Effect of endurance training program on Selected CHD risk factors among middle aged Overweight men of Jammu and Kashmir State.

Nazir Ahamad Waza*, Dr.K.Sreedhar Mushtaq Ahmed. *****

*Assistant Professor, Government College of Physical Education, Ganderbal, Srinagar, J&K State
**Associate Professor, Department of Physical Education and sports Sciences, Annamalai University ;
*** Assistant Professor Government College of Physical Education Ganderbal Srinagar, J&K State.

Abstract

The aim of this study was to examine the effects of a Low Intensity Endurance training on selected CHD risk factors among middle aged overweight men of Jammu and Kashmir state. Forty males (Height: 167.98±2.67, Weight: 81.58±3.14, BMI: 28.98±1.42) were randomly assigned either to an experimental group (N =20) or a Control Group (N = 20). The experimental group underwent a low intensity endurance training program for twelve weeks while the control group maintained their regular routine. The experimental group trained three times in a week which is progressively increased to five sessions as the training progresses. The duration of the sessions were from 30 to 50 min. Height, Weight, and BMI were measured before (Pre) and after(Post) the training program. Fasting blood samples were collected 24 hours before, and after the training period and analyzed for Total Cholesterol, LDL Cholesterol, HDL Cholesterol and Triglycerides. The obtained data were statistically analyzed using ANACOVA to find out significant difference if any. The result shows a significant reduction in Body Weight, BMI, and Fasting blood sugar. In conclusion, resistance training improved Lipid profiles except HDL Cholesterol among overweight Middle aged men.

Introduction

It is becoming increasingly clear that a person's health and well-being are improved by physical activity as well as by a nutritious diet (Centers for Disease Control and Prevention, 1996). Exercise may favorably modify the natural history of a number of chronic diseases. It confers increased physical abilities and improves the quality of life (Bassey, 1985). Cardiovascular disease is already the leading cause of mortality in developing countries (World Health Organization,2002). Between 1990 and 2020, mortality from ischemic

heart disease in developing countries is expected to increase by 120% for women and 137% for men (Leeder. et al., 2004). The concept that a sedentary lifestyle leads to an increase in the clinical manifestations of coronary heart disease (CHD), especially myocardial infarction and sudden death, has become generally accepted by the public and many health professionals. Most often, the idea has been expressed that regular exercise, in conjunction with other risk-reducing behaviors, will help protect against an initial cardiac episode (primary prevention); will aid in the recovery of patients following myocardial infarction, coronary artery bypass surgery, or coronary angioplasty (cardiac rehabilitation); and will reduce the risk of recurrent cardiac events (secondary prevention). The beneficial aspects of physical activity on lipids and lipoprotein metabolism have been generally accepted. There is general acceptance that exercise results in changes that likely reduce the risk of developing cardiovascular disease and may slow the progression of established coronary artery disease (Niebauer. et al., 1997:Lang, 1997). More active people develop less CHD than their inactive counterparts, and when they do develop CHD, it occurs at a later age and tends to be less severe (Berlin and Colditz, 1990; Powell, et al., 1987). The results of the numerous reports are quite variable, with some studies demonstrating a highly significant beneficial effect of exercise (Lakka, et al., 1994; Morris, et al., 1953; Paffenbarge , et al., 1978; Shapiro, et al., 1969; Shaper, and Wannamethee, 1991), others showing a favorable but non significant trend in favor of the more active (Costas, et al., 1978; Salonen, et al., 1982), and a few early studies showing no difference in CHD rates (Chapman, and Massey, 1964; Paul, 1969). India being a well-known developing country it is rapidly transforming. This transformation has ushered swift and profound changes in many aspects of our lives. The health consequences of such changes have by far been predominantly prolific. According to the Global Burden of Diseases Study, by the year 2020, India is projected to have 45 million patients of cardio vascular heart disease. India, the second most populous country, has the highest number of diabetics in the world and annual coronary deaths are expected to reach 2 million by 2010 (Basnayar and Rajapasha, 2004). Higher prevalence of both risk factors for cardiovascular disease and disease rates in urban compared to rural communities in India (Guptha et al, 1997; Gupta and Gupta, 1996). The role of physical activity in modification of Coronary heart Disease risk factors continues to be of considerable concern. Research has shown that endurance exercises are both safe and effective for men and women of all ages, including those who are not in perfect health. Literature concerning the role of endurance

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 endurance training program on body composition and lipid profiles variables among middle aged overweight men of Jammu and Kashmir state.

