

Research Article

Lifestyle Modification Protocol in a Controlled Setting Show Significant Improvement in the Physical and Mental Health in Elderly Participants

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Abstract

A 60-day observational study was conducted to evaluate how lifestyle modification principles relying upon a customized regimen of aerobic and muscle strength exercise, a plant-based diet and meditative stress reduction techniques may improve physical endurance and strength, mental health, and reverse normal aging associated with the average American lifestyle. All enrolled participants were generally in good health respective to their age. Several subjects had overlapping mild medical conditions. The results demonstrate that the intervention of a customized lifestyle modification regimen of regular daily exercise, a plant-based diet, and daily stress reduction practices, such as meditation and yoga, may provide a viable and beneficial preventative strategy as an anti-aging and wellness model to increase the physical and mental health of elderly men and women.

Keywords: Diet; Exercise; Lifestyle Modification; Meditative stress reduction; Muscle strength exercise; Physical and Mental Health; Plant-based diet; Yoga

Introduction

A frequent criticism of the US's healthcare policies has been its failure to proactively develop and implement a rigorous preventative program to reduce chronic illnesses and reverse cellular aging that are often associated with lifestyle activities, behaviour, diet, nutrient deficiencies and exposure to environmental toxins [1,2].

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In recent years, there has been growing interest in lifestyle medicine [3,4]. Lifestyle, especially pertaining to physical activity and diet, has been assessed to have a positive association on the physical and mental health of elderly citizens. Physical inactivity, a sedentary lifestyle, social isolation and chronic stress are critical factors leading to premature aging associated with the non-communicable diseases [5]. Increased physical activity has been associated with lower mortality and hospitalization among seniors aged 70 and over [6].

Life expectancy is directly associated with the onset of many non-communicable diseases and a growing body studies and analyses have led to an emerging consensus that many illnesses are preventable by dietary and lifestyle interventions.

To date, few studies have been conducted to evaluate the capacity to sustain and improve physical health and mental well-being in a controlled environment over a sustained period of time that incorporate a wide-range of all-inclusive healthy lifestyle interventions to effect behaviour changes in diet, physical activity, stress reduction and mental resilience.

Design and Methods

The study was conducted in a controlled setting. All participants were housed in-residence at a retreat centre to assure each followed an identical daily regimen: exercise programs, diet, intermittent fasting, stress reduction sessions and followed similar daily and evening hours.

All participants were 64 years or older with an average of 73 years. Each received a thorough physical and medical examination before starting the study and had blood tested using Life Extension Foundation's Buyer Club's Healthy Aging Panel (HAP). Every two weeks individualized examinations were conducted. At the conclusion of the study a final physical examination was conducted and a second round of blood tests was performed.

The protocol included upwards of 3 hours of daily exercise, vegan plant-based diet, stress reduction practices (i.e., meditation and yoga) intermittent daily fasting, and "green" time in nature. Throughout the study, participants were regularly measured on weight, body fat, muscle mass, hydration levels, bone density, strength, endurance and blood pressure.

Physical exercise

Exercise and physical training schedules were tailored to the level of each participant's specific physical requirements. Every morning, participants went for a power walk and gradually increase their distance.

Following breakfast, participants performed an hour-long full cardio-exercise program, including muscle resistance, aerobic exercises and bike spinning.

Daily records were kept on participants' exercise performance including miles and speed walking, ropes, versa climber, pushups, sit-ups, balance and lateral pull downs repetitions.

Daily diet regimen

An alkalizing, anti-inflammatory, plant-based, dairy- and gluten-free diet was designed. The diet excluded refined carbohydrates, wheat and dairy, meat, poultry and fish. No caffeine, alcohol, refined sugar, artificial sweeteners or additives and no carbonated beverages were served.

The daily diet was based on a modified fasting protocol: five days per week, fresh juices for breakfast and two solid meals for lunch and dinner. For the remaining two days, participants followed a modified fast with no solid foods. All fasted after a 6 pm dinner until 9 am.

Stress reduction techniques

Participants were daily instructed and led in a variety of anxiety and stress reduction techniques, which included meditation, mindfulness training and physical Yoga.

Each participant completed the Hamilton Depression Rating Scale (HDRS) before starting the study and again after its completion.

No participant was taking prescription medications during the course of the study.

Results

Twenty-six of the original 33 enrolled participants completed the full 60 day program.

