



EFFECTS OF A 30-DAY FITNESS CHALLENGE ON BODY COMPOSITION AND MARKERS OF HEALTH IN WOMEN

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Abstract

Numerous studies have documented the value of exercise in controlled clinical trials. However, results achieved in clinical trials may not be realized when applied to the general public. **PURPOSE:** To determine the effects of a second international 30-day fitness challenge on fitness and markers of health in women. **METHODS:** 29,220 sedentary women (44.8±13 yrs, 84.0±20 kg, 31.3±7 kg/m² BMI, 38.3±7% fat) at 3,446 Curves® clubs in the US and Canada participated in the study. Subjects gave online consent and then completed questionnaires and baseline measures. Participants then followed the Curves 30-min circuit training program 3 d/wk plus a 30-min walk 4 d/wk. After 4-wks, subjects repeated testing and questionnaires. Data were analyzed by dependent T-test and are presented as mean±SD changes from baseline. **RESULTS:** Post-study results were obtained from 2,967 clubs with 14,535 participants. Participants experienced significant ($p<0.05$) decreases in weight (-2.1±3.4 lbs, -1.2%; $n=14,350$), percent fat (-0.7±1.9%, -1.8%; $n=14,396$), total inches (-3.9±5.3 in, -1.9%; $n=13,548$), BMI (-0.31±2.8 kg/m², -0.9%; $n=14,432$), systolic BP (-2.6±11 mmHg, -1.6%; $n=3,870$), and diastolic BP (-2.2±8 mmHg, -2.1%; $n=3,863$). Participants also reported significantly less weekly (-10%) and monthly (-19%) alcohol consumption, sugar intake (-24%), and fat intake (-22.4%) with greater calcium intake (6.6%), and fiber intake (7%). **CONCLUSIONS:** Results corroborate previous findings that significant improvements in body composition, markers of health, and positive behaviors can be achieved through short-term fitness initiatives.

Supported in part by Curves International Inc. Waco, TX

Rationale

The Curves International fitness and weight loss program has become a very popular means of promoting health and fitness among women. The program involves a 30-minute circuit resistance-training program 3 times per week that involves performing two rotations through 14 hydraulic bidirectional exercises for 30-seconds interspersed with 30-seconds of low impact recovery calisthenics. The program is designed to promote general improvements in cardiovascular fitness, muscular strength and endurance, flexibility, and body composition.

Researchers in the Exercise & Sport Nutrition Laboratory at Texas A&M University have conducted extensive research on the effectiveness and safety of the Curves fitness program. Prior research has shown this program to be highly effective in controlled clinical trials (*Nutri Metab* 6/1/2009). The purpose of this study is to evaluate the impact of a 30-day national fitness intervention on fitness and health behaviors in a large-scale population.

Experimental Design

Subjects

- 29,220 sedentary women (44.8±13 yrs, 84.0±20 kg, 31.3±7 kg/m² BMI, 38.3±7% fat) at 3,446 Curves® clubs in the US and Canada participated in the study.
- Subjects were informed as to the experimental procedures and signed online informed consent statements in adherence with the human subject guidelines of Texas A&M University.

Training Protocol

- Participants followed the Curves 30-min hydraulic resistance training circuit program interspersed with callisthenic exercises 3-d/wk plus were encouraged to walk briskly for 30-min a day on non-resistance training days.

Methods & Procedures

- Subjects were recruited to participate in this study through a national Curves/AVON advertisement campaign that offered a 30-day free Curves membership for participation.
- Pre and post-test assessments were obtained by club personnel and recorded on study cards.
- Body weight, height, and anthropometric measurements were obtained using standard procedures
- A handheld BIA analyzer was used to assess body fat.
- HR & BP were measured using automated analyzers.
- Questionnaires included membership/adherence, exercise history/comfort, exercise barrier, food frequency, alcohol frequency, physical activity, and medical family history.
- Subjects completed pre- and post-measurements, questionnaires, and entered pre- and post-study data online.

Statistical Analysis

- Data were analyzed by dependent T-test using SPSS for Windows version 18.0 software (Chicago, IL), and are presented as mean±SD changes from baseline.

