

EFFECTS OF PHYSICAL CONDITIONING IN ALTERING TOTAL CHOLESTEROL LEVEL AMONG TRAINED AND UNTRAINED WOMEN

Aruna Sujatha Karra, Ph.D Scholar, Department of Physical Education & Sports sciences, Acharya Nagarjuna University Ongole Campus, Ongole, Andhra Pradesh, India.

Dr. I. Devi Vara Prasad, Assistant Professor, Department of Physical Education & Sports sciences, Acharya Nagarjuna University Ongole Campus, Ongole, Andhra Pradesh, India.

ABSTRACT

The purpose of the study was to assess the effects of physical conditioning in reducing the total cholesterol level among trained and untrained women. The study was delimited to twenty trained and twenty untrained woman from the inhabitants of Ongole, Andhra Pradesh, India. They were further sub-divided into experimental and control group of 10 subjects in each category. The subjects were of the age group of 22 to 25 years. The duration of the training period was restricted to twelve weeks and the number of sessions per week was confined to six. Total cholesterol level was selected as dependent variable and assessed during pre and post test. Three-way analysis of variance was used to find out the influence of each factor independently. Due to the effect of physical conditioning the total cholesterol level of trained and untrained groups subjects were significantly decreased. The result of the study also indicates that, significant differences exist among trained and untrained women irrespective of groups and tests, significant differences exist between experimental and control groups irrespective of category and tests, significant differences exist between pre and post tests irrespective of category and groups on total cholesterol level.

Key words: Physical conditioning, total cholesterol, trained and untrained women.

INTRODUCTION

The human body is built for physical activity and movement. Throughout the ages, man has to be physically active in order to procure his daily food and to succeed in the battle for survival. Improved standard of living and increasing affluence, however, have led to a decreased emphasis on physical fitness and locomotive power and in the industrialized world modern man has become more and more sedentary both at work and during his leisure hours. The need for physical activity, however, remains as great as ever, which is why physical conditioning is so important, particularly as a leisure pursuit.

Physical activity is an important ingredient in the quality of life because it increases energy and promotes physical, mental and philological well being in addition to conferring worthy health habits. Physical inactivity is considerably more dangerous than physical activity. A healthy person has been defined as an individual who is not obviously ill and

whose physical and mental functions correspond to those of the average person in the same age group at the same period of time.

The primary health goals are to avoid premature death and to avoid preventable diseases. Components related to these goals include heredity, environment, habit and health status. Behaviour that contributes to a healthy life includes regular exercise, proper nutrition, adequate sleep, relaxation and abstinence from tobacco, excess alcohol and non-essential drugs. Regular physical activity helps prevent and delay premature development of a variety of major health problems (Howley & Franks, 1997).

Cholesterol is the greatest health problem in our society but it is also essential to life. Cholesterol is not a deadly fat floating around in our arteries. Actually it is not fat at all, but rather an alcohol wax that at times behaves like fat. Cholesterol is a natural compound found in all animal tissues and is important for many structures and functions of our body. Cholesterol is one of the most important components of cell membranes, imparting stability and other properties. Cholesterol is also the precursor molecule for the synthesis of steroids, the largest group of hormones. Cholesterol and other blood lipids are fat-soluble and thus cannot float around freely in the water-like medium of the blood.

The more fit the individual the lower the risk. The goals of exercise are improvement of oxygen delivery and metabolic processes, build strength and endurance, decrease of body fat, improvement of the movements in joints and muscles and increased sense of well being. Benefits of exercise mainly focus on heart protection. Most of the research indicated that overall fitness reduced mortality rates in men with non-cardiac cause nearly as well as it did from heart-related death. Physician recommends at least three-minutes of moderate exercise, such as brisk walking every day. Exercise also has physiological and psychological advantages leading to better health and physical fitness. In addition to lowering of body fat, blood cholesterol and blood pressure, other beneficial results of exercise include mood, improvement, better sleep and an increase in basic metabolic rate that promotes weight loss.

Since physical conditioning yielded a host of advantages when performed in a systematic and rhythmical way, the investigator was interested in finding out the effects of physical conditioning in reducing total cholesterol level. Further the researcher was motivated to go deep analysis whether there was any difference between trained and untrained population.

