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## Effect of resistance exercise on total cholesterol among college women

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### Abstract

The purpose of the study was to find out the effect of resistance exercise on total cholesterol. To achieve this purpose of the study, forty female students studying from various department, at Sree Narayana College, Chempazhanchy, Trivandrum, Kerala, India. (n=40) were randomly selected as subjects and their age ranged between 18 and 22 years. The selected subjects were randomly assigned into two equal groups such as experimental group (EG) and control group (CG) with twenty subjects each (n=20). The experimental groups underwent their respective experimental treatment for eight weeks three days per week a session on each day. Control group was not engaged to any specific training apart from their curriculum. Resistance endurance was taken as variable for this investigation. The pre and post test were conducted one day before and after the experimental treatment. Analysis of covariance (ANCOVA) was used to analyze the collected data. The results revealed that the experimental group (EG) produced significant improvement ( $p \leq 0.05$ ) due to resistance training on strength endurance when compared to control group (CG).

**Keywords:** Resistance exercise, total cholesterol

### 1. Introduction

Resistance training has been become the most widely accepted method for improving muscular strength and power (Kraemer, 1994) [4]. Youth sports have become more popular and in many ways, more competitive. Many young athletes and parents are seeking way to achieve a competitive edge. Many precious studies have explored the effect of different resistance training frequencies on developing muscle strength and size of adolescents (American college of sports medicine, 2000). While the literature supports the efficiency of resistance training (Ramsay *et al.*, 1990) [7] two or three times per week. Resistance training may be isotonic in design. This means that some part of the body is moving against some type of force. Heart rate is acutely elevated immediately following a workout and affected by the amount of resistance, the number of repetitions and the muscle mass involved in the contraction (small vs. large mass exercises) (Fleck, 1988) [3]. Interestingly, in terms of chronic adaptations, there appears to be a reduction in heart rate from resistance training, which is considered beneficial (Stone *et al.*, 1991) [8].

Exercise is most important for every living being; in other words we can also say that physical inactivity results in several types of diseases in the body. Regular exercise not only keeps our body regular fit but it also helps in maintaining out mind fresh for a longer period of time. Out mind will not feel tired if we do the regular exercises. It also increases the blood circulation of the body and prepares as for the hard work, all day long regular exercise also can prevent chorionic diseases and other health problems related to lungs and heart. Regular exercises help to strengthen the heart. The muscle mass can increase and the weight can be controlled Praveen Ganesan, 2009 [6]. Aerobic exercise is physical exercise that intends to improve the oxygen system. Cooper, Kenneth C aerobic means "with oxygen", and refers to the use of oxygen in the body s metabolic or energy- generating process. Many type of exercise are aerobic, and by definition are performed at moderate levels of intensity for extended periods of time.

Cholesterol from the Greek chole-(bile) and stereos-(solid) followed by the chemical suffix-oc for an alcohol, is an organic chemical substance classified as a way steroid of fat.

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It is an essential structural component of mammalian cell membranes and is required to establish proper membrane permeability and fluidity. In addition, cholesterol is an important component for the manufacture of bile acids, steroid hormones, and vitamin D. Cholesterol is the principal sterol synthesized by animals, predominantly in the liver (Olson RE (February 1998). *François poulleties de la sale* first identified cholesterol in solid form in gallstones, in 1769. However, it was only in 1815 that chemist Eugène Chenevix de Lahaye named the component "cholesterine" [http://www.wikipathways.org/index.php/Pathway: Total fat intake](http://www.wikipathways.org/index.php/Pathway:Total_fat_intake) also plays a role in blood cholesterol levels. This effect is thought to come about by changes in the quantity of cholesterol and lipoproteins that are synthesized by the body. In particular, saturated, monounsaturated and polyunsaturated fats have been shown to increase HDL-based cholesterol levels, with saturated fats also increasing LDL-based cholesterol levels. M. Svoboda and D.A Giordano, 1988. Over the past four decades, obesity has been on the rise. Obesity is a chronic disease with strong component obesity can also have a major impact on a women's fertility.

Total cholesterol is the sum of all the cholesterol in the blood. It is used to produce hormones and cell membranes and is transported in the blood plasma of all mammals (Emma, 2009) [2]. In addition, cholesterol is an important component for the manufacture of bile acids, steroid hormones, and vitamin D. Cholesterol is an important and necessary for mammals, high levels of cholesterol in the blood can damage arteries and are potentially linked to diseases such as those associated with the cardiovascular system (Pearson *et al.*, 2003) [5]. Resistance exercise helps to reduce the cholesterol level. Two types of cholesterol: Good cholesterol or high density lipoprotein (HDL) and a bad cholesterol or low-density lipoprotein (LDL). In this study, moderate intensity of resistance training was applied to normalize the level of cholesterol in body.