MATERIALS AND METHODS

A total number of 49 potentially overweight middle aged men volunteered for the study. They were recruited by personal invitation. All the subjects were businessmen or planters and were sedentary at entry, i.e. neither involved in a programme of regular exercise nor employed in a job that involves strenuous physical activities, otherwise apparently normal. All of them were informed in detail the nature of the study and what their contribution will be. Out of which 5 subjects opted out. In the second phase the height, weight and pulse rate of all the 44 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 (m^2). Out of the 44 subjects 40, who were having BMI above 26 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. All the 40 subjects volunteered for the study and their informed consent was obtained. The 40 subjects were randomly assigned to either Experimental group ('EXP', No: 20) or Control group ('CON', No: 20). 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 medication during the period of the study.

Table: 1
Baseline Characteristics of the Study group

	Experimental Group		Control Group		Total	
	Mean	SD	Mean	SD	Mean	SD
Age	39.70	2.36	40.30	2.98	40.00	2.67
Height	169.25	7.17	166.70	7.22	167.98	7.22
Weight	82.10	3.29	81.05	2.96	81.58	3.14
BMI	28.72	1.35	29.23	1.48	28.98	1.42

The experimental design adopted in the study was similar to a random group design involving 40 overweight middle aged men. They were randomly assigned to two equal groups: Experimental group (N: 20) and Control group (N: 20). The experimental group underwent a Low intensity endurance training Program for a period of 12 weeks, whereas the control group maintained their regular routine activities. The subjects of both the groups were tested on selected variables 24 hours before and after the period of experimentation.The experimental variable used in the present study is Low intensity endurance training. The nature of activities selected in the training were of moderate load, as it is best suited for the subjects on taking into account of the various factors. The criterion variables selected for this study were Body Weight (WT), Body Mass Index (BMI), Total Cholesterol (TC), Triglycerides (TG), Low Density Lipoprotein Cholesterol (LDLC) and High Density Lipoprotein Cholesterol (HDLC).

Table: 2
Training Shedule with Biweekly Load of Training

Week	No. of Training Sessions	Training duration of the sessions(min.)	Biweekly Load of Training (BWLT)(min.)
1&2	6	30	180
3&4	6	35	210
5&6	6	40	240
7&8	8	40	320
9&10	10	45	450
11&12	10	50	500
Total	46		1900 min.
Average duration per session = 41.30 min/session			

The subjects of both the groups were tested on selected variables 24 hours before and after the period of experimentation. The height (mts) and weight (kgs) were measured in the fasting state and with minimum clothing and without any footwear before and after the training program. The BMI was calculated by using the formula

BMI kg/m^2 = Weight (kg) / Height (mets) ^{2}

The selected variables namely Body Weight, BMI, were measured 24 hours prior (pre) and 24 hours after(post) and recorded. 48 hours before the commencement of the training program 10 ml of blood was collected into polystyrene disposable syringe with attached 21 G needle by venupuncture of a large anticubital vein in the right or left arm. The subjects were seated in the upright position at the time of sampling. Blood samples were drawn between 06.00 and 08.00 hours. All the subjects had not eaten or exercised the preceding 10 hours. The collected samples were transformed into sets of sterilized and labeled tubes. Those tubes were previously heparanized and 10 ml of blood was transformed into them for the purpose of plasma separation. Plasma was separated from white blood within 1 hour and the labeled samples were stored at 4°C. Lipoprotein analysis were completed within 24 hours of sampling. The post test samples were also taken in a similar fashion. After the completion of low intensity endurance training the blood samples were taken 48 hours after the last exercise session in order to eliminate the residual effect from the last exercise.

Table: 3
Method of Analysis of Biochemical Variables

S. No	Criterion Variables	Method	Reagent Manufacturer	Instrument name	Year of Manufacture and Country of manufacture
1	Triglycerides	GPO-POD	OLYMBUS	OLYUMBUS AU-400	2008- Germany
2	Total Cholesterol	CHOD-POD	OLYMBUS	OLYUMBUS AU-400	2008- Germany
3	HDL–Cholesterol	IMMUNO INIHIBITION	OLYMBUS	OLYUMBUS AU-400	2008- Germany
4	LDL–Cholesterol	IMMUNO INIHIBITION	OLYMBUS	OLYUMBUS AU-400	2008- Germany

The data collected from experimental 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 (ANACOVA). The pre test and posttest means of resistance training and control groups were tested for significance by applying ANOVA. As both the groups (EXP and CON) were selected from the same population and no attempt was made to equate the groups on the selected dependent variables or any other common variables, initial differences may exist, and there is a possibility of affecting the posttest mean.

