THE EFFECT OF 12 WEEKS OF PROGRESSIVE STRENGTH TRAINING ON LIPID PROFILE LEVELS IN INACTIVE MIDDLE-AGED MEN

M. Ravinder Rao

Physical Director, BJR Government Degree College, Narayanaguda, Hyderabad.

ABSTRACT

The aim of the present study was to investigate the effect of 12 weeks of progressive strength training on lipid profile levels in inactive middle-age men. Subjects of the study were 12 men (age 40-60) who participated is the study voluntarily. The training program began two days a week in the first month and continued to three non-consecutive days a week. The training intensity began with 60 percent 1rpm during the first two weeks and increased to 75-80% 1rpm.Triglyceride, cholesterol, LDL and HDL were measured before and after 12 weeks. Data was analysed using paired t-test statistical methods. Research findings showed that levels of triglyceride, total cholesterol, LDL and HDL no significant differences in post-test compared to pre-test (p=0.062, p=0.180, p=0.082 and p=0.476respectively). The results of this study showed that strength training cannot change the blood lipid and lipoprotein levels in inactive middle-aged men. In fact, subjects with normal lipid profiles may require greater exercise stimulus and energy expenditure further improve lipid profiles.

Keywords: *strength training; Lipid and lipoproteins profile; middle-aged men.*

INTRODUCTION

Cardiovascular disease has been recognized as a major leading cause of death for more than 10 decades, is known for a lot of people their lives each day to lose by this disease worldwide. Abnormal blood lipids known with increased LDL and low HDL as a risk factor for developing cardiovascular disease [1-3]. In addition, evidence suggests that physical inactivity is a risk factor for development of cardiovascular disease [4,5]. Physical activity beneficial effects such as improving abnormal lipid and lipoprotein levels, decreased blood pressure and body weight [4]. Physical activity, as a non-pharmacological treatment is often recommended for inactive individuals to positively modify lipid profile levels. Physical activity is a major modifiable determinant of cardiovascular disease [6,7]. Some studies have suggested that adults need at least 30 minutes a day of moderate intensity exercise to participate [8,9]. Strength training with moderate intensity exercise program for people with sedentary lifestyles is partly to thereby prevent cardiovascular disease and improve functional capacity, physical fitness, health, strength, and endurance [10,11].

The effect of strength training on lipids and lipoproteins is unclear. Some of the beneficial effects of Strength training on improvement blood lipids and lipoproteins levels have been reported [4,12]. Tan et al (2012) in study effects six months strength training on lipid profile levels in middle-aged men were examined and significant improvements in lipid profile levels were observed in these subjects [13]. Strength training is a good way to achieve the desired weight loss due to its effect on body fat in men and women is recognized. However, some studies have also no improved the lipid profile after the Strength training has been reported [14,15]. Yktaya et al (2011) the effect of eight weeks Strength training on lipid profile levels of middle-age men, No significant changes in levels of but no improvements in lipid profile levels observed [16].

In middle-aged, some studies demonstrate that physical activity reduces cardiovascular risk by about 50 percent independent of other risk factors. In middle-aged, physical activity is associated with the prevention of the development of risk factors [4,17]. Also investigate the effects of strength training on cardiovascular risk factors compared aerobic training very limited and physiological responses than aerobic training and strength training are indifferent [9,18], and additional research to understand the effects of different types of exercise on cardiovascular disease risk factors is needed. Therefore, this study investigated the effect of 12 weeks of progressive strength training on lipid profile levels in inactive middle-age men.

MATERIALS AND METHODS

Twelve sedentary male volunteers aged 40 to 60 years were selected based on age, health care provision, and non-smoking status. The subjects' physical characteristics are presented in Table 1. The objectives, details, and possible risks of the training program were explained to the subjects, and their written consent was obtained. Subjects' height and weight were recorded using a medical scale equipped with a stadiometer (Seca 220, Germany). Body fat percentage and body composition were measured using a body composition analyzer (InBody 3.0, South Korea).

Subjects were taught the correct techniques before starting the strength training sessions. The training program was conducted two days a week during the first month and continued three non-consecutive days a week thereafter. Training intensity began at 60% of 1RM during the first two weeks and increased to 75–80% of 1RM during the first month. The program included 10 strength exercises for the lower and upper body muscle groups. Three sets of 8 to 10 repetitions, with 90 to 120 seconds of rest between sets, were performed. The exercises included bench press, seated row, shoulder press, chest press, lateral pull-down, abdominal crunches, leg press, leg extension, triceps pushdown, and seated biceps curls.

