REVIEW OF RESEARCH

EFFECT OF LOW AND MEDIUM INTENSITIES OF AEROBIC TRAINING ON TOTAL CHOLESTEROL OF COLLEGE STUDENTS

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ABSTRACT:

The purpose of the study was to find out the effect of low and medium intensities of aerobic training on total cholesterol of college students. To achieve the purpose of the study, forty five college students were selected as subjects. The subjects were aged between 18 to 25 years. The subjects were divided into three groups (fifteen each) namely Low intensity training group – I, medium intensity training group – II and control group – III. The data collected from the three groups prior to and post experimentation were statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). When the obtained 'F' ratio value was significant the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases statistical significance was fixed at 0.05 levels. The result showed that there was a significant decrease on total cholesterol of college students.

KEYWORDS: *Low and medium intensities and total cholesterol.*

INTRODUCTION:

Intensity level is a very important part of any exercise program. Exercising at correct levels can make a big difference in the effectiveness of a program. Intensity can be defined as speed or workload of an activity. Many people, such as walkers, do not exercise at the correct intensity level for cardiovascular and fat burning enhancement. On the other hand some people can actually exercise at too high an intensity level. Here in two different level of intensities are applied in this study such as low and medium intensities of aerobic training. Several methods are available to measure the strength of the stimuli and thus the intensity (Bompa, 1999). It is well established that in chronic lung disease, aerobic exercise capacity is decreased and is limited not only by pulmonary mechanisms, but also by poor nutritional status (Marcotte, *et al*., 1986).

Aerobic exercise increases the level of the "good" HDL cholesterol in the bloodstream, which helps to carry the cholesterol out of the arteries, while decreasing the "bad" LDL cholesterol, which is associated with an increased risk of heart disease. Aerobic exercise helps to prevent obstructive blood clots from forming in these arteries. Muscles require energy to function and will acquire that energy from different chemical sources within the body depending on the intensity and volume of work. The health benefits and the performance benefits, or "training effect", require a minimum duration and frequency of exercise. Most authorities suggest at least twenty minutes performed at least three times per week (Michael Kent, 1997).

Each body composition method has some advantages and limitations and method selection depends on the information needed. In selecting the method one must take into account cost, possible radiation exposure, time required to obtain the information and accuracy of the information (Andreoli *et al*., 2009). BMI seems to be a rather

good method for analyzing changes in body fat if the intervention includes energy restriction (Evans, *et al*., 1999).

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. Nearly all of the cholesterol in the blood is carried by low-density and high-density lipoproteins, or LDL and HDL, respectively. Chylomicrons and very-low-density lipo proteins (VLDL) are the largest lipoproteins which carry primarily triglycerides (Keivn, 1991).

Serum levels of urea and uric acid are sometimes used for assessment of training- related stress (Urhausen, 2002). In addition, urea and uric acid accumulation is most frequently used as a measure of protein catabolism and degradation of adenonucleotides (Andersson, *et al*., 2008). The usage of triglycerides for energy production, fat storage in adipose tissues, and usage of cholesterol as a component in phospholipids of cellular membranes or in the synthesis of steroid hormones (Heitkamp, *et al*., 2008). Cholesterol is required to build and maintain membranes; it modulates membrane fluidity over the range of physiological temperatures. The hydroxyl group on cholesterol interacts with the polar head groups of the membrane phospholipids and sphingolipids, while the bulky steroid and the hydrocarbon chain are embedded in the membrane, alongside the nonpolar fatty-acid chain of the other lipids. Through the interaction with the phospholipid fatty-acid chains, cholesterol increases membrane packing, which reduces membrane fluidity (Sadava, *et al*., 2011).

METHODOLOGY

The purpose of the study was to find out the effect of low and medium intensities of aerobic training on total cholesterol of college students. To achieve the purpose of the study, forty five un trained college students were selected as subjects. The subjects were aged between 18 to 25 years. The subjects were divided into three groups (fifteen each) namely Low intensity training group – I, medium intensity training group – II and control group – III. The total cholesterol was assessed by Enzymatic colorimetric method. The data collected from the three groups prior to and post experimentation were statistically analyzed to find out the significant difference if any, by applying the analysis of covariance (ANCOVA). When the obtained 'F' ratio value was significant the Scheffe's test was applied as post hoc test to determine the paired mean differences, if any. In all the cases statistical significance was fixed at 0.05 levels.

