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Physical Education

# EFFECT OF WEIGHT TRAINING ON TOTAL CHOLESTEROL AMONG MIDDLE AGED OVERWEIGHT MEN

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**ABSTRACT** the purpose of the study was to find out the effect of weight training on total cholesterol among middle aged overweight men students. To achieve the purpose of the study, 24 subjects were randomly assigned to experimental group (12) and control group (12). Physical examination and medical checkup at the initiation of the study yielded normal results in all the subjects. The experimental group underwent a Weight Training Program for a period of 24 weeks, whereas the control group maintained their regular routine activities. The subjects of both the groups were tested on selected criterion variable such as total cholesterol 24 hours before and after the period of experimentation. The analysis of covariance (ANCOVA) was used to find out the significant differences if any, between the experimental group and control group on selected criterion variable. In all cases, 0.05 level of significance was fixed to test the significance, which was considered as an appropriate. The result of the present study has revealed that there was significant difference among the experimental and control group on total cholesterol.

**KEYWORDS :** weight training, total cholesterol, middle aged, overweight men

## INTRODUCTION

Man lives for happiness. Happiness gives him enjoyment and satisfaction, which depends on his physical and mental ability. The primitive man may due to the very nature of his daily activities, builds a strong physique superior to the civilized man. In modem civilized machinery world, the chance for the physical activities is less because of the invention of computer and so many other devices and the basic need of participation in the physical activity to maintain a good health is almost forgotten. The Health is defined as a state of complete physical, mental and social well being and not merely free from diseases or infirmity. Everybody desires a long and healthy life and exercise has a great part to play in this. In one aspect the body can be said to commence ageing from the moment it is born, although it is usual to say it really begins in about the mid-thirties. However different systems of the body age at different rates, no doubt depending upon how they are used or not used. Many people continue a very active life, both physically and mentally, well in to their old age. The barrier of these activities often seems to be physiological rather than physical, and when a person thinks he is too old to do something physically he may well be completely wrong, although too much of exercise could do harm. The only way to find out if one can do something is to try.

Physical Training implies participation in a program of regular and vigorous physical activity with the primary intention of improving either physical performance or health through the development of some component of fitness such as cardio-vascular function or muscle strength. Physical activity is defined as "bodily movement produced by skeletal muscles that requires energy expenditure" and produces healthy benefits. Exercise, a type of physical activity, is defined as a planned, structured, and repetitive bodily movement done to improve or maintain one or more components of physical fitness. Physical inactivity denotes a level of activity less than that needed to maintain good health.

Better performances are primarily the outcome of efficient technique, the progression of speed and the maturing competitive attitude on a sound basis of general endurance, all round strength and general mobility. The development of all round strength is best achieved via circuit training and then progressing this through strength training. Strength training is exercise that uses weights to condition the muscles by improving muscle tone, strength and endurance. Strength training not only tones muscles, it reduces fat, speeds metabolism, increases endurance, improves posture, strengthens bones, and cuts the risk of injury and fight the signs of aging. One can replace muscle lost to aging by strength training. Studies show that two to three months of strength training can replace 3 pounds of muscle. By lifting weights, you also counter your body's natural metabolic decline of 2 to 5 percent each decade.

Weight training is crucial to weight control, because individuals who have more muscle mass have a higher metabolic rate. Muscle is active tissue that consumes calories while stored fat uses very little energy. Strength training can provide up to a 15% increase in metabolic rate, which is enormously helpful for weight loss and long-term weight control. Strength training provides similar improvements in depression as anti-depressant medications.

Weight training is important for cardiac health because heart disease risk is lower when the body is leaner. Studies have found that cardiac patients gained not only strength and flexibility but also aerobic capacity when they did strength training three times a week as part of their rehabilitation program. All these studies have prompted the American Heart Association to recommend strength training as a way to reduce risk of heart disease and as a therapy for patients in cardiac rehabilitation programs.

Weight training is also known as resistance training or strength training. Strength is the ability to overcome resistance or to act against resistance. Strength should not be considered as a product of only muscular contractions. Strength is a conditional ability that depends mostly upon the energy liberalization process in the muscles.

The factors associated with an increased risk for premature development of heart disease can be grouped into those over which the individual has no control and that can be altered through basic change in lifestyle. Those that are beyond the individual's control include heredity, age, sex and race. Those factors that can be altered through basic change in life style include elevated blood fats (Cholesterol and triglycerides), elevated blood pressure (Hypertension), obesity, anxiety, tension and physical inactivity. Epidemiological studies have suggested the existence of a link between sedentary life style and increased risk of atherosclerotic disease. Males and females with a high percentage of body fat and a low $V0_2$ max showed significantly high total cholesterol and high density lipoprotein cholesterol. Low plasma high density lipoprotein (HDL) cholesterol concentration is a risk factor for coronary heart disease and is frequently associated with high triglyceride concentrations. Low levels of LDL cholesterol and triglycerides reduce the risk of coronary heart disease and any reduction in these components is welcome as a desirable development. High levels of LDL cholesterol and low levels of HDL cholesterol place one at extremely high risk for early heart attack.

