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IMPACT OF YOGIC PRACTICES AND AEROBIC TRAINING ON HIGH DENSITY LIPOPROTEIN (HDL) CHOLESTEROL AMONG MIDDLE AGED WOMEN

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Abstract

Health is considered as an outcome to proper wellness management and appropriate follow up in that direction. Physical wellness has been emphasized very much among all the dimensions of human wellness and health. The purpose of this study was to finding out the impact of yogic practices and aerobic training on high density lipoprotein (HDL) cholesterol among middle aged women. To achieve the purpose of this study, 45 middle aged women were selected at random as subjects. Their age ranged between 35 and 45 years. The subjects were teachers of different schools in Ananthapuramu town, Ananthapuramu (Dist.), Andhra Pradesh, India. High density lipoprotein (HDL) cholesterol was selected as dependent variable for the study. The selected subjects were divided into two experimental groups and a control group with fifteen subjects in each (n=15). Experimental Group I (YPG) underwent yogic practices, Group II (ATG) underwent aerobic training and Group III served as control group (CG) for the training period of 12 weeks. The data on selected dependent variable for pre and post tests were collected two days before and two days after the training programme respectively. The data on High Density Lipoprotein (HDL) cholesterol was assessed by Enzymatic Calorimetric Method with the blood samples collected from every subject. Fasting blood samples from every subject was taken in the morning to assess the High Density Lipoprotein (HDL), and was assessed in the Care Diagnostic Centre, Ananthapuramu, Andhra Pradesh, India. The data collected from the three groups before and after the experimental period were statistically examined for significant improvement by using analysis of covariance (ANCOVA). Whenever the F ratio was found to be significant, Scheffe's test was used as post hoc test to determine which of the paired means differed significantly. In all cases the criterion for statistical significance was set at 0.05 level of confidence (P < 0.05). It was found that systematic and well planned yogic practice and aerobic training programs significantly increased the high density lipoprotein (HDL) cholesterol in middle aged women.

Keywords: Health, Yogic Practices, Aerobic Training, High Density Lipoprotein.

Introduction

Active lifestyle and physical activity is the way-out to gain desired levels of health fitness and hence the exercise scientists around the world are conducting various research programmes aimed to solve the problems related to the health related fitness.

Our increased reliance on technology has substantially lessened work-related physical activity, as well as the energy expenditure required for activities of daily living like cleaning the house, washing clothes and dishes, mowing the lawn and traveling to work. As a result, more time is available to pursue leisure activities. The unfortunate fact, however, are that many individuals do not engage in physical activity during their leisure time. Although the human body is designed for movement and strenuous physical activity, exercise is not a part of the average lifestyle. Exercise scientists and health/fitness professionals have mentioned that regular physical activity is the best defense against the development of many diseases, disorders and illnesses. The importance of regular physical activity is to prevent diseases and premature death and to maintain a high quality of life. Primary goal of the physical exercise program is to develop and maintain cardio-respiratory fitness.

During middle age of women i.e. from 35 to 45 years of age, physical activity usually wanes, with a 5-10 kg accumulation of body fat. Active pursuits may be shared with a growing family, but it becomes less important to impress either an employer or persons of the opposite sex with physical appearance and performance. Later from 45 to 65 years of age, women reach the menopause, and men also substantially reduce their output of sex hormones. Career opportunities have commonly peaked, and a larger disposable income often allows energy demanding domestic tasks to be deputed to service contractors. The decline in physical condition thus continues and may accelerate.

Health is a quality of life that enables the individual to live the most and to serve the best **(J.P. William, 1994).** One should achieve the goal, as given in our age-old Sanskrit teachings, Sarvetra Sukhinah Santu, Sarve Santu Niramayahi, e.g. Let all be happy everywhere, let all remain healthy without disease or infirmity.