TRAINING PROGRAMME

The training programmes were scheduled for one session a day each session lasted between thirty five to forty five minutes approximately including warming up and warming down. During the training period, the experimental groups underwent their respective training programme three days per week (alternative days) for sixteen weeks in addition to their curriculum. Group–I on low intensity aerobic training, the training programmes were scheduled for one session a day each session lasted between thirty five to forty five minutes approximately including warming up and warming down. During the training period, the experimental groups underwent their respective training programme three days per week (alternative days) for twelve weeks in addition to their curriculum. The intensity starting from 25% of HRR to 35% of HRR of the subjects.

Group–II on moderate intensity aerobic training, the training programmes were scheduled for one session a day each session lasted between thirty five to forty five minutes approximately including warming up and warming down. During the training period, the experimental groups underwent their respective training programme three days per week (alternative days) for twelve weeks in addition to their curriculum. The intensity starting from 45% of HRR to 55% of HRR of the subjects.

Low and Medium Intensity Aerobic Training

Weeks	Days	Exercise	Low Intensity (HRR)	Medium Intensity (HRR)	Minutes
I & II	Mon	Continuous running	25%	45%	30
	Wed	Aerobic exercises			
	Fri	Continuous running			
III & IV	Mon	Continuous running	25%	45%	35
	Wed	Aerobic exercises			
	Fri	Continuous running			
V & VI	Mon	Continuous running	30%	50%	30
	Wed	Aerobic exercises			
	Fri	Continuous running			
VII&VIII	Mon	Continuous running	30%	50%	35
	Wed	Aerobic exercises			
	Fri	Continuous running			
IX & X	Mon	Continuous running	35%	55%	30
	Wed	Aerobic exercises			
	Fri	Continuous running			
XI & XII	Mon	Continuous running	35%	55%	35
	Wed	Aerobic exercises			
	Fri	Continuous running			

Results

Table - 1

Analysis of Covariance on Total Cholesterol of Experimental and Control Groups

	Low Intensity Aerobic	Medium Intensity Aerobic	Control Group	S OV	Sum of Squares	df	Mean squares	'F' ratio
Pre test Mean SD	186.60	187.26	187.46	B	6.17	2	3.08	0.25
	2.87	3.62	3.77	W	502.26	42	11.95	
Post test Mean SD	169.26	167.66	187.73	B	731.24	2	1865.62	171.38*
	3.69	3.45	2.65	W	457.20	42	10.88	
Adjusted Post test Mean	169.32	167.64	187.69	B	3692.86	2	1846.43	167.85*
				W	451.01	41	11.00	

(The required table value for significance at 0.05 level of confidence with degrees of freedom2 and 42 is 3.23 and degree of freedom 2 and 41 is 3.22)

**Significant at .05 level of confidence*

Table-1 showed that the pre test mean and standard deviation on total cholesterol of low and medium intensity aerobic training and control groups were 186.60 ± 2.87, 187.26 ± 3.62 and 187.46 ± 3.77 respectively. The obtained 'F' ratio value of 0.25 for pre test means on total cholesterol of low and medium intensity aerobic training and control groups were less than the required table value of 3.23 for the degrees of freedom 2 and 42 at 0.05 level of confidence. It revealed that there is statistically insignificant difference among the low and medium intensity aerobic training and control groups during pre test period on total cholesterol. It was inferred that the random assignment of the subjects for the three groups was successful. The post test mean and standard deviation on total cholesterol of low and medium intensity aerobic training and control groups are 169.26 ± 3.69, 167.66 ± 3.45 and 187.73 ± 2.65 respectively. The obtained 'F' ratio value of 171.38 for post test means on total cholesterol of low and medium intensity aerobic training and control groups are greater than the required table value of 3.23 for the degrees of freedom 2 and 42 at 0.05 level of confidence.

