Section: Research Paper

INSULATED AND UNITED INFLUENCE OF HYDRAULIC RESISTANCE AND LADDER AGILITY TRAINING ON SELECTED LIPID PROFILE AMONG WORKING WOMEN

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Abstract

Objective

Technical knowledge is challenging old beliefs and myths about health, leading to a better understanding of how to lead a healthy life beyond just the absence of illness. Women's health management is gaining global attention due to the increasing health issues associated with modern lifestyles. Health is not just about being free from illness but also having enough strength and energy to exercise daily and proper functioning of different body systems. A study aimed to investigate the insulated and united influence of hydraulic resistance training and ladder agility training on the lipid profile of working women.

Methods

The study consisted of 60 healthy untrained women aged 25 to 32 years, who were randomly assigned to one of four teams: investigational Team 1 (hydraulic resistance training), investigational Team 2 (ladder agility training), investigational Team 3 (a combination of hydraulic resistance and ladder agility training), and control Team. The investigational Teams participated in eight weeks of training, while the control Team did not undergo training.

Results

The mean values and statistical test results for Total Cholesterol (TCL), Low-density Lipoprotein cholesterol (LDL), and High-density Lipoprotein Cholesterol (HDL) levels for four different Teams before and after an intervention. The adjusted after-test mean values were highest in the CHRLATG Team, indicating that the combined hydraulic resistance and ladder agility training intervention may have been the most effective in reducing TCL and LDL and increasing HDL levels.

Conclusion

The study found that hydraulic resistance and ladder agility training significantly affected the lipid profile of working women, with the HRTG/LATG Team having lower mean values for LDL and higher mean values for HDL than the control Team. These findings suggest that HRTG/LATG may be an effective intervention for improving lipid profiles among working women, although further studies are needed to confirm these outcomes and investigate long-term effects.

Keywords: Hydraulic resistance training, ladder agility training, Total cholesterol, high-density lipoprotein cholesterol, low-density lipoprotein cholesterol.

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INTRODUCTION

Today, technical know-how breaks down the misunderstandings and myths surrounding health that have been cherished for generations and has the great potential to move up, develop, and lead a healthy life beyond the narrow concept of the human body. Women's management is a modern development that has gained attention worldwide in recent years. Issues associated with health are increasing because the generation is changing into many advances and inactive. Health was the premise of freedom from illness, disability, and death. Helping the human experience to uncover the essence of some of the health beyond liberation from illness remembers "the presence of enough strength, energy, and energy to exercise every day." Other fitness essences include a health approach and "proper functioning of different body systems (K. Mano Sakthi & Dr K. Divya, 2023)."

In addition to eating healthy, students need to be fit in the amount of time they need to do their daily physical activities. Exercise can develop and care for mental and emotional well-being. According to the Stress and Depression Society of Physical Education, it can help college students reduce their daily stress(Schultz et al., 2022).

The athlete performs exercises on a hydraulic machine, forced to produce more force and power to stun the increasing confrontation as they move faster. The athletes must create maximum energy and power in short bursts, and hydraulic resistance training can help advance the specific type of strength needed for these activities. Although hydraulic resistance machines can be exclusive, they offer unique structures that make them appreciated tools for athletes looking to improve their enactment. By providing resistance that increases with speed, these machines can help athletes develop the explosive power and strength needed for success in various sports. (Kunz et al., 2019).

There is a mechanical distinction between hydraulic and pneumatic machines because hydraulic machines use oil and gaseous tension. Moreover, there are significant contrasts from a biomechanical and physiological perspective. Hydraulic engines are more efficient concentrically and have no flight resistance. Typically, the weight is lifted concentratedly and delivered at random. With hydraulic machines, lifting up and then pushing down is more of a challenge.

Also, other hydraulic activities do not depend on gravity to oppose and are planned in one of the following ways: The weight on the functioning muscles closes when development is unexpectedly halted; the framework will promptly return to its underlying state. However, whether adequate preparation will be performed to achieve the advantage remains unclear. It is because the degree of resistance power relies upon individual exertion and speed throughout every redundancy. (Resistance Training – HSC PDHPE, n.d.)