Fitness is not an end, it is the beginning. A person must get fit to perform and will not necessarily get fit by performing. Fitness is not a matter of physical capacity alone. To develop and maintain a person's physical fitness, vigorous effort by the individual is required. Body fitness and weight control greatly reduce cardiovascular diseases. This results from (a) maintenance of moderately lower blood pressure, (b) reduced blood cholesterol and (c) low density lipoprotein along with increased high-density lipoprotein. As pointed out earlier, these change all a work together to reduce the number of heart attacks and brain strokes (**Powell, 1972)**.

Physical fitness is the individual's ability to meet the requirements of their environments **(Harold M. Barrow, Rosemary McGee et al., 1979).** Physical fitness is a general state of health and wellbeing and, more specifically, the ability to perform aspects of sports, occupations and daily activities. Physical fitness is the ability to carry out tasks without undue fatigue. Physical fitness is a state of physiologic wellbeing that is achieved through a combination of good diet, regular physical exercise, and other practices that promote good health**.**

In modern days people are more desirous of having good health and would like to lead a qualitative life. For this the wellness experts throughout the world are sponsoring the idea of possessing high levels of health related physical fitness than simply having the skill related physical fitness. The goal of health related fitness is prevention or rehabilitation from disease as well as the development of a high level of functional capacity for daily tasks.

The word Yoga is derived from Sanskrit root 'yuj' means to mind and yoke ***(*Iyengar, 1996*).*** It is true union of our will with the will of God. Our ancient stages have suggested eight sages of yoga to secure purity of body, mind, soul and final communion with God. These eight stages are known as Ashtanga Yoga.

The practice of yoga includes different asanas and different types of pranayamas. Yoga is also useful in lessens in an amount of glucose, sodium, cholesterol, triglycerides, catecholamines, total white blood cell count, boosts the level of cholinesterase, ATPase, hemoglobin, hematocrit, lymphocyte count, vitamin C, thyroxin, total serum protein.

Aerobic refers to a variety of activities like walking, jogging and running for a measured time. These produce beneficial changes in the body, especially the action of the lungs, heart and blood circulation **(Mitchell and Dalc, 1980).** Aerobics is a progressive physical conditioning programme that stimulates cardio respiratory activity for a time period sufficiently long to produce beneficial changes in the body. To do any work we need energy and even while at rest some physiological functions have to be carried within our body and for that purpose, some calories of energy will be burnt. As the intensity and duration of work increases, the demand for the fuel in the working muscles also increases. The organs, which supply the needful, should cope with the demand.

The major benefits of aerobic exercises are stronger and more efficiently operating heart and lungs, more energy, physical flexibility, conditioned muscles, proper use of fats and effective burning of calories. The increased oxygen flow gained through aerobics re-energies by giving any one more energy and a "re-awakening" of his senses (**Kolata and Gina, 2002)**.

The main purpose of the aerobic training is to increase the circulation of the blood and the intake of oxygen. This can be done by yoga's simple movements of the spine and various joints of the body with deep breathing but without violent movements of the muscle. The elasticity of muscles plays an important role to keep the body youthful. Yoga gives a good training to spinal column and other joints that they maintain and even supply blood to every part of the body. Doing yoga exercises of the twist movements and asanas, the various blood vessels are pulled and stretched and blood is equally distributed to every part of the body. The stretched muscles and ligaments during the yoga practice will be immediately relaxed and they carry more energy to the muscle fibers. So, more energy flows in to the relaxed muscles. Aerobic training cannot be done in old age. But there is no age limit to practice yoga. Aerobic training needs more food. Yoga need moderate food. Fatigue appears after doing aerobic training. Fatigue disappears if yoga and pranayama is practiced. Tension increase and nerves are more tightened through aerobic training. Nerves and body muscles are relaxed by yoga. Aerobic training need instruments, large place, etc. Yoga can be practiced in open or closed space without any instruments. Aerobic training wastes more energy due to quick movements and more lactic acids are formed in the muscle fibers. Energy is not wasted in yoga practice.

