provide healthy behavior and physical activity interventions to vulnerable populations, including minority groups and older adults[2]. The purpose of this study was to examine the effectiveness of the ACE Mover Method philosophy at positively modifying and maintaining healthy lifestyle behaviors in three select vulnerable cohorts, including

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older adults and minority community members. Similar to our previous findings, we hypothesized that the ACE Mover Method philosophy would elicit favorable healthy lifestyle behavior changes following the intervention in each of these vulnerable groups.

Methods

Participants

Nonsmoking men and women (N=64, 21 to 83 years of age) were recruited from a local university and surrounding community via advertisement through the university website, local community newspaper, and word-of-mouth. The following sample sizes were targeted for each vulnerable group within the community: N = 24, Older adults (>65 years of age) and N = 40, Minority (Hispanic/Latino, Black, and Asian/Pacific Islander). This study was approved by the Human Research Committee at Western Colorado University. All participants provided informed consent in advance of their participation in the study.

Experimental design

Participants were randomized to one of the following groups:

1. The treatment group (N=32) received a 10wk ACE Mover Method intervention consisting of weekly, client-centered educational sessions in addition to performing their 10wk personalized exercise program.
2. The second group (N=32) performed their 10wk personalized exercise program and served as the controls.

Participants in both groups completed a 10wk personalized exercise training program based on the American Council on Exercise (ACE) Integrated Fitness Training (IFT) model guidelines[3]. The personalized exercises training program was comparable to that we have used previously and details can be found elsewhere[4]. Each participant consulted with a team of health and fitness professionals and was assigned a Western Colorado University undergraduate or graduate student who served as their personal trainer. The student personal trainers worked directly under the supervision of qualified MSc- and PhD-trained exercise physiologists. The exercise team designed and progressed an appropriate and safe personalized exercise program using the evidence-based ACE IFT model guidelines for both Cardiorespiratory and Muscular Training. The student personal trainers coached members during their exercise sessions, provided motivational support, engaged in spotting, and corrected exercise technique.

Participants within both groups completed baseline and post-program testing. Assessments of anthropometric measures, cardiometabolic risk factors, and maximal oxygen uptake (VO_2max) were obtained at baseline and 10wk. At baseline, the talk test was performed to identify ventilatory thresholds (VT1 and VT2) for Cardiorespiratory Training. The procedures for all our assessments were consistent with our previous research and detailed elsewhere[3-4]. Additionally, at baseline and

post-program, participants also performed assessments for lifestyle behaviors and psychological outcomes, including the following: International Physical Activity Questionnaire, Sedentary Behavior Questionnaire, and Simple Lifestyle Indicator Questionnaire.

ACE Mover Method Intervention

The ACE Mover Method intervention paralleled the exercise training program and lasted 10 weeks. Similar to our previous approach, participants received once weekly ~10min ACE Coach Approach educational sessions that were embedded within their normal exercise routine[4]. The specific ACE Coach Approach sessions were individualized to each participant's unique goals and needs. Researchers were provided with examples of ACE Mover Method and Coach Approach scenarios as part of their training[3]. Every participant–researcher interaction was a collaboration aimed at positive lifestyle change (e.g., reduced sedentary time, healthy eating, and stress reduction) and consisted of the following steps:

- **Step 1** of this process involved asking powerful questions to identify what the participant hoped to accomplish by working with the researcher. Open-ended questions were posed to spark the discussion.
- **Step 2** involved asking more questions to discover what potential obstacles may get in the way of the participant reaching his or her specific goals. Questions like "What do you need to *start* doing now to move closer to your goals?" and "What do you need to *stop* doing that will enable you to reach your goals?" were posed to participants.
- **Step 3** focused on collaboration as the participant and researcher worked together to set SMART goals and establish specific steps to take action toward those goals. The participant was permitted to lead the discussion of how to monitor and measure progress in order to empower him or her to take ownership of their personal behavior-change journey.

Statistical Analyses

All analyses were performed using SPSS Version 26.0 (IBM Corporation, New York, NY, USA) and GraphPad Prism 8.0. (San Diego, CA). Measures of centrality and spread are presented as mean ± standard deviation (SD). Primary outcome measures include dietary habits, stress, and sedentary behavior as assessed by questionnaires at baseline and 10wk. Paired and independent t-tests were used to compare within-group and between-group changes from baseline to 10wk for all primary outcome measures. The probability of making a Type I error was set at $p<0.05$.