The adjusted post test means on total cholesterol of low and medium intensity aerobic training and control groups are 169.32, 167.64 and 187.69 respectively. The obtained 'F' ratio value of 167.85 on total cholesterol were greater than the required table value of 3.22 for the degrees of freedom 2 and 41 at 0.05 level of confidence. It was observed from this finding that significant differences existed among the adjusted post test means of experimental and control groups on total cholesterol.

Since, the adjusted post test 'F' ratio value was found to be significant the Scheffe's test is applied as post hoc test to determine the paired mean differences, and it is presented in table-2.

Table-2
Scheffe's Test for the Difference between the Adjusted Post Test Paired Means of Total Cholesterol

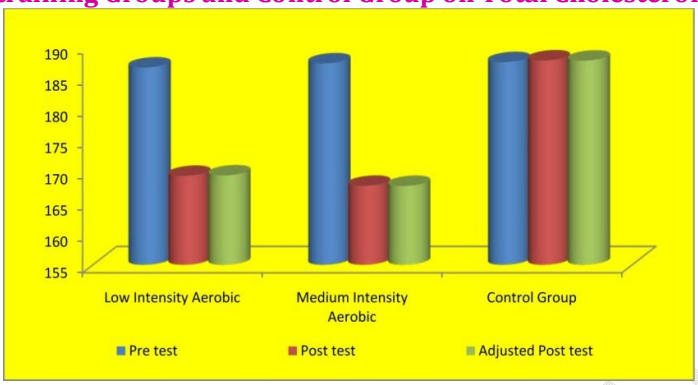
Adjusted Post Test Means			DM	CI
Low Intensity Aerobic	Medium Intensity Aerobic	Control Group		
169.32	167.64		1.68	3.07
169.32		187.69	18.37*	3.07
	167.64	187.69	20.05*	3.07

**Significant*

Table-2 showed the Scheffe's test result that there was significant difference existed between the adjusted post tests mean difference values 18.37 and 20.05 of low intensity aerobic training and control groups; medium intensity aerobic training and control groups respectively on total cholesterol, which are higher than the confidence interval value 3.07 at 0.05 level of significance. Moreover the result also stated that there is no significant difference between the low and medium intensity aerobic training group to reduce on total cholesterol. However both experimental groups had significantly decreased on total cholesterol when compared to control group.

Figure

Mean Scores of Pre, Post Test and Adjusted Post Test of Low and Medium Intensity of Aerobic training Groups and Control Group on Total Cholesterol



DISCUSSION ON FINDINGS

The present result of the study stated that significant differences existed among experimental and control groups on total cholesterol. Moreover the result also stated that there is no significant difference between the low and medium intensity aerobic training group to reduce on total cholesterol. However both experimental groups had significantly decreased on total cholesterol when compared to control group. The following studies are supporting the present study result. Hamid and others (2014) investigated the effect of 12 weeks of aerobic training on homocysteine, lipoprotein A and lipid profile levels in sedentary middle age men, they found that significant decrease in homocysteine, lipoprotein A, TG, cholesterol and LDL and significant increase in HDL. Asieh and others (2013) results showed that aerobic exercise effects were just significant on the mean change of low density lipoprotein. Leila (2013) examined the 8-week Aerobic exercises on some of Cardiovascular Risk Taking factors in men, experimental group was seen the meaningful decreasing in the amount of cholesterol (TC), triglyceride (TG), blood light lipoprotein (LDL). Kobra and others (2013) results showed that after the six-week aerobic exercise program, LDL, TC, and TG levels significantly decreased and HDL levels significantly increased in both experimental groups. Halverstadt and others (2007) exposed that 24 weeks of aerobic exercise training showed that total cholesterol, triglycerides, and low-density lipoprotein cholesterol (LDL-C) decreased significantly and high-density lipoprotein cholesterol (HDL-C) subfractions increased significantly. Muthuraj and Wise (2012) concluded that due to the effect of twelve weeks of concurrent strength and endurance training the percent body fat of the subjects was significantly decreased.

CONCLUSION

Conclusion of the study stated that the low intensity of aerobic training and medium intensity of aerobic training groups had significant decreased on total cholesterol when compared to control group, due to the twelve weeks of low and medium intensity of aerobic training respectively. And also conclusion stated that there is no significant difference between the low and medium intensity aerobic training group to reduce on total cholesterol.

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