METHODOLOGY

Subjects and Variables

The study was delimited to twenty trained and twenty untrained women from the inhabitants of Ongole, Andhra Pradesh, India were selected as subjects. They were further sub-divided into experimental and control group of 10 subjects in each category. Subjects were free from any known disease. All untrained participants had not exercised on a regular basis for at least one year. The investigator selected the total cholesterol level as dependent variable and it was assessed by blood analysis in the bio-chemistry lab.

Training Protocol

The duration of the study was restricted to 12 weeks and the number of sessions per week was confined as six. The subjects of both trained and untrained groups performed physical conditioning with moderate intensity. The intensity of the training was fixed according to the consideration of the heart rate of the individuals. The participants were continued their practice for forty minutes duration and they were gone for walking in between the rest period for relaxation. The intensities and the load of the training were increased, according to the adaptation conditions of the subjects. After each three weeks the intensity of the experimental groups were increased.

Statistical Procedure

The experimental design used was the $2 \times 2 \times 2$ factorial design. The first factor consists of trained and untrained women and the second factor consists of groups (Experimental & Control) and the third factor consists of “test” measured at 2 different times (pre & post). Three-way analysis of variance was used to find out the influence of each factor independently and also their combined influence.

Results

The descriptive analysis of the pre and post test data showing mean and standard deviation and ‘T’ ratio on total cholesterol of trained and untrained women of experimental and control groups are presented in table-I.

Table – I: Descriptive Analysis of the Data and ‘T’ Ratio on Total Cholesterol of Trained and Untrained Women of Experimental and Control Groups

Category	Group	Test	Mean	SD	MD	‘T’ ratio
Trained	Experimental	Pre test	195.30	1.49	2.90	29.00*
		Post test	192.40	1.51		
	Control	Pre test	195.60	1.50	0.70	0.97
		Post test	196.30	1.63		
Untrained	Experimental	Pre test	214.90	2.76	9.90	99.00*
		Post test	205.00	2.58		
	Control	Pre test	215.90	1.85	0.50	0.51
		Post test	215.40	2.06		

**Significant at 0.05 level*

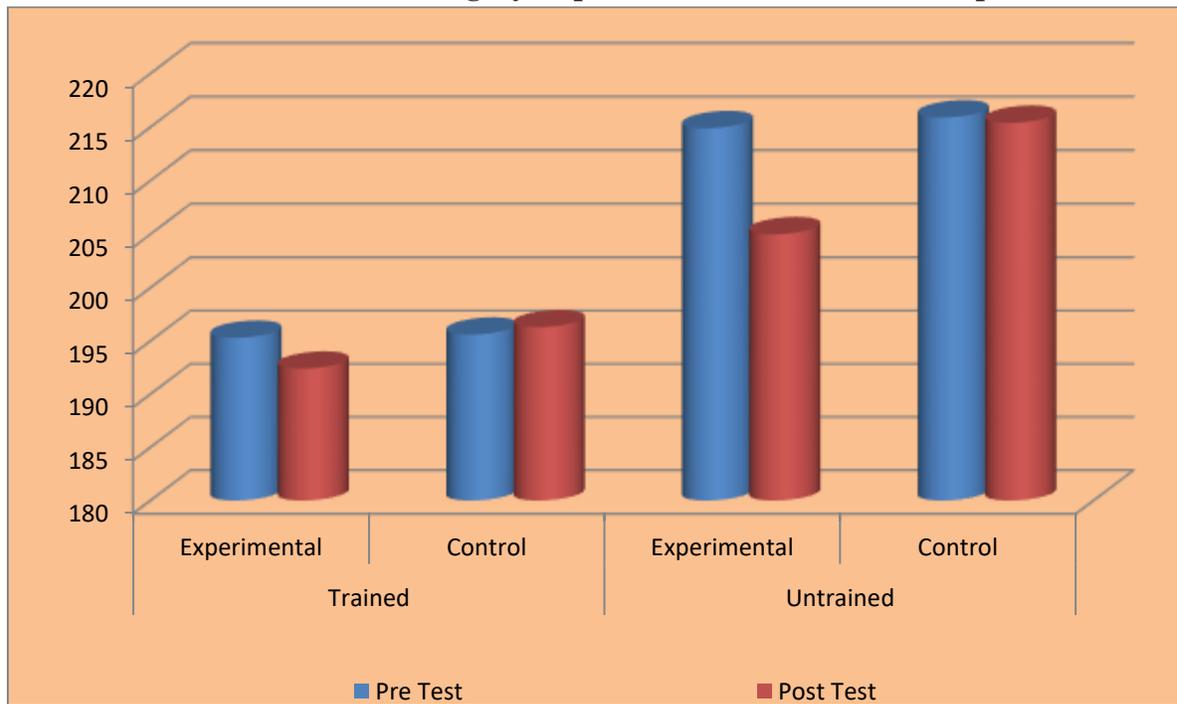
The table value required for significant for df 9 is 2.26.