Results

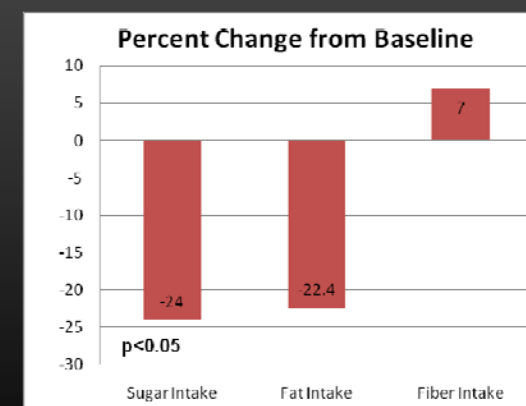
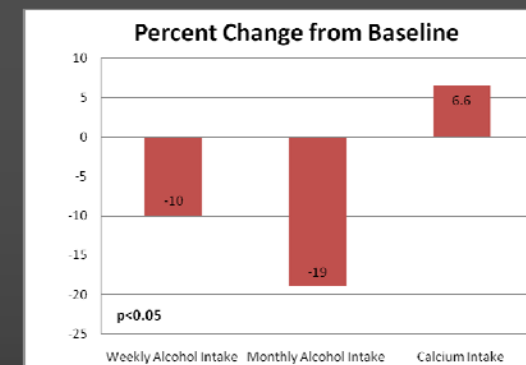
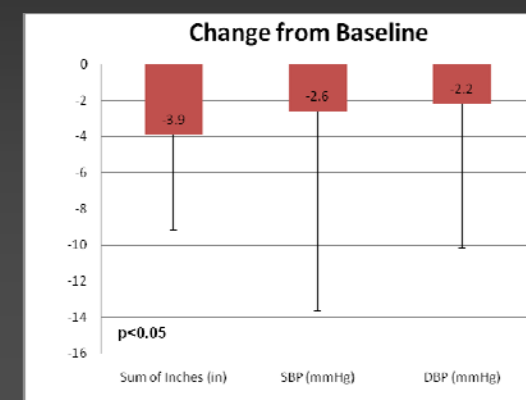
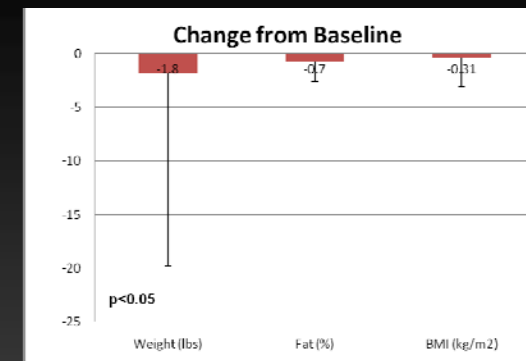
- Post-study results were obtained from 2,967 clubs with 14,535 participants.
- Participants experienced significant ($p<0.05$) decreases in weight (-2.1±3.4 lbs, -1.2%; $n=14,350$), percent fat (-0.7±1.9%, -1.8%; $n=14,396$), total inches (-3.9±5.3 in, -1.9%; $n=13,548$), BMI (-0.31±2.8 kg/m², -0.9%; $n=14,432$), systolic BP (-2.6±11 mmHg, -1.6%; $n=3,870$), and diastolic BP (-2.2±8 mmHg, -2.1%; $n=3,863$).
- Participants also reported significantly less weekly (-10%) and monthly (-19%) alcohol consumption, sugar intake (-24%), and fat intake (-22.4%) with greater calcium intake (6.6%), and fiber intake (7%).

Conclusions

- Results corroborate previous findings that significant improvements in body composition, markers of health, and positive behaviors can be achieved through short-term fitness initiatives.