Results

There was considerable drop out in the present study with only 56.3% (36/64) of the originally recruited participants completing the 10wk intervention. The Delta and

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Omicron surges of the COVID-19 pandemic likely played a significant factor in participant attrition, although to respect participant medical privacy, exact reasons for study drop out were not obtained and recorded. The physical and physiological characteristics at baseline and 10wk for participants who completed the study are presented in Table 1. After 10wk, cardiometabolic health and cardiorespiratory fitness improved ($p < 0.05$) in both control and Mover Method groups. With the exception of waist circumference and LDL cholesterol ($p < 0.05$), the changes from baseline to 10wk across various cardiometabolic health variables and cardiorespiratory fitness were similar for both groups ($p > 0.05$).

Table 1. Physical and physiological characteristics at baseline and 10wk for control and Mover Method groups (values are mean ± SD).

	Control group (N=17)		Mover Method group (N=19)	
Outcome variable	**Baseline**	**10wk**	**Baseline**	**10wk**
Age (yr)	53.5 ± 16.6	-------	52.4 ± 17.8	-------
Body mass (kg)	77.9 ± 20.7	77.4 ± 20.5*	84.7 ± 17.1	83.9 ± 16.8*
Waist circumference (cm)	85.0 ± 15.5	85.2 ± 14.9	87.9 ± 10.3	85.6 ± 9.1*†
Systolic BP (mm Hg)	125.4 ± 12.9	119.9 ± 13.0*	126.1 ± 15.6	120.6 ± 15.0*
Diastolic BP (mm Hg)	83.9 ± 5.5	80.4 ± 5.8*	81.1 ± 9.5	78.0 ± 8.0*
Total cholesterol ($mg \cdot dL^{-1}$)	174.8 ± 46.7	182.9 ± 49.7	201.1 ± 35.3	199.4 ± 28.1
HDL cholesterol ($mg \cdot dL^{-1}$)	55.3 ± 22.7	59.8 ± 20.7*	53.9 ± 13.3	58.4 ± 10.7*
LDL cholesterol ($mg \cdot dL^{-1}$)	99.8 ± 29.8	99.4 ± 32.8	123.0 ± 33.7	114.3 ± 26.1*†
Triglycerides ($mg \cdot dL^{-1}$)	102.6 ± 39.4	93.6 ± 29.2	92.4 ± 28.8	91.6 ± 20.8
Blood glucose ($mg \cdot dL^{-1}$)	90.1 ± 10.9	87.8 ± 9.3	90.8 ± 6.1	88.1 ± 3.9*
VO_2max ($mL \cdot kg^{-1} \cdot min^{-1}$)	30.0 ± 6.7	33.9 ± 6.9*	29.2 ± 7.1	33.2 ± 7.7*
MetS z-score	-2.20 ± 3.05	-2.53 ± 2.49	-2.19 ± 1.32	-3.23 ± 1.12*

* Within-group change is significantly different from baseline, $p < 0.05$; † Change from baseline is significantly different from control group, $p < 0.05$.

Healthy behavior and lifestyle changes

The healthy behavior and lifestyle change scores at baseline and 10wk for participants who completed the study are presented in Table 2. Healthy behavior and lifestyle scores were similar at baseline between groups. In the control group, there were no significant ($p > 0.05$) changes between baseline and 10wk in any healthy behavior and lifestyle scores. In contrast, in the Mover Method group, there were significant improvements ($p < 0.05$) from baseline to 10wk within all healthy behavior and lifestyle change categories.

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Table 2. Healthy behavior and lifestyle change scores at baseline and 10wk for control and Mover Method groups (values are mean ± SD).

	Control group (N=17)		Mover Method group (N=19)	
Outcome variable	**Baseline**	**10wk**	**Baseline**	**10wk**
Sedentary Behavior Weekday (min)	504.7 ± 186.4	500.0 ± 173.1	507.9 ± 124.2	476.3 ± 121.7*†
Sedentary Behavior Weekend (min)	570.0 ± 186.0	566.2 ± 182.5	562.4 ± 143.2	527.1 ± 143.9*†
Life stress	3.59 ± 1.28	3.71 ± 1.05	3.47 ± 0.96	4.37 ± 1.34*†
Nutrition #1 (vegetables)	3.35 ± 1.17	3.29 ± 0.92	3.53 ± 1.02	4.11 ± 0.74*†
Nutrition #2 (fruits)	3.06 ± 1.03	3.18 ± 0.81	2.79 ± 0.71	3.89 ± 0.74*†
Nutrition #3 (fiber)	3.41 ± 0.71	3.59 ± 0.71	3.42 ± 1.02	4.11 ± 0.66*†

* Within-group change is significantly different from baseline, $p < 0.05$; † Change from baseline is significantly different from control group, $p < 0.05$.