Blood samples were collected after 12 hours of fasting at the pre-test and 48 hours after the last training session at the post-test. After collecting blood samples at each stage, 10 cc of blood was obtained from the left hand while the subjects were in a sitting position. Pars Azmoon kits, model numbers 90015, 90017, and 91004, and an enzymatic method were used to measure triglycerides, total cholesterol, high-density lipoprotein, and low-density lipoprotein. Low-density lipoprotein was calculated using the Friedwald equation:

LDL = TC − (HDL + TG/5)

All values were expressed in milligrams per decilitre (mg/dl). Statistical analysis was performed using SPSS Version 18. Data normality was determined using the Kolmogorov–Smirnov test.

RESULTS

A comparison of within-group differences in the research variables is presented in Table 2. The findings showed that the levels of triglycerides, total cholesterol, LDL, and HDL did not differ significantly between the post-test and pre-test values, with p-values of 0.062, 0.180, 0.082, and 0.476, respectively. An independent t-test was used for between-group comparisons, while a paired t-test was used for within-group comparisons of the measured variables. The level of statistical significance was set at **$p \leq 0.05$**.

Table 1. Results of Paired t-Test in the Group Before and After the Intervention

Parameter	Phase	Aerobic Training	p-Value
TG (mg/dl)	PRE	162.75 ± 30.71	0.062
	POST	155.92 ± 29.62	
TC (mg/dl)	PRE	166.92 ± 36.72	0.180
	POST	161.33 ± 30.07	
LDL (mg/dl)	PRE	5.17 ± 38.9413	0.082
	POST	128.50 ± 33.81	
HDL (mg/dl	PRE	46.17 ± 9.11	0.476
	POST	47.33 ± 12.02	

DISCUSSION

This study was designed to investigate the effect of 12 weeks of strength training on the lipid profile levels of inactive middle-aged men. The findings revealed that there were no significant differences in triglyceride levels at the post-test compared with the pre-test. The results were consistent with the findings of Soori et al. (2011), but did not agree with Gorzi et al. (2011), Soori et al. (2007), and Gelecek et al. (2006).

Previous research has demonstrated that physical activity may help reduce cardiovascular disease risk. According to some research evidence, sedentary individuals are at greater risk for cardiovascular diseases. One of the mechanisms for reducing the risk of cardiovascular disease may be related to regular physical activity and improvements in lipid profile and overall cardiovascular health.

Triglycerides are obtained from food or produced by the liver. During strength training, triglycerides may not be broken down sufficiently into fatty acids for use as an energy source by the active muscles.

The findings revealed that there were no significant differences in cholesterol levels at the post-test compared with the pre-test. The results were consistent with Soori et al. (2011) but did not agree with Gorzi et al. (2011), Bemelmans et al. (2007), and Gelecek et al. (2006). A decrease in insulin levels during physical training may cause changes in plasma cholesterol levels. Therefore, changes in insulin levels may contribute to a reduction in cholesterol.

The findings also revealed that there were no significant differences in LDL levels at the post-test compared with the pre-test. The results were consistent with Soori et al. (2011) but did not agree with Gorzi et al. (2011) and Gelecek et al. (2006). The effects of strength training on blood lipids are not entirely clear. However, high-volume strength training with short rest periods between training sessions may have a greater effect on blood lipid levels. Exercise can also increase the secretion of endocrine hormones such as epinephrine, norepinephrine, growth hormone, and cortisol.

Similarly, the findings revealed that there were no significant differences in HDL levels at the post-test compared with the pre-test. The results were consistent with Soori et al. (2011) but did not agree with Bemelmans et al. (2011) and Gelecek et al. (2006). Lipoprotein lipase is an enzyme that plays a major role in the conversion of VLDL to HDL. Increased physical activity may enhance lipoprotein lipase activity.

CONCLUSION

The results of this study showed that 12 weeks of strength training did not produce significant changes in the blood lipid and lipoprotein levels of inactive middle-aged men. Individuals with normal lipid profiles may require greater exercise stimulus and higher energy expenditure to achieve further improvements in their lipid profiles.

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