Funding

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<http://esnl.tamu.edu>





MAINTAINING A HIGH PROTEIN DIET WHILE PARTICIPATING IN A RESISTANCE TRAINING PROGRAM DOES NOT AFFECT MARKERS OF BONE HEALTH IN WOMEN

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Abstract

Diets containing foods with a high potential renal acid load (PRAL) such as fish, meat, meat byproducts, and cheese have been suggested to adversely affect bone unless buffered by the ingestion of alkali-rich foods like fruits and vegetables. For this reason, there has been some concern that high protein diets may adversely affect bone mass and markers of bone health particularly in women. **PURPOSE:** To examine whether bone density and/or markers of bone health would be negatively affected in women participating in a circuit resistance-training program while adhering to a hypo-caloric high protein diet. **METHODS:** 367 sedentary obese women (46.5 ± 11 yrs; 90.8 ± 16 kg; 34 ± 5.5 kg/m²; 45 ± 4 % body fat) participated in a supervised 10-wk exercise and weight loss program. Subjects were assigned to a no-exercise or exercise control group (C, n=12); an exercise only group (E, n=68); a high protein group (HP, n=139); or, a high carbohydrate group (HC, n=148). Diets consisted of 1,200 kcal/d for 1-wk and 1,600 kcal/d for 9 wks. Diets were 55% CHO, 15% P, and 30% F (HC) or 7-15% CHO, 55-63% P, and 30% F (HP). Subjects in the exercise groups participated in a supervised fitness program 3-d per wk. Each circuit-style workout consisted of 14 exercises (e.g. elbow flexion/extension, knee flexion/extension, shoulder press/lat pull, hip abductor/adductor, chest press/seated row, horizontal leg press, squat, abdominal crunch/back extension, pec deck, oblique, shoulder shrug/dip, hip extension, side bends and stepping) using hydraulic resistance that targeted opposing muscle groups in a concentric-only fashion. Subjects performed the resistance-exercise for 30-sec followed by performing floor-based callisthenic (e.g. running/skipping in place, arm circles, etc.) exercises for a 30-sec in an effort to maintain exercise intensity (60% to 85% of max HR). Fasting blood samples, body mass, and DEXA body composition/bone density measurements were obtained at 0 & 10 wks and were analyzed by MANOVA with repeated measures. Data are presented as means \pm SD changes from baseline for the C, E, HC, and HP groups, respectively. **RESULTS:** Body mass (0.9 ± 3.4 ; -0.3 ± 2 ; -3.9 ± 4.5 ; -4.6 ± 4 kg, $p=0.001$) and fat mass (0.8 ± 2.3 ; -0.6 ± 1.9 ; -2.8 ± 3.0 ; -3.4 ± 2.8 kg, $p=0.001$) were significantly decreased in the diet groups. No significant differences were observed in changes in bone mineral content (4 ± 66 ; -12 ± 79 ; -4 ± 61 ; 2 ± 66 g, $p=0.57$), bone mineral area (-4 ± 66 ; -18 ± 73 ; -14 ± 66 ; -7 ± 63 cm², $p=0.66$), or bone mineral density (0.008 ± 0.02 ; 0.0036 ± 0.03 ; 0.0054 ± 0.03 ; 0.005 ± 0.03 g/cm², $p=0.95$). In addition, no significant differences were observed among groups in changes in serum calcium ($p=0.28$), alkaline phosphatase ($p=0.17$), uric acid ($p=0.73$), total protein ($p=0.96$), or creatinine ($p=0.29$). **CONCLUSIONS:** Consuming a diet with a higher percentage of protein during a 10-wk weight loss and circuit resistance training program does not appear to adversely affect BMC, BMA, BMD, serum calcium, serum alkaline phosphatase, or general markers of protein status. **PRACTICAL APPLICATION:** Strength and conditioning specialists should not be concerned that short-term high protein/low fat diets during resistance-training may negatively affect bone mass in women. **ACKNOWLEDGMENTS:** This study was funded by Curves International, Waco, TX.

Rationale

Diets containing foods with a high potential renal acid load (PRAL) such as fish, meat, meat byproducts, and cheese have been suggested to adversely affect bone unless buffered by the ingestion of alkali-rich foods like fruits and vegetables. For this reason, there has been some concern that high protein diets may adversely affect bone mass and markers of bone health particularly in women. Researchers in the Exercise & Sport Nutrition Laboratory at Texas A&M University have conducted extensive research on the effectiveness and safety of the Curves fitness and weight loss program on markers of health in several populations of women. The program involves a 30-minute circuit resistance-training program using 14 hydraulic bidirectional exercises for 30-seconds interspersed with 30-seconds of low impact recovery calisthenics. The program is designed to promote general improvements in cardiovascular fitness, muscular strength and endurance, flexibility, and body composition. The program has high carbohydrate or high protein diet options. The purpose of this study was to examine whether bone density and/or markers of bone health would be negatively affected in women participating in a circuit resistance-training program while adhering to a hypo-caloric diet high in protein.