Digested carbohydrates produce sugar, which, circulates in blood and is used by the body as fuel. Absorption of the sugar into the cells regulated by the hormone insulin, which is produced in the pancreas and released when blood sugar level rises. Too low a concentration is known as hypoglycaemia,

sugar in the form of glucose present in the blood, and is normally 60 to 100 milligrams/100 milliliters of blood. It rises after a meal to as much as 150 milligrams/100 millilitres of blood, but this may vary. The uptake of glucose by the working muscles can be further enhanced if carbohydrate is ingested either prior or during exercise, 2009. [www.patient's medical.com](http://www.patient's_medical.com)

**2. Methods**

The aim of this study was to find out the effect of resistance exercise training on total cholesterol among college women. Forty (n=40) students from various department, Sree Narayana College, Chempazhancherry, Trivandrum, Kerala, were selected as subjects and the age of students were between 18 and 22 years. The selected subjects were randomly divided into two equal groups of twenty subjects each (n=20). The groups were one experimental group (EG) and one control (CG). During the training period, the experimental groups underwent their respective training programme for eight weeks 3 days per week and a session on each day apart from their regular activities. Control group (CG), who did not participate in any specific training apart from their regular activities. Moderate intensity (60-70%) of resistance was used in this experimentation. Total cholesterol was selected as dependent variable for this study. It was measured by Oxidase enzymatic method using Boehringer Mannheim kit. These are the exercise used as a resistance 1. Bench press 2. Half squat 3. Push press 4. Heel raises 5. Arm curl 6. leg curl 7. leg press 8. Military press 9. Sit ups 10. Medicine ball exercises. The pre and post-test were conducted one day before and after the experimental treatment.

**2.1 Data Analysis**

Mean and standard deviation were calculated for total cholesterol for each training group. And the data were analyzed by using analysis of covariance (ANCOVA). All analysis was carried out using SPSS and statistical significance was fixed at 0.05.

**3. Results**

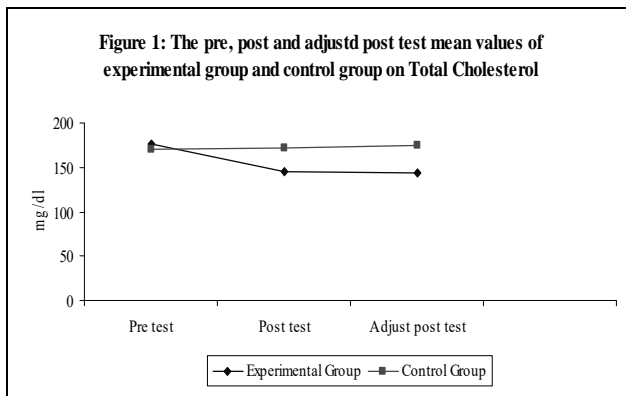
**Table I:** Analysis of Covariance on Total Cholesterol of Experimental Group and the Control Group

Test		Experimental Group	Control Group	SOV	SS	df	MS	F ratio
Pretest	Mean	176.15	170.55	B	313.6	1	313.6	1.007
	SD	15.55	19.53	W	11839.5	38	311.57	
Post test	Mean	145.65	171.50	B	6682.23	1	6683.23	18.5*
	SD	17.90	20.05	W	13723.55	38	361.15	
Adjusted Post test	Mean	143.01	174.14	B	9445.47	1	9445.47	110.35*
				W	3167.16	37	85.6	

F = (df 1, 38) (0.05) = 4.10 & (0.01) = 7.35; (P≤0.05) & (P≤0.01), F = (df 1, 37) (0.05) = 4.11 & (0.01) = 7.37; (P≤0.05) & (P≤0.01).

Table I shows that the pre-test mean of experimental and control groups are 176.15 and 170.55 respectively. The obtained F ratio of 1.007 for pre-test mean is less than the table value 4.10 for df 1 and 38 required for significance at 0.05 level and table value 7.35 for df 1 and 38 required for significant at 0.01 level. The post-tests mean of experimental and control groups are 145.65 and 171.50 respectively. The obtained F ratio of 18.5 for post-test mean is higher than the table value 4.10 for df 1 and 38 required for significance at 0.05 and table value 7.35 for df 1 and 38 required for significant at 0.01 level. The adjusted post-test mean of experimental and control groups are 143.01 and 174.14

respectively. The obtained F ratio of 110.35 for adjusted post-test mean is higher than the required table value 4.11 for df 1 and 37 required for significant at 0.05 and 7.37 for 0.01 level. The result of the study indicated that there was significant differences between the adjusted post-tests mean of resistance training group and control group on cholesterol at 0.05 and 0.01 levels.



#### 4. Conclusion

As health and fitness practitioners, designing exercise programs that alter the individual's total cholesterol in a positive way is an important component to be included in program objectives. Until specific recommendations based on further research are developed, we recommend resistance training exercises with moderate intensity are the best method to normalize cholesterol level. In summary, total cholesterol can be improved during the age between 18 and 22 years of female youngsters and favour the prescription of resistance exercise programme during the initial adaptation period. It is concluded that there was a significant improvement on total cholesterol level due to eight weeks of resistance exercise programme as compared to control group.

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