Physical Biomarkers

Statistically significant results were observed in loss of body fat (N=24) with a mean loss of -29.27%, and added bone density (N=18) with a median +16.6%. All but 6 participants completed the study with blood pressure readings characteristically normal for a middle-aged adult. The benchmark blood pressure limit was 130/80. No participants were obese or over-weight at the beginning of the study and three were clinically underweight.

Physical Vitals Results:

- Weight: N=21 decrease; N=4 increase. Mean average loss -4.6%
- Body Fat Percent: N=22 decrease; N=3 increase. Mean loss -29.3%
- Muscle Mass: N=17 gain; N=8 loss or no change. Mean gain +2.2%
- Water Percent: N=18 gain; N=7 loss or no change. Mean gain +8.15%
- Bone Weight: N=19 gain; N=6 loss. Mean gain +9.2%

Muscular performance results

- Ropes (min/sec): N=22 gain; N=3 decrease. Mean gain +587.3%
- Versa Climber (min/sec): N=23 increase; N=1 decrease. Mean gain +341.4%
- Pushups: N=24 increase; N=2 decrease. Mean increase +167.85%
- Sit-Ups: N=23 increase; N=2 decrease. Mean increase +266.4%
- Lateral Pull Reps: N=18 increase; N=2 decrease. Mean increase +282.7%

Caliper measurements

Throughout the trial, caliper measurements were taken to monitor progress in skin tightness and muscular strength. A statistically moderate but significant decrease was observed in all but one 80 year old man who was clinically underweight. Average cumulative decreases were as follow:

- Biceps -20.0%
- Triceps -17.9%
- Subscapularis -17.6%
- Subiliium -29.4%

Power walking (aerobic)

At the beginning of the study average distance was approximately 2 miles at an average pace of 22 min per mile. All but one participant increased their distance substantially. The highest increase recorded was 2 to 26 miles. The mean increase was 822.4% with an average of 12.4 miles. Average walking pace increased to 15 min/3 sec per mile. Due to minor foot injuries two participants were unable to complete the power walking sessions and have been excluded from the results.

Depression and Mental Health Biomarkers

Before and after the conclusion of the study, depression and anxiety levels were recorded with participants completing the Hamilton Depression Rating Scale survey. All participants completed the trial with statistically significant lower levels of depression and anxiety, a heightened sense of self-esteem and a positive outlook on life. Three individuals had had life-long clinically diagnosed depression. At the study's end, their scores noted they were depression-free. Eight were originally rated with mild and moderate depression and showed a greater than 100% improvement. Cumulative scores upon the completion of the study had decreased by 72.7%.

Discussion

This study has shown that within a 60-day period, seniors can substantially improve the quality of their physical health and mental well-being with a thorough change in their lifestyles and habits that includes daily aerobic and muscle strength exercise, a plant-based diet, and daily stress-reduction techniques. Given the renewed vitality that all participants exhibited, it was expected that mental health, reduced anxiety and depression, decreased significantly.

However, the results may be statistically significant for this particular unit of senior participants because of the relatively healthy dietary and active lifestyle followed prior to the study. The average elderly American is overweight or obese, disproportionately sedentary, has a poor diet and is prescribed one or more medication for an existing illness.

In future geriatric lifestyle studies it is suggested that when interviewing potential trial participants, a greater emphasis is placed upon differentiating those who adhere to the standard American diet, which is high in saturated and trans fats, animal proteins, refined carbohydrates, carbonated and caffeinated beverages and their overall caloric intake. Greater consideration should be given to differentiate between the healths of those who lead a sedentary life versus those who are physically active. In addition, consideration should be made for those living with chronic stress due to over-active and -taxing lifestyles, are

single versus married, and actively employed versus retired. Economic factors and population density may also be additional stressors [7]. Those individuals who led a healthy lifestyle and did not suffer from chronic stress were more likely to adhere to the dietary protocols and exercise regimen. Those who were most likely to not follow the protocols do so reluctantly or had failed completely had highly stressed lifestyles, broken relationships and unhealthy eating and social habits.

Limitations

Despite the rigor of a 60-day period in a controlled environment enabling all participants to follow an identical daily regimen, the study nevertheless recruited a relatively small number of participants. However, this observational study succeeded to investigate lifestyle modification in a sustained controlled environment and observed notable benefits in short duration.

Conclusion

The study's results significantly contribute to the growing clinical observational evidence to support lifestyle medicine as a fundamentally necessary and viable geriatric preventative strategy to improve physical vitality and endurance, mental health and general wellness for the elderly.

There are no Conflicts of Interest to declare. The study was funded independently by the authors' organization affiliations.

Data sets of participants' physical metrics and blood examination results are available upon request.

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