Experimental Design

- Subjects were informed as to the experimental procedures and signed informed consent statements in adherence with human subject guidelines.
- 367 sedentary obese women (46.5 ± 11 yrs; 90.8 ± 16 kg; 34 ± 5.5 kg/m²; 45 ± 4 % body fat) participated in this study.
- Subjects were assigned to a no-exercise or exercise control group (C, n=12); an exercise only group (E, n=68); a high protein group (HP, n=139); or, a high carbohydrate group (HC, n=148).
- The diets involved consuming 1,200 kcal/d for 1-wk and 1,600 kcal/d for 9 wks.
 - High carbohydrate diet consisted of 55% CHO, 15% PRO and 30% Fat
 - High protein diet consisted of 7-15% CHO, 55-63% PRO, and 30% FAT
- Subjects participated in a supervised 30-min resistance circuit training program that was interspersed with calisthenic exercises and performed 3-d per week for the entire duration of the study.

Methods & Procedures

Body mass, DEXA body composition, anthropometric measurements, resting blood pressures, and fasting blood samples were obtained at 0 and 10 weeks.

Statistical Analysis

Data were analyzed by MANOVA with repeated measures using SPSS for Windows version 17.0 software (Chicago, IL) and are presented as means \pm SD % change from baseline for each group (C, E, HC, and HP) at week 10 of the study.

Results

- Body mass (0.9 ± 3.4 ; -0.3 ± 2 ; -3.9 ± 4.5 ; -4.6 ± 4 kg, $p=0.001$) and fat mass (0.8 ± 2.3 ; -0.6 ± 1.9 ; -2.8 ± 3.0 ; -3.4 ± 2.8 kg, $p=0.001$) were significantly decreased in both diet groups.
- No significant differences were observed in changes in bone mineral content (4 ± 66 ; -12 ± 79 ; -4 ± 61 ; 2 ± 66 g, $p=0.57$), bone mineral area (-4 ± 66 ; -18 ± 73 ; -14 ± 66 ; -7 ± 63 cm², $p=0.66$), or bone mineral density (0.008 ± 0.02 ; 0.0036 ± 0.03 ; 0.0054 ± 0.03 ; 0.005 ± 0.03 g/cm², $p=0.95$).
- No significant differences were observed among groups in changes in serum calcium ($p=0.28$), alkaline phosphatase ($p=0.17$), uric acid ($p=0.73$), total protein ($p=0.96$), or creatinine ($p=0.29$).

