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Impact of Resistance Training and Pranayamic Practice on Low-Density Lipoprotein Levels in Professional College Students

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Abstract: The purpose of this study was to investigate the lipid profile alterations that take place during resistance exercise training among professional college students. Forty professional college female students were randomly selected as subjects and their ages ranged between 18-25 years. They were randomly divided into two equal groups such as the experimental group (group I) and the control group (group II) with twenty subjects (n =20) each. The experimental group underwent dumbbell resistance workouts and pranayama practice for eight weeks (three days per week) and the Group II Control group (CG) did not undergo any specific training apart from their regular activities. LDL cholesterol was selected as a test variable and assessed before and after the training period. The collected data was statistically analyzed by using a paired t-test to determine the paired mean difference. From the results of the study, it is found that there was a significant improvement ($p \leq 0.05$) in the LDL cholesterol level of the training groups when compared to the control group.

Keywords: Resistance training, Pranayama, LDL Cholesterol

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Introduction

Inactivity can contribute to high cholesterol levels in women. When individuals lead a sedentary lifestyle and do not engage in regular physical activity, it can lead to weight gain, decreased metabolism, and an increase in LDL (bad) cholesterol levels. Physical inactivity can also lead to lower levels of HDL (good) cholesterol, which is important for heart health. Incorporating

regular exercise, including aerobic activities and resistance training, can help improve cholesterol levels and overall cardiovascular health in women. Women need to maintain an active lifestyle and engage in regular physical activity to help manage cholesterol levels and reduce the risk of heart disease. Women can benefit from resistance exercise for various reasons.

Resistance training helps increase muscle strength, which can improve overall physical performance and functional abilities. It also helps increase bone density, reducing the risk of osteoporosis. Additionally, resistance exercise can boost metabolism, aid in weight management, and enhance overall body composition. Regular resistance training can also help prevent injuries, improve posture, and promote overall well-being. Resistance exercises for women can include activities such as weightlifting, bodyweight exercises, resistance band workouts, and using weight machines at the gym. These exercises help build muscle strength, improve bone density, and increase metabolism. It is important to consult with a fitness professional to create a personalized resistance training program tailored to individual goals and fitness levels (Hees *et al.*, 2002).

Regular practice of pranayama techniques can help improve lung function, increase oxygen supply to the body, and enhance respiratory health. Deep breathing through pranayama can also help reduce stress, calm the mind, and promote relaxation, which can have a positive impact on mental well-being and emotional balance. Additionally, pranayama practices can aid in improving digestion, boosting metabolism, and enhancing overall energy levels. Incorporating pranayama into a daily routine can be beneficial for women looking to improve their physical, mental, and emotional health (Walsh *et al.*, 2003).

Exercise can be a powerful tool for women to manage life pressures effectively. Regular physical activity has been shown to reduce stress, anxiety, and symptoms of depression by releasing endorphins, the body's natural mood elevators. Exercise can also improve sleep quality, boost self-esteem, and increase overall energy levels, which can help women better cope with the demands of daily life. Additionally, engaging in exercise can provide a sense of accomplishment, control, and empowerment, leading to improved mental resilience and a more positive outlook on

life. By incorporating regular exercise into their routine, women can better manage life pressures, enhance their overall well-being, and build a strong foundation for a healthy and balanced lifestyle (Ferrier *et al.*, 2001).

The intensity of resistance exercise refers to the level of effort or difficulty involved in performing the exercises. It is an important factor in determining the effectiveness of the workout and the results achieved. The intensity of resistance exercise can be adjusted by varying factors such as the amount of weight lifted, the number of repetitions and sets performed, the speed of movement, and the rest periods between sets. Higher-intensity resistance exercises, such as lifting heavier weights or performing more challenging bodyweight exercises, can help build muscle strength and size more effectively. It can also lead to greater improvements in muscle endurance and overall fitness. However, it is important to gradually increase intensity levels to avoid injury and allow for proper recovery. On the other hand, lower-intensity resistance exercises, such as using lighter weights or focusing on bodyweight exercises, can be beneficial for beginners or individuals recovering from injuries. It can help improve muscle tone, endurance, and overall fitness levels (Tanaka *et al.*, 2000). The purpose of this study was to investigate the lipid profile alterations that take place during resistance exercise training among professional college students.

Materials and Methods

To conduct the study, 40 female professional college students from Kozhikode, Kerala, aged between 18-25 years, were randomly selected as participants. These forty individuals were divided into two groups of twenty each. Group I (n = 20) underwent a combined regimen of resistance exercise and pranayama practice (RPTG), while Group II served as the control group (CG) (n=20) and did not engage in any specific training beyond their regular activities. The training sessions were conducted three days a week in the morning (6.30 am to 7.30 am) over eight weeks.