For eliminating any possible influence of pre test means the adjusted posttest means of resistance training and control group were tested for significance by using ANACOVA. All the data were analyzed using SPSS statistical package. The level of confidence was fixed at 0.05 level of significance as the number of subjects was limited and also as the selected variables might fluctuate due to various extraneous factors.

RESULTS AND DISCUSSION

Table: 4
Analysis of Covariance for the Selected Body composition Variables among Experimental & Control groups.

Variable		Pre Test		Post Test		Gain	%	Adj Post test	F-Ratio
		Mean	**±SD**	**Mean**	**±SD**				
1.Body weight	**Exp**	82.10	2.96	77.10	2.67	-5.00	6.09	76.62	401.01*
	Con	81.05	3.29	81.10	3.21	0.05	0.0	81.58	
2. BMI	**Exp**	28.72	1.35	26.98	0.32	-1.74	6.06	27.24	448.01*
	Con	29.23	1.48	29.25	0.32	0.02	0.0	28.99	

Body Weight (Wt) reduction in experimental group after training was significant ($p>0.05$, 82.10±2.96Vs 77.10± 2.67) with a 6.09% reduction. Body Mass Index (BMI) was reduced significantly in 'Exp'($p>0.05$, 28.72±1.35 Vs 26.98 ± 0.32) and the percentage of reduction was 6.06 whereas the control group does not show any significant change.

Table: 5
Analysis of Covariance for the Lipid profiles among Experimental and Control groups.

Variable		Pre Test		Post Test		Gain	%	Adj Post test	F-Ratio
		Mean	**±SD**	**Mean**	**±SD**				
1.Total Cholesterol	**Exp**	317.20	41.83	284.85	43.10	32.35	10.20	285.2	65.40*
	Con	318.10	43.92	322.00	43.87	3.9	1.26	321.5	
2. LDL Cholesterol	**Exp**	228.70	27.89	204.05	24.65	24.65	10.78	203.2	1207.3*
	Con	226.75	27.90	228.25	27.31	2.5	1.10	229.2	
3. HDL Cholesterol	**Exp**	42.00	2.77	44.65	1.46	2.65	6.31	44.35	119.00*
	Con	41.05	3.10	40.40	2.62	0.65	1.58	40.70	
4.Triglyceride	**Exp**	235.65	23.70	211.75	19.35	23.90	10.14	207.2	392.16*
	Con	229.60	23.91	230.70	24.63	1.10	0.50	231.7	

The Total Cholesterol reduction in experimental group after training was significant (317.20±41.83 Vs 284.85± 43.10) with a 10.20% reduction. LDL Cholesterol has decreased significantly in 'Exp' ($p>0.05$, 228.70±27.89 Vs 204.05±24.65) and the percentage of reduction was 10.78. HDL Cholesterol shows a significant increase ($p>0.05$, 42.00± 2.77 Vs 44.65 ± 1.46) i.e. an increase of 6.31%. Triglyceride shows a significant decrease ($p>0.05$, 235.65± 23.70 Vs 211.75± 19.35) which shows a reduction of 10.14%. Blood Sugar also shows a significant decrease ($p>0.05$, 92.27 ± 5.83 Vs 83.00±5.43) and the percentage of increase is 10.04 whereas the control group does not show any significant change. After going through the results it was concluded that , the endurance training resulted in the following changes in the Experimental group when compared with the Control group.A significant decrease in Body Weight, Body Mass Index, Total cholesterol, LDL cholesterol, HDL Cholesterol and Triglycerides. It is commonly assumed that enhanced physical activities induces an appreciable increase in energy expenditure and hence effective in controlling weight and adiposity. Studies provide strong evidence that occupational and recreational exercise reduces mortality from cardiovascular diseases (Stout, 1996). Endurance training is traditionally associated with influencing lipid profiles favorably among diverse populations and there are evidence of resistance training also producing favorable changes (Stone et al., 1991), and improves psychological well being via an enhanced body image due to body composition changes (Tucker, 1987).