Consumed from foods of animal origin, including meat, fish, poultry, egg and dairy products, plant food, such as grains, fruits, vegetables, and oils from these sources contain no dietary cholesterol. Serum Cholesterol Travels in the blood in district particles containing both lipid and proteins. Three major classes of lipoproteins are found in the serum of a fasting individual, low density lipoprotein (LDL) high-density lipoprotein (HDL). Another lipoprotein class, intermediate-density

lipoprotein (IDL) reseed between VLDL and LDL in clinical practice, IDL is included in the cholesterol not a fat but rather a lipid, which is a classification of molecules that includes fats. Cholesterol is vital to life and is found in all membranes. It is necessary for the production bile acids and steroid hormones. Dietary cholesterol is found only in animal foods. Abundant in organ meals and egg yolks, cholesterol is also continued in meals and poultry. Vegetable oils and shortenings are cholesterol free. Cholesterol high blood cholesterol is a risk factor in the development of coronary heart disease. Most of the cholesterol that is found in the blood is manufactured by the body in the liver at a rate of about 800 to 1,500 milligrams a day in the form of lipoproteins. The most abundant lipoproteins include low density, high density and very low density lipoproteins LDL seems to be the culprit in coronary heart disease and is popularly known as the bad cholesterol by contrast, HDL is increasingly considered desirable and known as the good cholesterol ***(Durstine, et al., 2002).***

High density lipoprotein (HDL) is known as the "good" cholesterol because it helps remove other forms of cholesterol from your bloodstream. Higher levels of HDL cholesterol are associated with a lower risk of heart disease. High density lipoproteins (HDL) form a class of lipoproteins, varying somewhat in their size (8-11 nm in diameter) and contents that carry cholesterol from the body's tissues to the liver. Because HDL can remove cholesterol from atheroma within arteries, and transport it back to the liver for excretion or re-utilization, they are seen as "good" lipoproteins.

HDL participates in the reverse cholesterol transport process whereby excess cholesterol in cells in the periphery is transported to the liver and ultimately excreted from the body in the faces. People who have naturally higher levels of HDL cholesterol are at lower risk of heart attacks and stroke. Ideally, your HDL cholesterol level should be over 40 mg/dL (1.0 mmol/L) for a man and over 50 mg/dL (1.3 mg/dL) for a woman. High density lipoprotein (HDL) is known as the "good" cholesterol because it helps remove other forms of cholesterol from your bloodstream. Higher levels of HDL cholesterol are associated with a lower risk of heart disease.

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Number of studies has been conducted in different fields of Physical Education and Sports Sciences. But there was lacking a complete treatise on the subjects especially on the impact of yogic practices and aerobic training on high density lipoprotein (HDL) related to the middle aged women.

The main objective of this study is, to make awareness of physical activity especially about yogic practices and aerobic training and significantly improves health, physical fitness and work capacity.

Accordingly, the investigator makes an attempts to study the impact of yogic practices and aerobic training on high density lipoprotein (HDL) of middle aged women.

Methodology

The present study was to find out the impact of yogic practices and aerobic training on high density lipoprotein (HDL) among middle aged women. To achieve the purpose of this study, 45 middle aged women were selected at random as subjects. Their age ranged between 35 and 45 years. The subjects were teachers of different schools in Ananthapuramu town, Andhra Pradesh, India and hence there was no difference in routine life pattern and hence were considered as a homogeneous group. The selected subjects were divided into two experimental groups and a control group with fifteen subjects in each (n=15). Experimental Group I (YPG) underwent yogic practices, Group II (ATG) underwent aerobic training and Group III served as control group (CG) for the training period of 12 weeks. The subjects of the control group were not allowed to participate in any of the training programme except in their routine activities. Among various biochemical variables, high density lipoprotein (HDL) was selected as dependent variables for the study.

