Effect of Yogasanas and Pranayama Exercises on Lipid Profiles and Antioxidant Status in Young Healthy Individuals

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Abstract

Life on Earth requires oxygen for its existence, oxygen is a highly reactive molecule that damages living organisms by producing reactive oxygen species. Consequently, organisms a complex network of antioxidant metabolites and enzymes that work together to prevent to prevent oxidative damage to cellular components such as DNA, proteins and lipids. During exercise, oxygen consumption can increase by a factor of more than 10. This leads to a large increase in the production of oxidants and results in damage that contributes to muscular fatigue during and after exercise. Yoga, a form was designed to find to find out the effects of Yogasana and pranayama on the selected lipid profiles which has influence on antioxidant status. Sixty male students studying B.P.ED, in the Department of physical Education and sports sciences, Annamalai university were selected randomly as subjects and their age randomly as subjects and their age ranged between 22-28years. They were divided into three groups of twenty each. Group I served as Asana; Group II pranayama and group III as control. You asana and pranayama practices were given to experimental groups control group was not given any lipid profiles, cholesterol and triglycerides, and statically analyzed using ANCOVA and moderates the lipid levels and influences antioxidant status of young healthy individuals

Key words: Asana, Pranayama, Antioxidant status, Cholesterol,Triglycerides

Introduction

Life on Earth requires oxygen for its existence, oxygen IS a highly reactive molecule that damages living organisms by producing'reactive oxygen species.(Davies K (1995) Consequently, organisms contain a complex network of antioxidant metabolites and enzymes that work together to prevent oxidative damage to cellular components such as DNA, proteins and lipids (Vertuani S, Angusti A, Manfredini S 2004)

In general, antioxidant systems either prevent these reactive species from being formed, or remove them before they can damage vital components of the cell. However, since reactive oxygen species do have useful functions in cells, such as redox signaling, the function of antioxidant systems is not to remove oxidants entirely, but instead to keep them at an optimum level.(Rhee SG (June 2006)

During exercise, oxygen consumption can mcrease by a factor of more than 10. This leads to a large increase in the production of oxidants and results in damage that contributes to muscular fatigue during and after exercise. The inflammatory response that occurs after strenuous exercise is also associated with oxidative stress, especially in the 24 hours after an exercise session.(Tan DX et.a!' 2000),

Yogic techniques are known to improve ones overall performance. Pranayama is known to be a part of yogic techniques. Patanj ali in its yoga sutra describes- Y ama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana and Samadhi as eight angas (parts) of yoga (Yoga Sutra of Patanjali, cited by Christopher C. 2008) . Amongst them, in the present materialistic world, the third and fourth part, Pranayama and Asana (Postures) are considered as very important parts and prescribed by modem medicine too.

Researches have proved the beneficial effects of different yogasanas and pranayama are well reported and has sound scientific basis (Raghuraj et al., 1998: Bhattacharya et al., 2002), . Different types ofpranayama produce different physiological responses in normal young. volunteers (Raghuraj et al., 1998; Bhattacharya et al., 2002; Madanmohan et al., 2005) . Breathing exercises are reported to influence cardiorespiratory and autonomic functions (Srivastav et al., 2005) and also help in reducing the scores of anxiety (Brown and Gerbarg 2005) and stress (Bhattacharya et al., 2002). However, there was dearth of research to find out the effect of yogasnas and pranayama exercises on lipid profiles and the resultant effect on antioxidant status in young healthy individuals.

The present study was designed to find out the effect of yoga sana and pranayama exercises on selected lipid profiles and antioxidant status in young healthy individuals.

Methodology

To achieve the purpose, sixty male healthy students studying B.P.Ed, in the Department of Physical Education and Sports Science, Annamalai University, Tamil Nadu were selected randomly as subjects and their age ranged between 22-28 years. The selected subjects were divided into three groups, namely, yogasanas group, pranayama group and control group, consisting of 20 subjects in each. The selected yogasana group was given Padmasana, Dhanurasana, Bhujangasana, Vajrasana, Matsyasana, Pachimototsana, Artha Chakrasana and Sarvangasana for 12 weeks. The pranayama group was given Nadi Sodhana (Alternate Nostril Breathing), Sarna Vritti Pranayama (Equal Breathing), Bastrika Pranayama(Bellow Breath), Ujjayi Pranayama (Ocean Breath), and·Kapalabhati Pranayama (Skull Shining Breath) for 12 weeks. The control group was not exposed to any treatments and was strictly under control. Lipid profiles,

Which has direct influence on antioxidant status, total cholesterol and triglycerides were tested perior to and after the experiment treatment from all the three groups. Boehringer- Manheim kit was used to measurethe selected variables. The differences between the initial and final scores were considered as the effect of asanas and pranayamas on the selectedlipid profiles, that has direct influence on the antioxidant status. The collected data were analysed through Analysis of covariance (ACOVA)and if significant differences were recorded post hoc test using scheffe's confidence Interval test was done to compare the differences between paired means.