Obesity is associated with dangerous conditions like diabetes mellitus and coronary artery disease. The statistics shows that someone who is 40 percent over his or her desirable weight runs twice the risk of getting coronary heart disease, a person who is 20 to 30 percent overweight many times likely to get diabetes than those people of desirable weight. Obesity contributes directly to high blood pressure, which itself is a risk factor in coronary artery disease. Physical activity was significantly correlated among males and females with high density lipoprotein cholesterol, percentage body fat and VO2 max.

Data from longitudinal studies suggest that resistance training decreases Total Cholesterol, LDL Cholesterol and Triglycerides. It is being increasingly recognized that high BP is an important public health problem in developing countries. A research finding has shown that Resistance Training reduces Arterial Blood Pressure. Resistance exercise prolongs the onset of peak cardiovascular responses, decreases the cardiovascular response to exertion, and improves recovery from maximal exertion. There are reports of improved lipid profiles in both men and women after high intensity resistance training.

## MATERIALS AND METHODS

A total number of 41 potentially overweight men volunteered for the study. In the first phase all of them were informed in detail the nature of the study and what their contribution will be. Out of which 9 subjects opted out. In the second phase the height, weight and pulse rate of all the 32 subjects in fasting state without shoes and with minimum clothing were measured. All the measurements were performed in the erect position by the researcher. The Body Mass Index (BMI) was computed as the weight (Kgs) divided by height square (m2). Out of the 32 subjects 29, who were having BMI above 27 were selected for the third phase. In the third phase a written explanation of the experimental procedure and potential risk factors were given to each subjects. Five of them opted out of the study due to personal reasons. All the other 24 volunteered as subjects for the study and their informed consent was obtained.

The 24 subjects were randomly assigned to either Experimental group ('EXP', No: 12) or Control group ('CON', No: 12). Physical Examination and Medical checkup at the initiation of the study yielded normal results in all the subjects and none of the subjects received any period of the study. The baseline characteristics of the medication during the subjects were given in Table-I

| | Experimental Group | | Control Group | | Total | |
|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD |
| **Age** | 39.17 | 2.29 | 41.75 | 2.45 | 40.45 | 2.67 |
| **Height** | 168.42 | 6.14 | 166.92 | 5.70 | 167.67 | 5.84 |
| **Weight** | 88.00 | 9.02 | 87.83 | 7.80 | 86.10 | 8.79 |
| **BMI** | 30.96 | 2.07 | 31.52 | 1.89 | 31.24 | 1.96 |

The selected subjects were randomly divided into three groups of 12 subjects each group. Group one acted as experimental group, and group II acted as control group. The experimental group subjects were underwent regular weight training practice for twenty four weeks. The subjects were tested on selected criterion variable such as total cholesterol prior to and immediately after the training period. Analysis of covariance (ANCOVA) was applied for analyze the data. The 0.05 level was used to test this significance.

## ESTIMATION OF TOTAL CHOLESTEROL

Cholesterol esterase hydrolyses cholesterol esters to free cholesterol and fatty acids. In second reaction cholesterol oxidase converts cholesterol to cholestenone and H202 in presence of peroxides. Hydrogen peroxide oxidatively couples with 4 aminoantipyrine / phenol to produce red quinonenimine which has absorbance maximum at 520 nm (505-530 nm). The intensity of the red colour is proportional to the total cholesterol in specimen.

Cholesterol Esters _____ Cholesterol + Fatty acids
Cholesterol + $O_2$ _____ $H_2O_2$ + 4 cholestenone
$H_2O_2$ + 4 Aminoantipyrine + Phenol ___ RedQuinoeimine +

### Procedure

### Preparation of the working solution

The kit contains Enzyme, Diluents and Standard (200 mg/dl). The content of the enzyme vial was transferred into the bottle of diluents. The content was mixed gently.

### Components of working solution

Phosphate Buffer PH 7.7
Cholesterol Oxidase
Cholesterol esterase
Peroxidase
Aminoantipyrine
Phenol
Stabilizers / Surfactants

One ml of working solution was pipette out into each of the test tubers meant for standard and blank 0.01 ml (10.1) of distilled water was added to the blank test tube 0.01 ml (10.1) of cholesterol standard (200 mg/dl) was added to standard tube and 0.01 ml (10.1) of plasma was added in to the corresponding tubes other than those of blank and standard. The assay mixture was incubated for 15 min at 37°C. After completion of the incubation the absorbance of the assay mixture against the blank was measured at 520 nm.