During the training period, the experimental groups underwent their respective training programme three days per week on alternate days for twelve weeks in addition to their regular daily activities. Before the commencement of the experimentation and at the middle of the training period (after sixth week), the investigator recorded the target heart rate tests for aerobic training group subjects. The data on selected dependent variable for pre and post tests were collected two days before and two days after the training programme respectively.

The data on high density lipoprotein (HDL) was assessed by Enzymatic Calorimetric Method with the blood samples collected from every subject. Fasting blood samples from every subject was taken in the morning to assess the High Density Lipoprotein (HDL), and was assessed in the Care Diagnostic Centre, Ananthapuramu, Andhra Pradesh, India. The data

collected from the three groups before and after the experimental period were statistically examined for significant improvement by using analysis of covariance (ANCOVA). Whenever the F ratio was found to be significant, Scheffe's test was used as post hoc test to determine which of the paired means differed significantly. In all cases the criterion for statistical significance was set at 0.05 level of confidence ($P < 0.05$).

Results

The influence of independent variables (yogic practices and aerobic training) on the high density lipoprotein (HDL) was determined by subjecting the collected data by using appropriate statistical techniques and the results are presented below.

The analysis of covariance on the data obtained for high density lipoprotein (HDL) of pre test, post test and adjusted post test of yogic practices, aerobic training and control groups are presented in table I.

Table I: Analysis of Covariance for the Pre Test, Post Test and Adjusted Post Test Data on High Density Lipoprotein of Yogic Practices, Aerobic Training and Control Groups

Tests / Groups		Yogic practices group	Aerobic Training Group	Control Group	SOV	Sum of Squares	df	Mean Squares	F ratio
Pre Test	$\bar{X}$	84.86	83.22	84.23	**B**	27.365	2	13.682	0.060
	σ	7.53	22.05	11.27	**W**	12765.57	57	223.93	
Post Test	$\bar{X}$	97.22	95.27	84.48	**B**	1883.22	2	941.622	10.15*
	σ	7.20	10.26	10.951	**W**	5282.66	57	92.65	
Adjusted Post Test	$\bar{X}$	96.904	95.688	84.42	**B**	1886.92	2	943.486	19.21*
					W	2748.20	56	49.05	

*Significant at 0.05 level of confidence.

SOV: Source of Variance; B: Between, W: Within
(The Table value for significance at 0.05 levels with df 2 and 57 and 2 and 56 are 3.14 and 3.15 respectively)

The statistical analysis from above table shows that the pre test means of yogic practices group, aerobic training group and control groups are 84.86, 83.22 and 84.23 respectively. The obtained F ratio 0.060 for pre test is lesser than the table value of 3.14 for df 2 and 57 required for significance at 0.05 level. The post test means of yogic practices group, aerobic training group and control group are found 97.22, 95.27 and 84.48 respectively. The obtained F ratio 10.15 for post test is lesser than the table value of 3.14 for df 2 and 57 required for significance at 0.05 level. The adjusted post test means of yogic practices group, aerobic training group and control group are 95.904, 95.688 and 84.42 respectively. The F ratio obtained for adjusted post test 19.21 is greater than the table value of 3.15 for df 2 and 56 required for significance at 0.05 level.

The above analysis of the study indicates that there is a significant difference among the adjusted post test means of yogic practices group, aerobic training group and control group. Further, to determine which of the three paired means had a significant difference, the Scheffe's was applied as post hoc test and the results are presented in table II.

Table II: Scheffe's Post HOC Test for Differences between the Adjusted Post Test Paired Means of High Density Lipoprotein Cholestrol

Adjusted Post Test Means			Mean Differences	F Value
Yogic practices group	Aerobic Training Group	Control Group		
96.905	95.689	--	1.216	0.29
96.905	--	84.43	12.47	25.81*
--	95.689	84.43	11.25	31.57*

***** Significant at 0.05 level.

Table F (0.05) = 6.32

From the above table it can be seen that the mean difference between yogic practices group and aerobic training group was 1.216 ($P > 0.05$) and the calculated F value was 0.29 ($P > 0.05$). The mean difference between the yogic practices group and the control group was 12.47 ($P > 0.05$) and the calculated F value was 25.81 ($P > 0.05$). The mean difference between aerobic

training group and the control group was 11.25 ($P < 0.05$) and the calculated F value was 31.57 ($P < 0.05$). From that it can be clearly noticed that aerobic training group responded to the training with more positive influences of high density lipoprotein when compared with the yogic practices group and control group. The yogic practices group responded better when compared with the control group.