CONCLUSIONS

On the basis of the findings it was concluded that low intensity endurance training program can produce favorable changes in Body weight, BMI, Total Cholesterol, LDL Cholesterol, Triglycerides, and HDL Cholesterol among middle aged overweight men of Jammu and Kashmir state.

References

Basnayar B, Rajapasha LC. Cardiovascular and infectious diseases in South Asia: the double whammy. *BMJ*. 2004;328

Bassey,E.F.,"*Benefits of Exercise in elderly*",Bernard Issac (Ed), Recent Advances in Geriatric Medicine ,(Edinburg, Churchill Livingston,1985) P-91.

Berlin, J.A., and Colditz, G.A. A meta-analysis of physical activity in the prevention of coronary heart disease, *American Journal of Epidemiology*, 1990, P-*132*.

Centers for Disease Control and Prevention, National Center for Chronic Disease and Health Promotion. Physical activity and health: a report of the Surgeon General. Washington, DC: US Government Printing Office, 1996.

Chapman, J.M., and Massey, F.J., The interrelationship of serum cholesterol, hypertension, body weight and risk of coronary disease, *Journal of Chronic Diseases*, 1964,P- 17.

Costas, R., Garcia-Palmieri, M.R., Nazario, E., and Sorlie, P.. Relation of lipids, weight and physical activity to incidence of coronary heart disease: The Puerto Rico Heart Study. *American Journal of Cardiology*1978,, *42*.

Gupta R, Gupta VP. Meta-analysis of coronary heart disease prevalence in India, *Ind Heart J*, 1996; 48.

Gupta R, Prakash H, Kaul V., Cholesterol lipoproteins, rural-urban differences and prevalence of dyslipidaemia among males in Rajasthan, *JAPI* ,1997; 45.

Lakka, T.A., Venalainen, J.M., Rauramaa, R., et al. Relation of leisure-time activity and cardio respiratory fitness to the risk of acute myocardial infarction in men, *New England Journal of Medicine*, 1994. *330*.

Lang T., The public health impact of globalization of food trade. In Shetty PS, McPherson K, eds. Diet, Nutrition and Chronic Disease: Lessons From Contrasting Worlds. Chichester, UK: Wiley; 1997.

Leeder S, Raymond S, Greenberg H, Liu H, Esson K. *A Race Against Time: The Challenge of Cardiovascular Disease in Developing Economies.* New York, NY: Columbia University; 2004.

Morris, J.N., Heady, J.A., Raffle, P.A.B., et al. Coronary heart disease and physical activity of work. *Lancet*,1953, *1053*, 1111-1120

Niebauer J, et al. Attenuated progression of coronary artery disease after 6 years of multifactorial risk intervention: role of physical exercise. *Circulation*, 1997;96:2534–2541

Paffenbarger, R.S., Wing, A.L., & Hyde, R.T. Physical activity as an index of heart attack in college alumni, *American Journal of Epidemiology*, 1978. *108*, 161-167.

Paul, O., Physical activity and coronary heart disease, Part II. *American Journal of Cardiology*, 1969, *23*, 303-318

Powell KE, Thompson PD, Caspersen CJ, and Kendrick JS. Physical activity and the incidence of coronary heart disease. *Annu Rev Public Health*, 1987;8:253-287

Salonen, J.T., Puska, P., & Tuomilehto, J.. Physical activity and risk of myocardial infarction, cerebral stroke and death: A longitudinal study in Eastern Finland. *American Journal of Epidemiology*, 1982, *115*, 526-537

Shaper, A.G., & Wannamethee, G. Physical activity and ischemic heart disease in middle-aged British men, *British Heart Journal*, 1991, *66*, 384-394.

Shapiro, S., Weinblatt, E., Frank, C.W., & Sager, R.V. Incidence of coronary heart disease in a population insured for medical care (HIP). *American Journal of Public Health (suppl.)*, 1969,*59*, 1-101.

Stone, M.H., Fleck, N. Triplett, and W.Kraemer. (1991*). Health and Performance related potential of Resistance Training*. Sports Med.**11**: 210-231.

Tucker, L. (1987). *Effect of Resistance Training on body attitudes; Who benefits most*. J Sport Med and physical Fit. **27**:70-78.

World Health Organization. *The World Health Report 2002—Reducing Risks, Promoting Healthy Life*. Geneva, Switzerland: World Health Organization; 2002.

World Health Organization. *The World Health Report 2003—Shaping the Future*. Geneva, Switzerland: World Health Organization; 2003.