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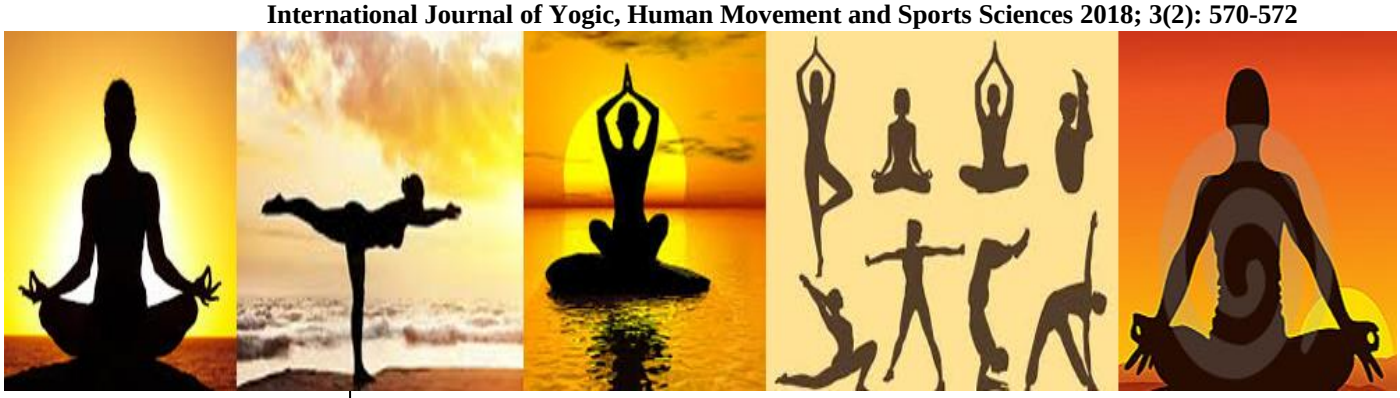

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Effect of aerobic and asanas on biochemical changes in obese adults

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Abstract
The aim of the study was to analyze the effect of aerobic training and selected asanas on biochemical (lipoproteins) in young obese adults. To achieve the purpose, thirty obese men students were selected randomly from different faculties of Govt. Arts and Sciences College, Manalmedu, Tamil Nadu, India and their age ranges between 18 to 25 years. Selected subjects were classified into three groups with ten members of each. Group 1 served as control, Group 2 act as aerobic training and Group 3 as asana training group. Exercise training such as aerobic exercise and selected asana were given to the experimental training groups for a period of three months (4 days/week) whereas the control group was given no special training other than regular activities. Blood samples were collected before and after the completion of full training course. Biochemical analyses were done on plasma lipoproteins (VLDL, LDL and HDL) to find out the significant effect of training on obese men. The data were collected and statistically analyzed using ANOVA and DMRT and they are significant at $p<0.01$. The resulted study shows significant changes in the lipoprotein levels in the experimental training groups than control.

Keywords: Obesity, aerobic training, asana, lipoproteins

Introduction
In middle aged and senior persons such lifestyle promotes or increases the risk of hypertension, obesity, muscle weakness, postural deficiencies, diabetes and coronary heart disease (WHO, 2004). Therefore, one of the main problems of sedentary lifestyle, obesity, is a public health problem which requires intervention and treatment. To put a resolution to this problem we have overviewed the literature studies and decided to undergo comparative study to find out the effect of aerobic training and selected asanas exercises in obese men.
Obesity increases the likelihood of various diseases, particularly heart disease, type 2 diabetes, breathing difficulties during sleep, certain types of cancer, and osteoarthritis. Obesity is most commonly caused by a combination of excessive dietary calories, lack of physical activity, and genetic susceptibility, although a few cases are caused primarily by genes, endocrine disorders, medications or psychiatric illness.
The Preliminary finding has been recommended aerobic exercise as a therapeutic lifestyle change for improving lipid and lipoprotein levels in adults (National Cholesterol Education Program, 2002). However, randomized controlled trials dealing with the effects of aerobic exercise on lipids and lipoproteins in men have led to less than overwhelming results.
Yoga is a system of philosophy established in India thousands of years ago. It seeks to develop the spiritual harmony of the individual through the control of mind and body. Evidence shows that the regular execution of these choreographies provides the practitioner with more physical flexibility, muscle strengthening, increased vitality, decreased psychological stress and reduced cardiovascular diseases. The primary treatment for obesity is dieting, physical exercise and asanas.

Methodology
For the purpose of the study, thirty obese men were randomly selected as subjects from various faculties of Govt. Arts and Sciences College, Manalmedu, Tamil Nadu, India and their age will range between 18-25years. Selected subjects were divided into three groups with ten members in each. Group I acts as Control Group CG (without training) who did not participate

any special training apart from the regular activities. Group II- Experimental group EG1-starts their workload with 35% of aerobic training and ends with 50% (medium intensity) and Group III- Experimental group EG2-served as asanas training group with selected asanas includes Surya Namaskar, Tadasana, Parivrtta Trikonasana, Paschimottanasana, Naukasna, Ardha halasana, Dhanurasana, Pavanamukthasana, Sarvangasana Ardhakati chakrasana and Bhujangasana including warming up and cooling down exercises on both experimental groups. Aerobic training and selected asana training programmes were conducted simultaneously in the Department of Physical Education in Govt. Arts and science College, Manalmedu for a period of 3months (4days/week). Lipoproteins such as LDL, VLDL and HDL measured using appropriate Boehringer-Manheim and other high graded biochemical analytical kit methods. Biochemical analysis was done in the Department of Biochemistry, Govt. Arts and Science College, Manalmedu by the concerned Biochemist and the results were produced by them. Biochemical variables were assessed before and after 3 months of aerobic training and asana practices. The data were collected and analyzed using ANCOVA. Further Scheffe's post hoc test was applied to know the paired mean difference if the optioned 'f' ration was significant. Level of confidence was fixed at .05.

