International Journal of Advanced Academic Studies

Dr. Baiju P Jose
Associate Professor,
Department of Physical
Education, St Cyril's College,
Adoor, Kerala, India

Effect of low intensity resistance training on BMI and lipid profile among middle aged overweight Indian men

Dr. Baiju P Jose

Abstract
In spite of considerable decrease in mortality rates over the past sixty years, Hypokinetic diseases continue to remain as a fatal factor in determining mortality. The aim of this study was to examine the effects of a Low Intensity Resistance training on blood lipids and BMI among middle aged overweight Indian men. Twenty-four males (Height: 167.67±5.84, Weight: 86.10±8.79, BMI: 31.24±1.96) were matched by age, and randomly assigned either to a Resistance Training group (n = 12) or a Control Group (n = 12). The Resistance training group underwent a low intensity resistance training program for twenty four week which included a six week preparatory training while the control group maintained their regular routine. The resistance-training group trained three times in a week at 60% effort of their one-repetition maximum using nine resistance exercises. Each exercise was performed for three sets of 12 repetitions each with recovery period of either 30 sec or 60 sec. Height, Weight, and BMI were measured before (Pre) and after (Post) the training program. Blood samples were collected 24 hours before, and after the training period and analyzed for Total Cholesterol (TC), High Density Lipoprotein Cholesterol (HDL-C), Low Density Lipoprotein Cholesterol (LDL-C) and Triglyceride (TG). The obtained data were statistically analyzed using ANCOVA to find out significant difference if any. The results shows a significant reduction in BMI, TC, LDL-C, and TG with no significant change in HDL-C and Resting Heart Rate. In conclusion, resistance training improved Lipid profiles except HDL Cholesterol among overweight Middle aged men.

Keywords: Low intensity resistance training, BMI, lipid

Introductions
The global prevalence of all the leading chronic diseases is increasing, the leading cause of death in India and western countries is life style disease. Low Intensity resistance training with slow movement and tonic force generation may be a practical and safe regimen for obese individuals but the health benefits are uncertain. (Hamasaki H. *et al*. (2015) [1] cardiovascular disease is already the leading cause of mortality in developing countries (World Health Organization, 2002) [18]. Being a developing country India is rapidly transforming and this has ushered swift and profound changes in many aspects of the lives of the people. The health consequences of such changes have by far been predominantly prolific.

Physical exercise induces an antiatherogenic lipoprotein profile and favorable body composition among young and older people (Giada *et al*., 1995). Data from longitudinal studies suggest that resistance training decreases Total Cholesterol, LDL Cholesterol and Triglycerides (Harris and Holly, 1987; Hurley *et al*., 1988; Ray and Carrasco, 2000; Stone *et al*., 1983; Wiley *et al*., 1992; Goldberg *et al*., 1984) [17, 8, 16, 6] and Arterial Blood Pressure (Carter *et al*., 2003; Lightfoot *et al*., 1994; Norris *et al*., 1990) [3, 10, 13]. Literature concerning the role of Resistance training on CHD risk factors modification are inconsistent and controversial. There is no literature available on these effects among Indian population. In view of controversies and discrepancies, the present study was taken up to investigate the effect of resistance training program on body composition, lipid profiles and physiological variables among middle aged overweight men.

Materials and Methods
A total number of 41 potentially overweight men residing in and around Nedunkandam town, in Kerala state volunteered for the study. The subjects were randomly assigned to either Resistance Training group ('EXP', No: 12) or Control group ('CON', No: 12).

Corresponding Author:
Dr. Baiju P Jose
Associate Professor,
Department of Physical
Education, St Cyril's College,
Adoor, Kerala, India

The Resistance Training group underwent a Resistance Training Program for a period of 24 weeks, which includes a 6 week starter program followed by 18 weeks main program, whereas the control group maintained their regular routine activities. The criterion variables selected for this study were Body weight, Body Mass Index (BMI), Triglycerides (TG), Total Cholesterol (TC), High Density Lipoprotein Cholesterol (HDL-C), Low Density Lipoprotein Cholesterol (LDL-C). The subjects of both the groups were tested on selected variables 24 hours before and after the period of experimentation. The data collected from Resistance Training and Control groups prior to and after completion of the training period on selected variables were statistically examined for significant differences if any, by applying analysis of covariance (ANCOVA). The pretest and posttest means of Resistance Training and Control groups were tested for significance by applying ANOVA. After eliminating the influence of pretest, the adjusted posttest means of Resistance Training and Control group were tested for significance by using ANCOVA.