Results

Table-I
Results on Calculation of Analysis of Covariance
(Scores in mg/dl)

Calculation of Anah sis of Covariance on Blood								
	Asana Group	Pranayam Group	Contro Group	Source of Varianc	Sum of Square	Df	Mean Squar	Obtain F
Pre Test	175.2	180.99	173.87	Betwee	569.7	2	284.8	2.91
Std Dev	7.88	12.22	9.06	Within	5576.2	57	97.83	
Post Test	164.8	167.22	173.69	Betwee	839.3	2	419.6	4.82*
Std Dev	8.18	10.84	8.77	Within	4966.0	57	87.12	
Adjusted Test Mean	166.1	163.32	176.27	Betwee	1744.1	2	872.0	140.43*
				Within	347.8	56	6.21	
Mean Diff	10.41	13.77	0.18					
Calculation of Analysis of Covariance on								
Pre Test	165.0	162.0	161.7	Betwee	129.3	2.0	64.6	0.8
Std Dev	6.6	6.8	12.2	Within	4515.7	57.0	79.2	
Post Test	153.1	156.2	162.3	Betwee	882.6	2.0	441.3	4.7*
Std Dev	8.5	6.3	13.0	Within	5312.2	57.0	93.2	
Adjusted Test Mean	151.4	157.0	163.3	Betwee	1384.5	2.0	692.3	17.3*
				Within	2245.8	56.0	40.1	
Mean Diff	11.9	5.8	0.6					

Required F $(_{0.05, 2, 57})$= 3.15 * Significant

Table-II
Scheffe's Post Hoe Analysis Results

Post Hoc Analysis for Blood Cholesterol				
Asanas Group	Pranayama Group	Control Group	Mean Difference	Reqd C.I
166.2	163.3		2.8	2.9
166.2		176.3	10.1*	2.9
	163.	176.6	13.0*	2.9
Post Hoc Analysis for Triglycerides				
151.4	157.0		5.6*	5.1
151.4		163.3	11.9*	5.1
	157.0	163.3	6.3	5.1

*Significant

The obtained results proved that twelve weeks yogasanas and pranayama treatments have been significantly moderated the blood cholesterol and triglycerides ($p<0.05$) as the obtained values were greater thanksgiving the paired differences of means between asanas group and control group, panayama group and control were significant. It was also found that asanas were significantly better than pranayama in reducing triglycerides.

Discussions

In this research, the antioxidant status of the subjects was measured through the lipid profiles of cholesterol and triglycerides. This interventional programmes, namely twelve weeks asnas and pranayamas proved that cholesterol and triglycerides can be significantly reduced and thereby the antioxidant status of the young healthy individuals can be moderated. According to Matill HA (1947) fats are a subgroup of lipids called triglycerides. Lipids also encompass molecules such as fatty acids and their derivatives, as well as opther sterol-containing metabolites such as cholesterol. Ther is strong evindence that one of adaptations resulting from exercise is a strengthening of the bod's antioxidant defenses, particularly the glutathione system, to regulate the increased oxidative stress. (Leeuwenburgh C, Fiebig R, Chandwaney R, Ji L 1994) The findings of this study that asanas and pranayama would significantly reduce cholesterol and triglycerides is in agreement with the findings of (Bhattacharya et.a!' 2002» who reported that the practice of yoga was found to be associated with significant decrease in cholesterol and influences oxidative status.

Conclusion

The findings of this study proved that yogasanas and pranayama significantly moderated cholesterol and triglycerides of the young healthy individuals and antioxidant status of the subjects were influenced. The antioxidant status of the individuals were limited to only lipid profiles of cholesterol and triglycerides in this study, in future researches similar other profiles can be included to get more accurate influences of yogic practices on antioxide status.

References

Bhattacharya S., Pandey U.S and Verma N.S.,(2002) "Improvement in oxidative status with yogic breathing in young healthy males". **Indian J Physiol Pharmacol**, Vol.46, pp. 349-54.

Christopher Chapple (2008) Yoga and the **Luminous: Patanjali's Spiritual Path to Freedom,** New York: SUNY Press,

Davies K (I995). "Oxidative stress: the paradox of aerobic life". **Biochem Soc Symp**, 61: 1-31

Leeuwenburgh C, Fiebig R, Chandwaney R, Ji L (1994). "Aging and exercise training in skeletal muscle: responses of glutathione and antioxidant enzyme systems". **Am J Physiol**, 267 (2 Pt 2): R439-45.

Madanmohan, Udupa K., Bhavanani A.B, Vijayalakshmi P and Surendiran A.,(2005) "Effect of slow and fast Pranayams on reaction time and Cardiorespiratory variables". **Indian J Physiol Pharmacol**, Vol. 49,pp. 313-8.

Matill HA (1947). "Antioxidants" . **Annu Rev Biochem**, 16: 177-192.

Raghuraj P., Ramakrishnan A.G, Nagendra HR and Shirely Telles., (1998). "Effect of two selected yogic breathing techniques on heart rate variability". **Indian J Physiol Pharmacol** Vol. 42, pp. 467-72.

Rhee SG (June 2006), "Cell signaling. H202, a necessary evil for cell signaling". **Science (journal),** 312 (5782): 1882-3

Srivastav R.D., Jain N and Singhal A (2005) "Influence ofaltemate nostril breathing on cardiorespiratory and autonomic functions in healthy young adults". **Indian J Physiol Pharmacol,** Vol. 49, pp.475-83

Tan DX et.al. 2000, "Significance of melatonin in antioxidative defense system: reactions and products". **Biological signals and receptors**, 9 (3-4): 137-59 ..

Vertuani S, Angusti A, Manfredini S (2004) "The antioxidants and pro-antioxidants network: an overview". **Curr Pharm Des**, 10 (14): 1677-94

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