Conclusions

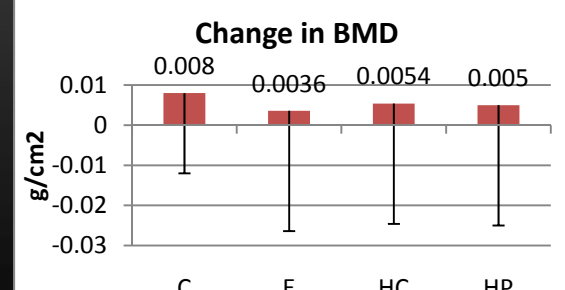
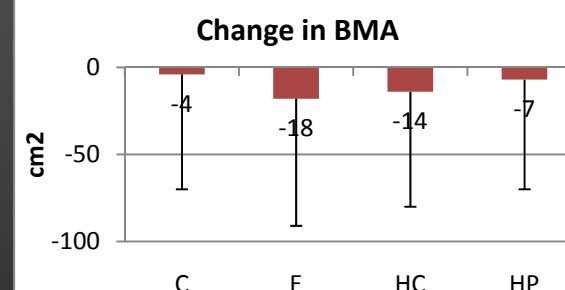
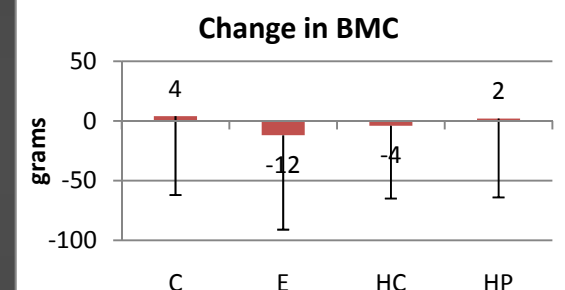
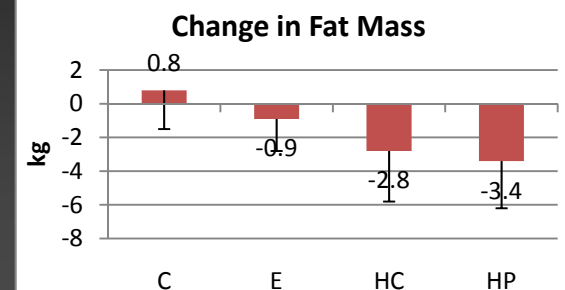
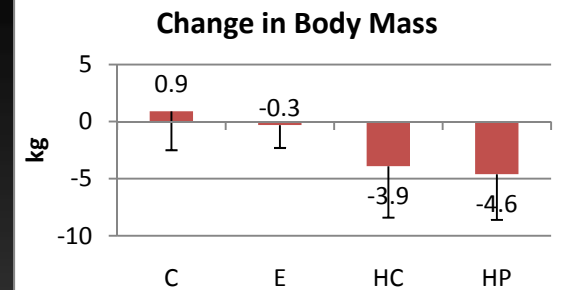
- Diet combined with circuit training promotes decreases in waist and hip circumference, weight loss, fat mass and body fat percentage while reducing blood pressure, cholesterol and uric acid, and increasing resting energy expenditure.
- Consuming a hypocaloric diet higher in protein while participating actively in a 10-wk circuit resistance training program does not appear to adversely affect BMC, BMA, BMD, serum calcium, serum alkaline phosphatase, or general markers of protein status.

Practical Application

Strength and conditioning specialist should not be concerned that short-term diets high in protein and low in fat may negatively affect bone mass in women.

Funding

Supported by Curves International Inc., Waco, TX
<http://esnl.tamu.edu>





EFFECTS OF A 30-DAY FITNESS CHALLENGE ON BODY COMPOSITION AND HEALTH MARKERS IN SEDENTARY WOMEN

C Canon, JY Kresta, M Byrd, C Rasmussen, Y Jung, D Khanna, M Koozehchian, M Mardock, J Oliver, S Simbo, M Greenwood, R Kreider.
Exercise & Sport Nutrition Lab, Texas A&M University, College Station, TX 77843



Abstract

Numerous studies have documented the value of exercise in controlled clinical trials. However, few large scale studies have evaluated the effects of initiation of resistance-training programs. **PURPOSE:** To evaluate the impact of a 30-day international fitness intervention on fitness and health behaviors in a large-scale population. **METHODS:** 72,870 sedentary women (44.0±13 yrs, 83.3±19.7 kg, 31.9±7 kg/m² BMI, 37.9±7% fat) responding to advertisements for a 30-day fitness challenge at Curves® clubs in the United States and Canada volunteered to participate in this study. Subjects gave online consent and then completed exercise, food frequency, and physical activity-related questionnaires. In addition, baseline body composition, obtained using a handheld bioelectrical impedance analyzer (BIA), blood pressure, and circumference measurements were taken by trained personnel. Participants followed the Curves 30-min circuit training program 3 d/wk. Each circuit-style workout consisted of 14 hydraulic resistance-exercises that targeted opposing muscle groups in a concentric-only fashion. Subjects performed the resistance-exercise for 30-sec followed by performing floor-based callisthenic (e.g. walking/skipping in place, arm circles, etc.) exercises for a 30-sec time period in an effort to maintain heart rate between 60% and 85% of age-predicted maximum heart rate. Participants were also encouraged to walk on non-training days and make positive changes in their diet. After 4-wks, subjects repeated questionnaires and had post-measurements recorded. Data were analyzed by dependent T-tests and are presented as mean±SD changes from baseline. **RESULTS:** Post-study results were obtained on 34,677 participants. Participants experienced significant (p<0.05) decreases in body weight (-0.86±2.2 kg, -1.1%; n=34,667), percent fat (-0.7±2.5%, -1.9%; n=34,349), total centimeters (-7.62±17.78 cm, -1.5%; n=33,899), BMI (-0.47±2.7 kg/m², -1.5%; n=12,167), systolic BP (-2.6±12.5 mmHg, -2.1%; n=11,767), and diastolic BP (-2.3±9.0 mmHg, -2.9%; n=11,711), as well as an increase in fat-free weight (0.05kg±2.4 kg, 0.1%; n=34,312). Participants also reported significantly less (p<0.05) weekly (-10%) and monthly (-17%) alcohol consumption, sugar intake (-24%), and fat intake (-22%) with greater calcium intake (5.3%), and fiber intake (6.8%). **CONCLUSIONS:** Significant improvements in body composition, markers of health, and positive health behaviors can be achieved through short-term circuit training fitness initiatives. **PRACTICAL APPLICATIONS:** Short-term circuit-training programs can be effectively used to promote positive changes in fitness and attitudes about health. **ACKNOWLEDGMENTS:** This study was supported by Curves International, Waco TX and Avon Inc., New York NY