Table-I shows that the pre-test and post test mean and standard deviation values on total cholesterol of trained category experimental group are 195.30 ± 1.49 and 192.40 ± 1.51 and untrained category experimental group are 214.90 ± 2.76 , 205.00 ± 2.58 respectively. The obtained ‘t’ ratio values 29.00 and 99.00 of trained and untrained category experimental groups are higher than the table value 2.26 required for significance at 0.05 level for df 9. Hence, it is concluded that due to the effect of physical conditioning the total cholesterol of trained and untrained groups subject’s were significantly decreased.

The pre-test and post test mean and standard deviation values on total cholesterol of trained category control group are 195.60 ± 1.50 and 196.30 ± 1.63 and untrained category control group are 215.90 ± 1.85 and 215.40 ± 2.06 respectively. The obtained ‘t’ ratio values 0.97 and 0.51 of trained and untrained category control groups are lesser than the table value 2.26 required for significance at 0.05 level for df 9. Hence, it is concluded that the pre and post test values on total cholesterol of trained and untrained category control groups did not differ significantly.

The pre and post test data showing mean value on total cholesterol of trained and untrained category experimental and control groups are represented in figure- I.

Figure- I: Pre and Post Test Mean Value on Total Cholesterol of Trained and Untrained Category Experimental and Control Groups



The three factor factorial analysis of variance on total cholesterol among trained and untrained women category experimental and control groups at pre and post test levels have been analyzed and the obtained results are presented in table-II.

Table – II: Three Factor Factorial Analysis of Variance on Total Cholesterol

Source of Variance	Sum of Squares	df	Mean Squares	Obtained "F" ratio
A factor (Category)	6408.20	1	6408.20	1629.20*
B factor (Group)	304.20	1	304.20	77.33*
C factor (Test)	198.45	1	198.45	50.45*
AB factor (Category & Group)	64.80	1	64.80	16.47*
AC factor (Category & Test)	84.05	1	84.05	21.36*
BC factor (Group & Test)	211.25	1	211.25	53.70*
ABC factor (Category & Group & Test)	42.05	1	42.05	10.69*
Error	283.20	72	3.93	

(Table values required for significance at 0.05 levels with df 1 and 72 is 3.96)

Table-II shows that the obtained 'F' ratio for Factor- A (Category) is 1629.20, which is greater than the table value of 3.96 with df 1 and 72 required for significance at .05 level of

confidence. The result of the study indicates that, significant differences exist among trained and untrained women irrespective of groups and tests on total cholesterol.

The obtained 'F' ratio for Factor- B (Group) is 77.33, which is greater than the table value of 3.96 with df 1 and 72 required for significance at .05 level of confidence. The result of the study indicates that, significant differences exist between experimental and control groups irrespective of category and tests on total cholesterol.

The obtained 'F' ratio for Factor- C (Test) is 50.45, which is greater than the table value of 3.96 with df 1 and 72 required for significance at .05 level of confidence. The result of the study indicates that, significant differences exist between pre and post tests irrespective of category and groups on total cholesterol.

The obtained 'F' ratio for AB factor (Category & Group), AC factor (Category & Tests) and BC factor (Groups & Tests) are 16.47, 21.36 and 53.70 respectively, which are higher than the table value 3.96 required for significance with df 1 and 72 at .05 level of confidence. It pointed out that, significant differences exist among these factors on total cholesterol.