The pre test, post test and adjusted post test means values of yogic practices group, aerobic training group and control group on high density lipoprotein are graphically presented in figure 1.

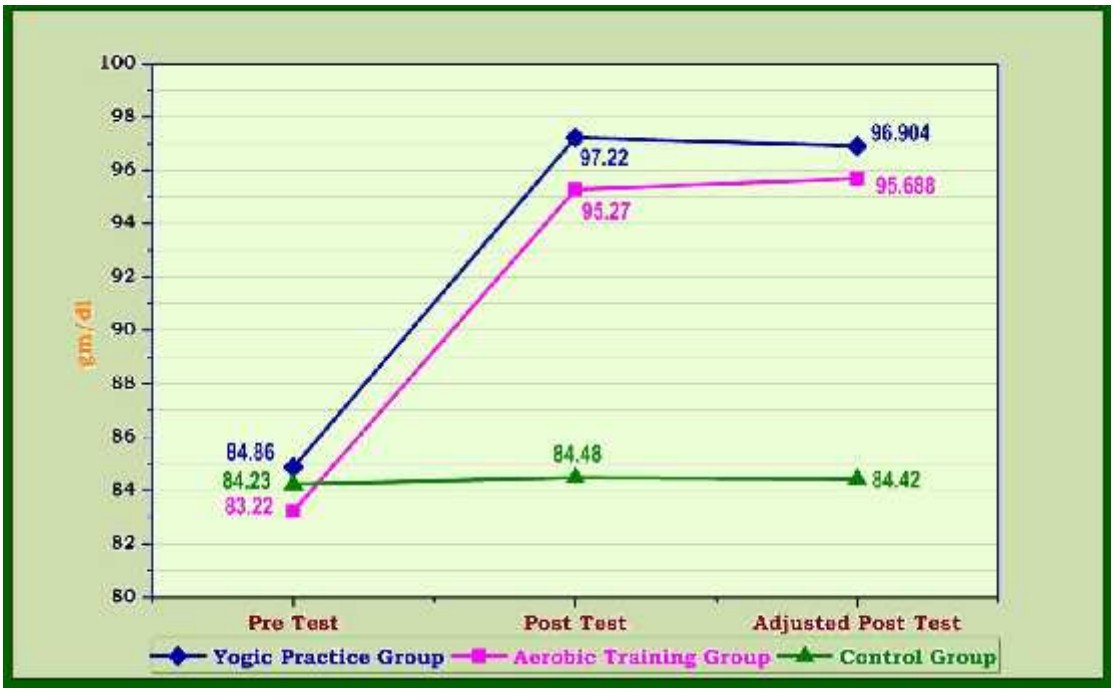

Figure I: Line Graph Showing Pre Test, Post Test and Adjusted Post Test Means of Yogic Practices Group, Aerobic Training Group and Control Group on High Density Lipoprotein

Conclusions

In the present investigation, as a result of two training programmes, namely, yogic practices and aerobic training, the following improvements occurred on high density lipoprotein (HDL) of middle aged women.

- Significant improvement was found in yogic practices group and aerobic training group when compared to control group towards increasing the high density lipoprotein (HDL) cholesterol level.
- It is concluded that aerobic training group found to be better than the yogic practices group in developing the high density lipoprotein (HDL) cholesterol.
- Systematic and well planned yogic practice and aerobic training programs significantly increased the level of high density lipoprotein (HDL) cholesterol in middle aged women.

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