Discussion

Given the prevalence of chronic disease throughout the United States there is an urgent need to identify successful educational strategies focused on positive healthy lifestyle changes. The introduction of the ACE Mover Method educational paradigm into the sixth edition of the ACE Personal Training manual[3] may be one successful strategy that health and fitness professionals could employee within the client-centered approach to inspiring active lifestyles. However, until recently, research was lacking on the potential effectiveness of an ACE Mover Method intervention. Our current findings extend our previous findings[1] and provide continued critical and encouraging evidence that the ACE Mover Method is a successful strategy for facilitating behavior and lifestyle changes. Indeed, in the Mover Method group of the present study, there were positive changes across all behavior and lifestyle categories, including less sedentary time, reduced stress, and improved healthy eating habits. Of particular interest, these findings were observed in various vulnerable segments (i.e., minorities and older adults) of the community, who have been disproportionately impacted by the COVID-19 pandemic with respect to overall health outcomes[2].

Why is the ACE Mover Method an important new instrument for Personal Trainers?

One of the most profound impacts a personal trainer can regularly have on the lives of their clients is to help them to positively change health-related behaviors and establish positive relationships with exercise. For this reason, the client–personal trainer relationship is the foundation of the ACE IFT Model. It is built upon rapport, trust, and empathy, with the personal trainer serving as a "coach" to the client throughout his or her physical activity and health behavior-change journey. This approach starts with realizing that the "client" is the first person in the client–personal trainer relationship. The ACE Mover Method provides personal trainers with a simple instrument that can be employed systematically to optimize client–personal trainer interactions and

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empower clients to make behavioral changes aimed at improving their health, fitness, and overall quality of life

How can the ACE Mover Method be used to Facilitate Behavior Change?

Applying behavior-change strategies with the ACE Mover Method in conjunction with the design and delivery of comprehensive exercise programs that help clients reach their unique fitness and wellness goals is a primary function performed by successful personal trainers. Some of the key areas that personal trainers can focus on with the ACE Mover Method to facilitate fitness-related and health-behavior changes include the following:

- Identifying each client's readiness to change behavior and stage of behavior change
- Fostering exercise adherence by creating positive exercise experiences that build self-efficacy
- Determining the need for, and appropriate selection and timing of, assessments and reassessments
- Designing, leading, and modifying exercise programs based on each client's current health and fitness status, needs, and goals
- Fostering a sense of self-reliance to empower clients to take ownership of their lifestyle changes
- Utilizing appropriate strategies to help clients transition from one stage of behavior change to the next and implementing relapse-prevention strategies
- Helping clients transition from extrinsic motivation to intrinsic motivation
- Establishing realistic short- and long-term goals to prevent burnout, provide multiple opportunities for success, and promote adherence
- Factoring a client's external lifestyle behavior stressors into total fatigue to avoid training plateaus and prevent overtraining
- Empowering clients by helping them increase self-efficacy and knowledge to train on their own
- Supporting clients in making physical activity a life-long habit

Conclusions

The ACE IFT Model is a comprehensive system for exercise programming that pulls together the multifaceted training parameters required to be a successful personal trainer. It organizes the latest exercise science and health-behavior research into a systematic approach to designing, implementing, and modifying exercise programs based on the unique abilities, needs, and goals of each individual. A key element of using the ACE IFT Model to empower clients to make behavioral changes to improve their health, fitness, and overall quality of life is the adoption of the ACE Mover Method. Given that the primary mission of the American Council on Exercise is to get

people moving, it is paramount that health and fitness professionals have evidence-based programming options available to implement on the individual and community levels. Our current findings provide critical translational evidence demonstrating personalized exercise programming based upon the ACE IFT model guidelines, including the ACE Mover Method paradigm, can be successfully implemented within vulnerable groups of clients to improve cardiometabolic health and facilitate healthy lifestyle changes.

Competing interests

This investigation was supported financially by the American Council on Exercise (ACE). The American Council on Exercise (ACE) was not involved in development of the study design, data collection and analysis, or preparation of the manuscript. There are no other potential conflicts of interest related to this article

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