The obtained 'F' ratio value of Interaction (Category & Group & Test) is 10.69, which is higher than the table value 3.96 required for significance. The result of the study shows that significant difference exists among trained and untrained category experimental and control groups at different stages of testing on total cholesterol.

Discussion

According to Ready et al., (1995) walking program improved the high density lipoprotein cholesterol and walking reduced the percentage of body fat, triglycerides, low density lipo protein cholesterol and total cholesterol. The same results were drawn by Irwin (2003). Fujino et al., (2002) examined and resulted that the walking improved the high density lipo protein cholesterol and reduced the low density lipo protein and total cholesterol. According to Suter et al., (1990) jogging improved the high density lipoprotein cholesterol and reduced the total cholesterol. Jafari et al., (2003) found out in his study that jogging reduced the body fat and triglycerides and improved the high density lipoprotein cholesterol. These findings were also in agreement with the findings of Marti (1990).

White and Jacques (2007) assessed the effectiveness of a 12-week pilot employee wellness program in reducing risk factors for coronary heart disease. The result of the study

showed that there was significant differences were observed between pre- and post-intervention measurements of total cholesterol. Len Kravitz and Vivian Heyward, (1993) studied the exercise & cholesterol controversy. The result of the study revealed that Aerobic fitness and exercise programs such as walking, jogging, and aerobics have been encouraged as a means to reduce total cholesterol. Alena et al., (2006) reported that 4 weeks of aerobic exercise training significantly decreased the levels of total cholesterol, LDL-C, and increased HDL-C. The possible reason for the reduction in total cholesterol and LDL-C, and elevation in HDL-C is exercise training (Heitkamp et al., 2008).

Conclusions

Due to the effect of physical conditioning the total cholesterol of trained and untrained groups subject's were significantly decreased. The result of the study also indicates that, significant differences exist among trained and untrained women irrespective of groups and tests, significant differences exist between experimental and control groups irrespective of category and tests, significant differences exist between pre and post tests irrespective of category and groups on total cholesterol. The result of the study shows that significant difference exists among trained and untrained category experimental and control groups at different stages of testing on total cholesterol.

References

- Alena TS, Michaelson JL, Ball SD, Guilford BL, Thomas TR., (2006). Lipoprotein subfraction changes after continuous or intermittent exercise training, *Med Sci Sports Exerc.*, 38: p 367-72.
- Heitkamp, H. C., Wegler, S., Brehme, U., *et al.*, (2008). Effect of an 8-week endurance training program on markers of antioxidant capacity in women, *J Sports Med Phys Fitness*, 48: p 113-119.
- Howley, Edward T. and Franks, B. Don. (1997). *Health Fitness Instructor's Handbook*, (3rd ed.), Human Kinetics Publishers, 7-8.
- Fujino, Y. *et al.*, (2002). "Walking exercise and its relationship to serum lipids in Japanese", *Journal of Epidemiol*, 12(2).
- Irwin, M.L. *et al.*, (2003). "Effect of exercise on total and intra-abdominal body fat in postmenopausal women: a randomized controlled trial", *JAMA*, 289(3).

- Jafari, M. *et al.*, (2003). "Evaluated the effects of physical exercise on plasma prebeta-1 high-density lipoprotein", *Metabolism*, 52(4).
- Len Kravitz, and Vivian Heyward, (1993). "Exercise & Cholesterol Controversy" *Expert Panel*.
- Marti, B., *et al.*, (1990). "Effects of long-term, self-monitored exercise on the serum lipoprotein and apolipoprotein profile in middle-aged men", *Atherosclerosis*, 81(1).
- Ready, A.E. *et al.*, (1995). "Walking program reduces elevated cholesterol in women postmenopause", *Canadian Journal of Cardiology*, 11(10).
- Suter, E. *et al.*, (1990). "The effects of self-monitored jogging on physical fitness, blood pressure and serum lipids: a controlled study in sedentary middle-aged men", *International Journal of Sports Medicine*, 11(6).
- White K, Jacques PH. (2007). "Combined diet and exercise intervention in the workplace: effect on cardiovascular disease risk factors", *Bird Health Center, Western Carolina University, AAOHN J.*, 55(3):109-14.