The ladder training method helps athletes improve muscle strength, strength stamina, speed endurance, coordination and range of motion. Ladder training is practical because of the situation routine of callisthenics performed sequentially. The Ladder Workout is a great mobility training tool because it is lightweight, portable, and offers countless indoor and outdoor options. Emphasize exercise's aerobic and conditioning nature to increase metabolism and burn fat. It is high-intensity interval training for attacking fat: more power in less time(Sornalingam, 2012).

These short bursts of hyperactivity during short breaks will burn fat and burn more calories. Furthermore, exercises such as lateral resistance movements, slow jumps, and floor walks resolve experiment abdominal stability. Altogether these activities draw the core to water and move into the situation. Bharathi Prabhakaran et al. study aimed to investigate the intensive fourteen-week

resistance exercise programme response to the lipid profile and body fat percentage in sedentary, premenopausal women. The results showed that resistance training led to significant improvements in lipid profile and body fat percentage, suggesting that resistance training can have favourable effects on the health of this population.

METHODS

Subjects

The study was based on working women; untrained healthy women were directed. Therefore, 60 working women subjects from working women around karaikudi, Tamil Nadu, participated in the experiment. The subjects were present, not intricate in any structured sports physical movement but were essential to perform a regular of fifty minutes per session. Their age fluctuated from 25 to 32 years, respectively. The study design ultimately informed those involved and followed the protocol of the training schedule to encourage them to participate with their consent. (Sakthi & Divya, 2022)The subjects were indiscriminately allocated into investigational Team 1 and hydraulic resistance training (HRTG N=15). Investigational Team 2, ladder agility training (LATG N=15), investigational Team 3, collaborative Team (HLTG N=15), and control Team (CG N=15). The investigational team has participated in eight weeks of hydraulic resistance training and Ladder agility training. The hydraulic resistance preparation was distributed as three days of morning meetings in the week, the ladder agility preparation was determined as elective days of the week in the first part of the day meeting, and the collaborative practice was set as a meeting of long elective periods of Monday to Saturday for 50 minutes every day with the assistance of specialists of the field coaches. The Control team did not go through preparation. (Lee et al., 2011).

Training Procedure

The preparation plan was framed with the assistance of a wellness mentor and master in the field at Karaikudi Fitness Center in Karaikudi, Tamil Nadu. The activity program consisted of ten warm-up minutes, thirty minutes of hydraulic resistance, ladder preparation, and ten minutes of cool-down and unwinding workouts. The warm-up consisted of developing exercises, followed by a slow-paced stroll. Then, the activity was directed utilizing hydraulic resistance machines with the accompanying exercises: pectoralis essential and minor to and fro, supraspinatus, infraspinatus move back and forth, low back flexion and expansion, adductor brevis and adductor longus adduction and snatching press, and elbow augmentation and flexion. During the primer stage, subjects completed fewer than one bunch of each activity and finished a few sets once they adjusted to the subsequent steps.

The ladder agility preparation was built and isolated into three periods of exercise to prepare the psyche and actual level to embrace their practice by the accompanying: Bounce Scotch, Sidelong Feet, In-out, Tango, Five Count, Get Over, Horizontal Crisscrosses, and Pushing Ahead (In/Our Succession). Each exercise was completed in two sets, and a rest time of thirty seconds was given between the sets. On varying days of the week, subjects participated in hydraulic resistance and ladder agility training.

Testing Procedure

The blood examples were taken from the subjects during the estimation trial, allowing insight into TCL, HDL, and LDL. Also, using a venous cut strategy, 10 ml of blood was drawn

from participants with cubical veins. Tests were conducted earlier than expected and after a trial length of about two months. All biochemical boundaries were estimated with a natural chemistry analyzer.

MATERIAL AND METHOD

Sixty female subjects, all working women, participated in the review. As part of every seven days of hydraulic resistance, ladder agility, and collaborative preparation practice, subjects were not associated with any organized games' actual work. Instead, they were crucial to achieving 50 minutes in hydraulic resistance, ladder agility, and collaborative preparation practice. The mean (S.D.) age, level, mass, and B.M.I. of the team were 25.96 ±2.5 years, 155.4 ± 2.3cm, 70.4 ±6.47kg, and 25.2 ±2.8 kg/m2 separately for all subjects. After training about the impartiality and methodology of the review, they consented to participate. Therefore, a randomized controlled study team configuration was proposed for the study.