Results

Table 1: Analysis of covariance for the selected variables among resistance training & control groups.

		RT Group	Control Group	F-Ratio
Bodyweight	Pre Test	88.20(8.95)	88.00(9.02)	0.003
	Post test	81.83(7.40)	88.20(8.65)	3.614
	AD PO test	84.57	91.63	87.02 (P>0.05)
BMI	Pre test	30.95(2.06)	31.52(1.90)	0.493
	Post test	28.99(2.01)	31.59(1.78)	11.44 (P>0.05)
	AD PO test	32.29	30.18	214.36 (P>0.05)
Total Cholesterol	Pre test	253.50(23.18)	248.58(24.67)	0.253
	Post test	236.41(15.68)	249.00(23.08)	2.439
	AD PO test	241.15	260.93	68.06* (P>0.05)
HDL Cholesterol	Pre test	40.17(4.84)	39.33(6.47)	0.128
	Post test	40.33(3.94)	40.00(5.67)	.028
	AD PO test	39.52	39.98	0.374
LDL Cholesterol	Pre test	163.83(27.69)	162.08(29.52)	0.022
	Post test	152.91(21.09)	165.00(29.51)	1.332
	Ad PO test	155.48	170.44	36.516* (P>0.05)
Triglycerides	Pre test	247.50(62.42)	236.25(65.51)	0.185
	Post test	216.66(51.84)	240.91(66.35)	0.995
	AD PO test	223.32	260.43	22.71* (P>0.05)

Table. 1 shows the Body weight, BMI and plasma concentration of Lipids among Resistance Training and Control group before (Pre) and after (post) the Resistance training period. There was a significant reduction in Body weight, Total Cholesterol (TC), Low Density Lipoprotein Cholesterol (LDL-C) and Triglyceride (TG) (P>0.05) whereas there was no significant change in High Density Lipoprotein Cholesterol (HDL-C).

Table 2: The pre and posttest means of resistance training (exp) and control (con) groups with percentage of gain

		Pre Test	Post Test	Gain	Percentage of gain
Bodyweight	RT	88.20(8.95)	81.83(7.40)	6.37 Kg	7.22% ↓
	Control	88.00(9.02)	88.20(8.65)	0.2 Kg	0.22% ↑
BMI	RT	30.95(2.06)	28.99(2.01)	1.96	6.33% ↓
	Control	31.52(1.90)	31.59(1.78)	0.07	0.22% ↑
Total Cholesterol	RT	253.50(23.18)	236.41(15.68)	17.09	6.74% ↓
	Control	248.58(24.67)	249.00(23.08)	0.42	0.16% ↑
HDL Cholesterol	RT	40.17(4.84)	40.33(3.94)	0.16	0.4% ↑
	Control	39.33(6.47)	40.00(5.67)	0.67	1.68% ↑
LDL Cholesterol	RT	163.83(27.69)	152.91(21.09)	10.92	6.66% ↓
	Control	162.08(29.52)	165.00(29.51)	2.92	1.8% ↑
Triglycerides	RT	247.50(62.42)	216.66(51.84)	30.84	12.46% ↓
	Control	236.25(65.51)	240.91(66.35)	4.66	1.97% ↑

After the training the Resistance Training group (88.20±8.95 vs 81.83±7.40) shows a decrease of 6.37 Kg (7.22%) in body weight. In the case of BMI Resistance Training group (30.95±2.06 vs 28.99±2.01) shows an decrease of 1.96 (6.33%). Total Cholesterol among Resistance Training group (253.50±23.18 vs 236.41±15.68) shows a decrease of 17.09 (6.74%), whereas in the case of HDL Cholesterol among Resistance Training group (40.17±4.84 vs 39.33±3.93) shows no change. LDL Cholesterol among Resistance Training group (163.83±27.69 vs 152.91±21.09) shows an decrease of 10.92 (6.66%) and Triglycerides (247.50±62.42vs 216.66±51.84) shows an decrease of 30.84 (12.46%) whereas the control group shows no significant difference in all the above mentioned variables.