### CALCULATION

$$\text{Cholesterol mg/dl} \quad \frac{\text{Absorbance of sample}}{\text{Absorbance of the standard}} \times 200$$

## RESULTS FINDINGS

The mean and standard deviation scores of pretest, posttest and adjusted posttest of total cholesterol on weight training and control group are given in table. 'F'ratio test computed in regards to the total cholesterol on weight training and control group in the pretest, posttest and adjusted post test are also presented in table.

The data collected prior to and after the experimentation period on Total Cholesterol among experimental and control groups were statistically analyzed and presented in table II.

**Analysis of Covariance for Total Cholesterol Among Experimental & Control Groups**

| | | Control Group | Exp. Group | F ratio |
|---|---|---|---|---|
| **Pre** | **Mean** | 248.58 | 253.50 | **0.253** |
| | **SD** | 24.67 | 23.18 | |
| **Post** | **Mean** | 249.00 | 236.41 | **2.44** |
| | **SD** | 23.08 | 15.68 | |
| **Adj Post** | **Mean** | 260.93 | 241.15 | **68.06*** |

Table II shows that the Pre Test means of Total Cholesterol among Experimental group (253.50 ±23.18) and Control group (248.58 ± 24.67) resulted in F - ratio of 0.253 which indicates no significant difference between Pre Test means at .05 level of confidence. The Post Test means of Total Cholesterol among Experimental group (236.41 ± 15.68) and Control group (249.00 ± 23.08) resulted in a F — ratio of 2.44 which is not significant at .05 level of confidence, whereas the adjusted post is means of Experimental (241.15) and Control groups ( 260.93 ) resulted in a F - ratio of 68.06 which was significant at .05 level of confidence. This indicates that there is a significant change in Total Cholesterol among experimental group when compared with the control group. After going through the results, it was concluded that Weight Training Programme has significantly reduced Total Cholesterol among over weight middle aged.

## DISCUSSION ON FINDINGS

The pre test means and post test means of Total Cholesterol among Control group (248.58 ± 24.67 vs 249.00 ± 23.08) shows an increase of 0.42 (16%). While the pre test means and post test means of Total Cholesterol among Experimental group (253.50 ±23.18 vs 236.41± 15.68)shows an decrease of 17.09 (6.74%). Furtherer more when the adjusted post test means of Experimental (241.15) and Control groups(260.93) were analyzed by means of Analysis of Covariance, The obtained results indicates a significant decrease in Total Cholesterol in the Experimental group when compared with the Control Group (P>0.05)

On the basis of the results obtained it was concluded that Resistance Training Program resulted in a significant decrease in Total Cholesterol among Overweight middle aged men. Exercise training influences Lipoprotein lipase activity, Lecithin cholesterol acyltransferace ratio and cholesterol esther transfer protein regulation resulting in enhanced cholesterol transport (Williams, T. et al., 1990). The obtained results were in conformation with the findings of Goldberg L. et al.(1984), Fripp RR, and Hodson JL(1987), Shaw BS, and Shaw 1.(2005), Boyden TW, et al.(1993), and in contradiction to the findings of Hurley BF(1989) and Kokkions et al.(1988).

## DISCUSSION ON HYPOTHESIS

Endurance training is traditionally associated with influencing lipid profiles favorably among diverse populations and there is some evidence of weight training also producing favorable changes. The weight training program was designed in such a manner to improve strength endurance which is evident from the low load and high repetitions.

On the basis of the results obtained it was concluded that Weight Training Program resulted in a significant decrease in Total

Cholesterol among Overweight middle aged men. In hypothesis it was stated that there will be a significant reduction in Total Cholesterol .The results of the study shows similar results and hence the hypothesis is accepted.

## REFERENCES:


1. Boy den TW, Pamenter RW, Going SB, *et al,*. Resistance exercise training is associated with decreases in serum low-density lipoprotein cholesterol levels in premenopausal women, *Arch Intern Med.*P-153,1993.
2. Fripp RR, and Hodgson JL, Effect of resistive training on plasma lipid and lipoprotein levels in male adolescents, *JPediatr.*Dec;l 11,1987.
3. Goldberg L., Elliot DL., Schutz RW., and Kloster FE., Changes in lipid and lipoprotein levels after weight training. *JAMA.* Jul 27;252(4), 1984.
4. Hurley BF., Effects of resistive training on lipoprotein-lipid profiles: a comparison to aerobic exercise training, *Med Sci Sports Exerc.* Dec;21(6), 1989.
5. Kokkinos PF et al., Effects of low- and high-repetition resistive training on lipoprotein-lipid profiles, *Med Sci Sports Exerc.* Feb;20(l), 1988.
6. Shaw BS, and Shaw I., Effect of resistance training on cardio respiratory endurance and coronary artery disease risk, *Cardiovasc J S Afr.* Sep- 0ct;16(5):256-9,2005.
7. Williams,T. et al., Changes in lipoprotein subfractionns during diet induced and exercise induced weight loss in moderately overweight men, *Circulation.%\,* PP. 1293-1304,1990.