STATISTICAL TECHNIQUE

The analysis of covariance of statistically used to find the data composed on or after the investigational and control Team before, after-training on designated variables be located studied. The mean differences were significant whenever the 'F' ratio for ANCOVA was used to find out the significant difference to determine which of the paired test. The level of significance confidence at 0.05 was fixed.

The obtained data of ANCOVA were used to find out the TCL, LDL and HDL from the Participation of the investigation and control Team, shown in Table- 1.

RESULTS

Table -1

ANALYSIS OF COVARIANCE OF TC, LDL, AND HDL OF INVESTIGATION TEAMS AND CONTROL TEAM

(Lab test means count in mg/dl)

Biochemical variables		HRTG	LATG	CHRLATG	CG	Sum of variance	Sum of square	Degree of freedom	Mean square	'F' test
TC	before Test Mean	179.13	177.07	179.20	177.60	B/G	52.58	3	17.52	1.25
						W/G	784.66	56	14.01	
	after Test Mean	169.07	163.08	170	174.40	B/G	841.06	3	280.35	26.33*
						W/G	596.26	56	10.64	
	Adjusted after-Test Mean	171.20	166.13	177.60	181.53	B/G	2090.71	3	696.90	61.6*
						W/G	633.46	55	11.31	
LDL	BeforeTest Mean	101.27	101.47	100.60	102.47	B/G	26.850	3	8.95	1.26
						W/G	396.00	56	7.07	
	after Test Mean	90.60	90.33	85.00	100.87	B/G	1979.93	3	659.97	78.85*
						W/G	468.667	56	8.36	
	Adjusted	96.87	96.07	90.87	102.80	B/G	1074.85	3	358.28	37.10*

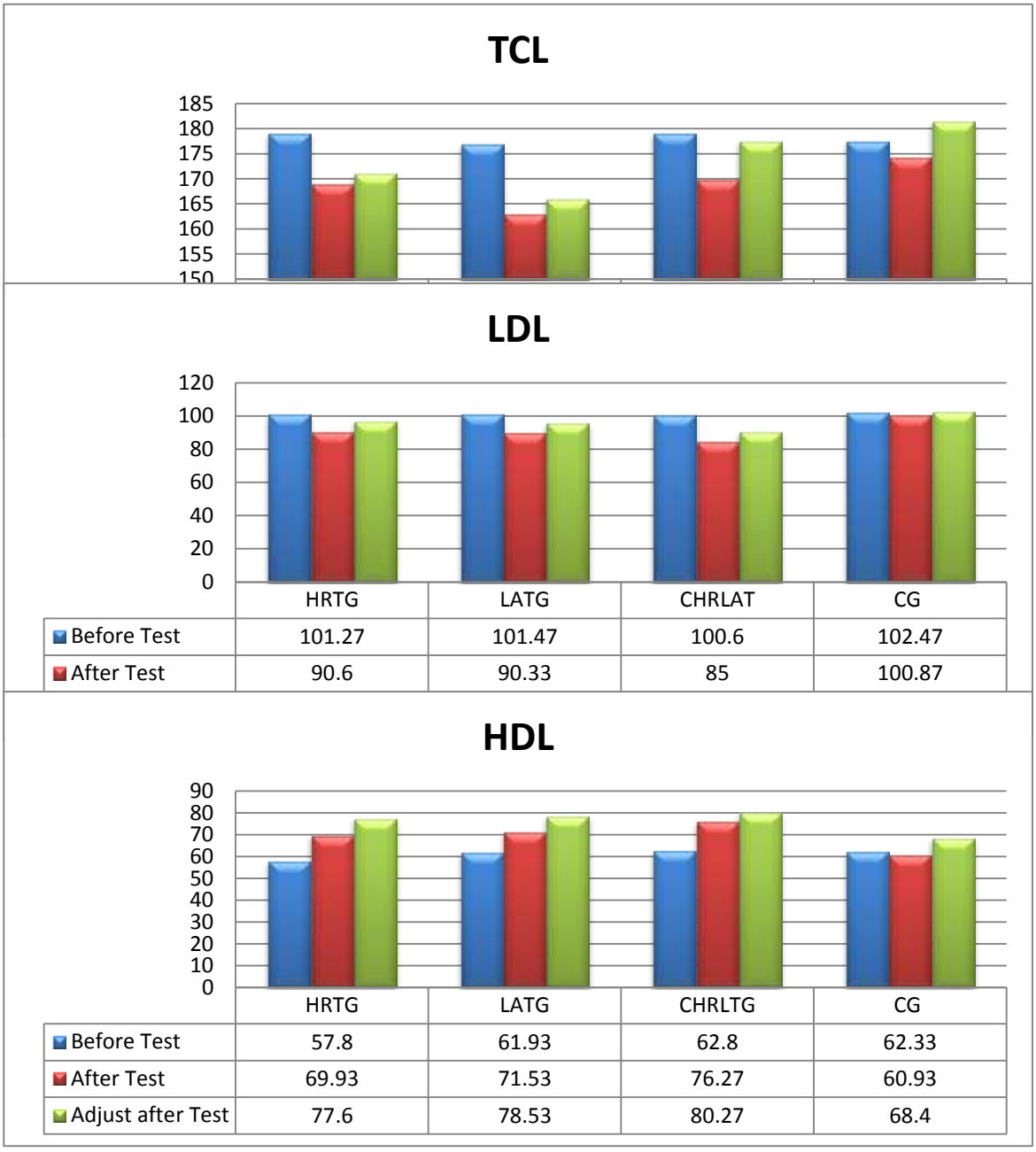
	after-Test Mean					**W/G**	**540.80**	**55**	**9.65**	
HDL	**Before Test Mean**	**57.80**	**61.93**	**62.80**	**62.33**	**B/G**	**239.11**	**3**	**79.70**	**2.39**
						W/G	**1313.06**	**56**	**23.44**	
	After Test Mean	**69.93**	**71.53**	**76.27**	**60.93**	**B/G**	**1850.80**	**3**	**616.93**	**28.26***
						W/G	**1222.53**	**56**	**21.83**	
	Adjusted after-Test Mean	**77.60**	**78.53**	**80.27**	**68.40**	**B/G**	**1271.73**	**3**	**423.91**	**19.36***
						W/G	**1225.86**	**55**	**21.89**	