Conclusion
The purpose of this study was to examine the effects of a Low Intensity Resistance training on blood lipids and BMI among middle aged overweight Indian men.
Resistance Training Program resulted in a significant decrease in Body weight and Body mass Index among Overweight middle aged men. On the basis of the results obtained it is evident that Resistance Training Program

resulted in a significant decrease in Triglycerides, among Resistance Training group. Resistance Training Program resulted in a significant decrease in Total Cholesterol and LDL Cholesterol. In this study there was no significant change in HDL cholesterol. In the present study the intensity of the exercise was moderate and may not be sufficient to impart any significant change in HDL cholesterol. Longer duration and more intense resistance Training may result in favorable change in HDL-C concentration. On the basis of the findings it was concluded that resistance training program can produce favorable changes in Body weight, BMI, Total Cholesterol, LDL Cholesterol, Triglycerides and does not produce any significant change in HDL Cholesterol. Resistance training can be recommended to middle aged persons who are overweight for weight reduction and to induce favorable changes in Lipid profiles.

References

1. Hamasaki H, Kawashima Yu, Yoshiki Tamada, *et al*. PLoS One 2015, Associations of Low Intensity Resistance Training with Body Composition and Lipid Profile in Obese Patients with Type 2 Diabetes. PLoS One. 2015 Jul15;10(7).
2. Dr. Vittal BG, Dr. Abhijith D. Fasting and non-fasting lipid profile: A comparative study. Int. J Adv. Biochem. Res. 2021;5(1):06-08. DOI: 10.33545/26174693.2021.v5.i1a.56
3. Carter JR, Ray CA, Downs EM, Cooke WH. Strength training reduces arterial blood pressure but not sympathetic neural activity in young normotensive subjects. J Appl Physiol. 2003Jun;94(6):2212-6.
4. Fripp RR, Hodson JL. Effect of resistive training on plasma lipid and lipoprotein levels in male adolescents. J Pediatr. 1987;111(6 Pt 1):926s-31.
5. Giadia F, Vigna GB, Vitale E, Baldo-Enzi G, Bertagilia M, Grecca R, *et al*. Effect of age on the response of blood lipids, body composition, and aerobic power to physical conditioning and deconditioning. Metabolism. 1995;44(2):161-5.
6. Goldberg L, Eliot DL, Schutz RW, Kloster FE. Changes in lipid and lipoprotein levels after weight training. JAMA. 1984 Jul 27;252(4):504-6.
7. Basavaraj V Savadi, Gaurang K Anandpara, BM Rashmi, Bhagyajyoti Nalwarkar. Association of lipoprotein (a) and high-sensitive C-reactive protein in preeclampsia. Int. J Adv. Biochem. Res. 2021;5(1):30-34. DOI: 10.33545/26174693.2021.v5.i1a.62
8. Hurley BF, Hagberg JM, Goldberg AP, Seals DR, Ehsani AA, Brennan RE, *et al*. Resistive training can reduce coronary risk factors without altering VO$_2$ max or percent body fat. Med Sci Sports Exerc. 1989;20:150-154.
9. Larry G Shaver. Essentials of Exercise Physiology. New Delhi: Surjeeth Publications, 1981, 192-94.
10. Lightfoot JT, Torok DJ, Journell TW, Turner MJ, Claytor RP. Resistance training increases lower body negative pressure tolerance. Med. Sci. Sports Exercise. 1994;26:1003-1011.
11. Manning JM, Dolly-Manning CR, White K, KambaI Silas S, Kesselhant M, Ruoff M. Effects of a resistive training program on lipoprotein-lipid levels in obese women. Med Sci Sports Exerc. 1991;23:1222-6.
12. Murray CJL, Lopez AD. The Global Burden of Disease. Boston, Mass: Harvard School of Public Health, 1996.
13. Norris R, Carroll D, Cochrane R. The effects of aerobic and anaerobic training on fitness, blood pressure, and psychological stress and well-being. J. Psychosom. Res. 1990;34:367-375.
14. Reddy KS, Yusuf S. Emerging epidemic of cardiovascular disease in developing countries. Circulation. 1998;97:596-601.
15. Robert W Stout. Some Health Benefits of Physical Activity. The Farmingam Study, Arch Inten Medn. 1996;15:857-61.
16. Wiley RL, Dunn CL, Cox RH, Hueppchen NA, Scott MS. Isometric exercise training lowers resting blood pressure. Med Sci Sports Exerc. 1992;24:749-754.
17. Harris KA, Holly RG. Physiological response to circuit weight training in borderline hypertensive subjects. Med Sci. Sports Exerc. 1987;19:246-252.
18. World Health Organization. The World Health Report 2002-Reducing Risks, Promoting Healthy Life. Geneva, Switzerland: World Health Organization; c2002.