Rationale

The Curves International fitness and weight loss program has become a very popular means of promoting health and fitness

among women. The program involves a 30-minute circuit resistance-training program 3 times per week that involves performing two rotations through 14 hydraulic bidirectional exercises for 30-seconds interspersed with 30-seconds of low impact recovery calisthenics. The program is designed to promote general improvements in cardiovascular fitness, muscular strength and endurance, flexibility, and body composition.

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Experimental Design

Subjects

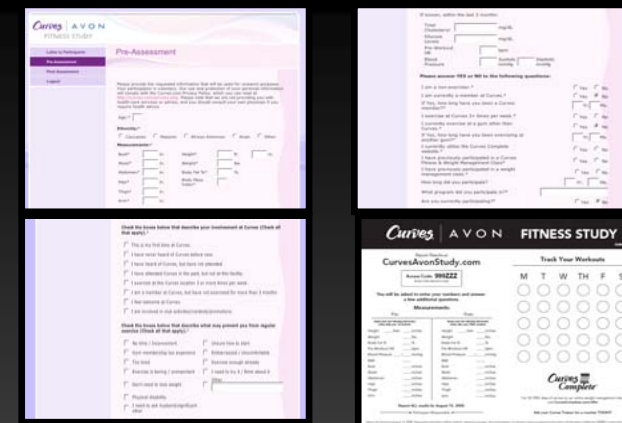
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- Subjects gave online consent and then completed exercise, food frequency, and physical activity-related questionnaires.

Training Protocol

- Participants participated in the Curves 30-min hydraulic resistance training circuit program with callisthenic exercises interspersed 3-d per week for 4-wks.
- Participants were also encouraged to walk on non-training days and make positive changes in their diet.

Methods & Procedures

- Subjects recruited through national Curves/AVON campaign and consent obtained via online system.
- Pre and post-test assessments obtained by club personnel and recorded on online questionnaires and measurements.
- Subjects entered post-study data online after 30 days.
- Handheld BIA analyzer used to assess body fat, HR & BP measured using automated analyzers.
- Questionnaires included membership/adherence, exercise history/comfort, exercise barrier, food frequency, alcohol frequency, physical activity, and medical family history.



Statistical Analysis

- Data were analyzed by dependent T-test using SPSS for Windows version 16.0 software (Chicago, IL), and are presented as mean±SD changes from baseline.

Results

- Post-study results were obtained on 34,677 participants.
- Participants experienced significant (p<0.05) decreases in body weight (-0.86±2.2 kg, -1.1%; n=34,667), percent fat (-0.7±2.5%, -1.9%; n=34,349), total centimeters (-7.62±17.78 cm, -1.5%; n=33,899), BMI (-0.47±2.7 kg/m², -1.5%; n=12,167), systolic BP (-2.6±12.5 mmHg, -2.1%; n=11,767), and diastolic BP (-2.3±9.0 mmHg, -2.9%; n=11,711), as well as an increase in fat-free weight (0.05kg±2.4 kg, 0.1%; n=34,312).
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