HRTG- Hydraulic Resistance Training Team, **LATG-** Ladder Agility Training, **CHRLATG-** Collaborative Hydraulic Resistance and Ladder Agility Training Team, **C.G.-** Control Team, **B.G.-** Between in Team, **W.G.-** Within team.

* level of significance at 0.05 table value for df (3, 56) at 0.05 level = 2.76 table value for df (3, 55) at 0.05 level = 2.78

Table 1 shows that the Table includes three biochemical variables: Total Cholesterol (TCL), Low-density Lipoprotein cholesterol (LDL), and High-density Lipoprotein Cholesterol (HDL). For each variable, there are three sections: "Before Test Mean," "After Test Mean," and "Adjusted after-Test Mean." Each section contains mean values for the variable, separated into two subTeams: "B/G" (Before team) and "W/G" (After team). In addition to the mean values, the Table provides the sum of variance, a sum of squares, degrees of freedom, mean square, and F-test for each variable. The F-test was used to determine if there was a significant difference between the mean values of B/G and W/G subTeams. Here are the actual values in the Table: Variable: Total Cholesterol (TC), Before Test Mean: HRTG 179.13, LATG 177.07, CHRLATG 179.20 and CG 177.60, F-test: 1.25. After Test Mean: HRTG 169.07, LATG 163.08, CHRLATG 170 and CG 174.40, F-test: 26.33*.Adjusted after-Test Mean HRTG 171.20, LATG 166.13, CHRLATG 177.60 and CG 181.53, F-test: 61.6* Variable: Low-density Lipoprotein (LDL), Before Test Mean: HRTG 101.27, LATG 101.47, CHRLATG 100.60 and CG 102.47, F-test: 1.26. After Test Mean: HRTG 90.60, LATG 90.33, CHRLATG 85.00 and CG 100.87, F-test: 78.85*. Adjusted after-Test Mean HRTG 96.87, LATG 96.07, CHRLATG 90.87 and CG 102.80, F-test: 37.10* Variable: High-density Lipoprotein (HDL) Before Test Mean: HRTG 57.80, LATG 61.93, CHRLATG 62.80 and CG 62.33, F-test: 2.39. After Test Mean: HRTG 69.93, LATG 71.53, CHRLATG 76.27 and CG 60.93, F-test: 28.26*. Adjusted after-Test Mean HRTG 77.60, LATG 78.53, CHRLATG 80.27 and CG 68.40, F-test: 19.36*.The mean values for TCL, LDL, and HDL levels decreased after the intervention for all Teams. The adjusted after-test mean values for all three biochemical variables were highest in the CHRLATG Team. It indicates that the collaborative high-intensity resistance and lifestyle and aerobic training intervention may have been the most effective in reducing TCL and LDL and increasing HDL levels. The "F" test results for all three biochemical variables were statistically significant (indicated by the asterisks), suggesting significant differences between the means of the Teams. Overall, the Table provides detailed information on the mean values and statistical test results for TCL, LDL, and HDL levels for four different Teams, allowing researchers to conclude the effectiveness of the intervention in improving these biochemical variables.