Results

Table 1: Ancova for selected strength variables between physical training group and control group

Variables	Adjusted Post Test Mean			sov	Sum of Squares	df	Mean Squares	'F' Ratio
	Control Group	Aerobic Training Group	Asanas Training Group					
LDL	168.2	155.5	161.3	B	776.59	2	388.29	69.96*
				W	144.29	26	5.55	
VLDL	40.32	32.69	36.90	B	282.06	2	141.03	145.00*
				W	25.28	26	0.97	
HDL	42.14	48.96	45.62	B	230.46	2	115.23	71.91*
				W	41.66	26	1.60	

* Significant at .05 level of confidence.
The table values required for significance at 0.05 level of confidence for 2 and 26 is 3.37.

Table 1 shows the levels of VLDL, LDL and HDL in control and experimental training groups. Significant decrease was found in VLDL, LDL and increase in HDL in aerobic training groups when compared to asana and control. A better result was produced in aerobic group.

Table 2: Scheffe's post hoc test of paired mean difference

Variables	Control Group	Aerobic Training	Asanas Training	Mean Difference	Confidence Interval
LDL	168.2	155.5		12.7*	2.51
	168.2		161.3	6.90*	
		155.5	161.3	5.80*	
VLDL	40.32	32.69		7.63*	0.85
	40.32		36.90	3.42*	
		32.69	36.90	4.21*	
HDL	42.14	48.96		6.82*	0.09
	42.14		45.62	3.48*	
		48.96	45.62	3.34*	

* Significant at .05 level of confidence.

Table 2 shows the pair mean difference between control group and aerobic training group, control group and asana training group and aerobic training and asana training group, on LDL, VLDL and HDL were found significant difference.

Discussions

A daily life pattern of insufficient physical activity can cause obesity, which is a serious worldwide health threat (World Health Organization 1997) [1]. While fat accumulates in any part of the body, the associated risks depend on the area of the accumulation. In particular, fat in the abdominal organs is closely associated with diabetes, cardiovascular diseases and other metabolic diseases (Hunter *et al*., 1997; Williams *et al*., 1997) [2, 2]. Aerobic and asana exercises given to the specific training group, showed better changes in reducing the LDL and VLDL and thereby retains the high density lipoproteins in obese males.

Resulted study also showed that short term training of 12 weeks aerobic training found to be more effective in reducing the cardiac risk factors and increases the HDL level than asana exercise group. A study reported that the combined work of yogasana and pranayama in young male students for a period of 12 weeks training showed better effect in reducing LDL, VLDL, HDL.

However this recent research also supports the present study to derive the better training programme. In our study, we found that 12 weeks of aerobic training at medium intensity significantly reduced the plasma lipoproteins than asana training groups in obese males. However, it can be controlled through diet and exercise. When there is the HDL and LDL cholesterol levels are reversed making LDL level higher than HDL level. High-density lipoprotein makes up HDL cholesterol levels and is also known as the good cholesterol.

The low-density lipoproteins (LDLs) are the major carriers of cholesterol towards tissue having atherogenic potential, while the high density lipoproteins (HDLs) carry cholesterol from peripheral tissues to the liver. The HDLs thus give protection against many cardiac problems and obesity. (Kitamura, 1994). Numerous studies have examined the effect of aerobic exercise through exercise training. Studies also showed that intense aerobic exercise has been shown to reduce cholesterol concentration and to increase high density lipoprotein concentration (Hartung *et al*., 1981; Heath *et al*., 1983) [4] and exercise training after myocardial infraction has resulted favourable lipoprotein changes. (Ballantyne *et al*., 1982).

From our study, it is revealed that no other research by

undergoing comparative studies have shown such an improvement in 12 weeks of training at a shorter duration, at less strain in medium intensity in obese people. The study determines the 'Aerobic exercise' as most effective exercise training group in increasing HDLC level, and investigates the subjects who most benefit from exercise through increases in HDL-C level and decreases in LDL and VLDL and coronary heart diseases risk factors. Aerobic training is the best part of our life training programme to emphasize our life style. Hence the study reinforces the idea that aerobic exercise is an important.

Conclusion

The training programs used in this study produced significant benefits on reducing LDL-VLDL C, and retains the HDL level in a short term period. Accordingly, the results of the current study suggest that aerobic-based training programme is found to be better than asana training.

Implication

Obesity is declined in aerobic exercises because of the merits found. Aerobic exercise was trained in all age groups and is enough to positively influence the metabolic health indicators of sedentary older women and men.

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