Table 1: Mean Standard deviation and mean difference t test for the Control group and Experimental group for LDL cholesterol

Group	Test	N	Mean	SD	MD	t
Control group	Pre-test	20	104.74	9.23	0.91	0.76
	Post-test	20	103.83	8.40		
Experimental group	Pre-test	20	104.11	9.84	7.7	2.98**
	Post-test	20	96.41	9.46		

*Significant at 0.05 level of confidence for the degree of freedom (df) at 38 = 2.021

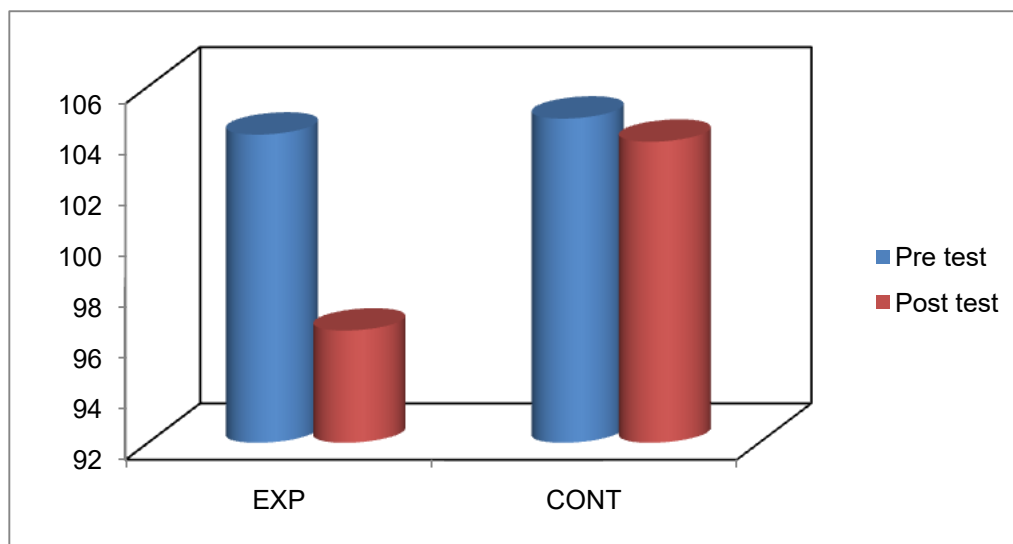


Fig. 1: Pre-test and Post-test mean values of LDL cholesterol for Resistance training and Pranayama group and control group.

Low-density lipoprotein (LDL) cholesterol levels were chosen as the variable for the study and were assessed using the Cholesterol oxidase enzymatic method with the Boehringer Mannheim Kit. Both groups began with warm-up exercises, followed by Group I performing a series of resistance exercises with dumbbells, such as jumping jacks, lunges, split squats, lateral dumbbell raises, lateral bends, abdominal twists, dumbbell bench presses, and step-ups with dumbbell raises, with intensity and repetitions increasing bi-weekly. Additionally, the anuloma-viloma pranayama technique of alternate nostril breathing was practiced 21 times in a cycle. Biochemical values of all subjects were measured before and after the 8-week training period.

Statistical analysis

Mean and Standard deviation were calculated for the LDL cholesterol of each group. The data were analyzed by using a paired t-test. Statistical significance was set to priority at 0.05 levels.

Results and Discussion

Table 1 shows the obtained t value 2.98 for the experimental group concerning the LDL level was significantly higher and hence, it was proved that there was a significant difference in the LDL level of the experimental group which participated in resistance training and pranayama practice for 8 weeks.

The study results (Fig. 1) demonstrated a significant impact of combining resistance

training and pranayama practice on the selected biochemical variable, specifically LDL, within the experimental group. These findings align with previous studies by Fleur Poelkens *et al.* (2007) who have also observed alterations in serum lipid levels as a result of exercise.

Breathing exercises for women can offer a range of benefits, including stress reduction, improved relaxation, enhanced focus and concentration, and better overall mental well-being. Deep breathing exercises can help activate the body's relaxation response, reducing stress hormones and promoting a sense of calm. These exercises can also improve lung function, increase oxygen flow to the brain and muscles, and help regulate blood pressure. Additionally, practicing breathing exercises regularly can aid in better sleep, boost energy levels, and enhance overall emotional balance. Incorporating breathing exercises into a daily routine can be a valuable tool for women to manage stress, improve mental clarity, and promote overall health and well-being.

Conclusion

The findings of this study indicated that engaging in 8 weeks of resistance training and pranayama practice led to a notable decrease in LDL cholesterol levels among professional college women, while the control group did not exhibit any changes in LDL cholesterol levels. This study could be extended to various age groups with diverse exercise routines, offering potential benefits to society.

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