The figures show the before, after, and adjusted after-test mean values of the hydraulic resistance training Team, ladder agility training Team, collaborative hydraulic resistance and ladder agility training Team, and control Teams on TCL, LDL and HDL cholesterol are sketchily symbolized in fig.I II and III.



DISCUSSION

The study found that eight weeks of hydraulic resistance training and ladder agility drills significantly improved total cholesterol(TCL), low-density lipoprotein(LDL), and high-density lipoprotein cholesterol(HDL) among working women. The study suggests regular physical activity can lessen basal cardiovascular result changes and metabolic control rate, resting oxygen utilization, and general wellness levels. The concentrate also showed that joining hydraulic resistance and ladder agility drills further developed lipid profiles. However, there was a significant intensification in low-density lipoprotein

cholesterol (LDL), high-density lipoprotein cholesterol (HDL), and total cholesterol(TCL) after the training. The authors suggest that these exercise practices can be beneficial in reducing the level of cholesterol and improving overall fitness among working women.

According to this study aimed to investigate the differential effects of endurance training (ET) and resistance training (RT) on cardiovascular risk factors (CRF) and anthropometric/body composition in young adult women. Participants underwent an 8-week training program, with the ET Team performing treadmill workouts and the RT Team circuit weight training. Both Teams showed significant improvements in CRF, but no significant differential effects were observed between the two types of training. The authors suggest that accurate training loads may have contributed to the lack of differential effects(Beqa Ahmeti et al., 2020)**.**

Sakthi & Divya 2023 et al. study aimed to determine the physiological responses of college women students to hydraulic resistance training and found that it significantly improved their resting pulse rate, systolic pressure, and diastolic pressure compared to the control Team. The study concludes that hydraulic resistance training can be a safe and effective way to improve fitness and lifestyle in untrained women.

CONCLUSION

The study results suggest that hydraulic resistance and ladder agility training (HRTG/LATG) significantly affected the lipid profile of working women. Before the test, the mean values for total cholesterol (TCL), low-density lipoprotein (LDL), and high-density lipoprotein (HDL) were relatively similar across the Teams. However, after the test, there were notable differences in the mean values for these variables between the HRTG/LATG and control Teams (CG). After the test, the HRTG/LATG Team had a significantly lower mean value for LDL than the CG. This difference was also observed in the adjusted after-test mean, which considered the potential influence of other variables. In contrast, the HRTG/LATG Team had a significantly higher mean value for HDL than the CG. Again, this difference was also observed in the adjusted after-test mean.

The findings suggest that HRTG/LATG may be an effective intervention for improving lipid profiles among working women. The significant differences observed between the HRTG/LATG Team and the CG may be attributed to the physiological effects of the training, such as improved cardiovascular fitness and increased muscle strength. On the other hand, additional readings are desired to authorize these outcomes and to examine the long-standing special effects of HRTG/LATG on lipid profiles and other health outcomes.

PRACTICAL APPLICATION

The research investigated the consequence of hydraulic resistance and ladder agility training on designated lipid profiles, including total cholesterol (TCL), low-density lipoprotein (LDL) and high-density lipoprotein (HDL), among working women. The training was conducted at Arimaa fitness centre in Karaikudi, and plasma samples were taken from the contributors with their consent and analyzed in a lab in Karaikudi. The data was then analyzed using SPSS 64-bit to determine the mean values and variances. The results indicate that the training significantly affected the adjusted after-test mean TCL, LDL, and HDL levels. Overall, the study suggests that hydraulic resistance and ladder agility training can positively influence the lipid profile of working women.

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