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Research article

EFFECT OF PRANAYAMA AND YOGASANAS ON LIPID PROFILE IN NORMAL HEALTHY VOLUNTEERS

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ABSTRACT

Background: The present study was conducted to assess the impact of Pranayama and Yogasanas on healthy individuals in Patanjali yoga centre, Kurnool. Methodology: 30 subjects in the age group of 25-35 years, of either sex were included in the study and none of them had a history of Lipid Metabolism Disorders. The scope and objectives of the present study were explained to the subjects and their written consent was obtained for participation in the study. The Institutional Ethical Committee had approved the study protocol and design. Pranayamas and yogasanas were practiced by the subjects for One and half hour on each day for three months. The Lipid profiles were compared one day prior and one day after experimental period. Result: A Significant reduction was observed in Total Triglycerides, Total Cholesterol, VLDL-cholesterol and LDL Cholesterol and a significant elevation of HDL-cholesterol was seen in the healthy volunteers at the end of 3 months. Conclusion: It was concluded from the results of the study that yoga practice has brought positive changes in the lipid profile in healthy individuals. The results of the present study indicate that Pranayama and yogasanas can be helpful in patients with lipid metabolism disorders Patients

KEYWORDS: Pranayama, Yogasanas, Lipid Profile, Lipid Metabolism disorders

INTRODUCTION

Coronary heart disease (CHD) is one of the major causes of death in United States [1] for both men and postmenopausal women in western world [2]. A study conducted in India suggests that the prevalence of CHD is about 10% [3]. Dyslipidemia is one of the important modifiable risk factors in CHD [4]. It initiates atherosclerotic plaque formation, finally resulting in degeneration of endothelial cell function, which enhances the coagulability of blood by activation of various factors for which apolipoproteins have been implicated. Hypercholesterolemia (increase in LDL-cholesterol), combined hyperlipidemia (increase in triglycerides and LDL-cholesterol) and hypertriglyceridemia are three important risk factors for CHD [5]. The modification of lipid profile may be important in both prevention and control of CHD [6].

Various attempts such as physical exercises [7-9] and dietary modifications [10,11] and combined diet and exercise trials have been performed to control the lipid content of the blood in efforts to treat and prevent coronary artery disease. A study conducted on patients with angina and coronary risk factors showed a positive response in lipid profile after 4-14 weeks of yogic practice [12]. Subjects with mild to moderate hypertension reported that yoga can play an important role in risk modifications for cardiovascular diseases [13].

Pranayama and yoga in normal volunteers on cardio-respiratory efficiency [14,15] and bone metabolism [16] have resulted in a significant improvement in numerous physiological systems and normal healthy individuals had resulted in an improvement in lean body mass and a reduction in fat skin fold thickness after yogic practices [17]. The short term yogic training significant decrease in LDL cholesterol and increase in HDL cholesterol [18].

The present studies were undertaken with the objective to ascertain whether a short course of yogic practices has any influence on Lipid Profile of a normal adult healthy individual.

METHODOLOGY

DURATION: The active intervention period was one and half hour per day for three months. Each enrolled subject was followed for a period of 3 months during the intervention programme.

PLACE: The present study was carried out at "yoga vignana Kendra", Kurnool. The training of yoga was given by a yoga teacher.

Study subjects: age group of 25-35 years, of either sex was included in the study.

Criteria for inclusion: Those subjects who had voluntarily enrolled for this programme during the study in the age group of 25-35 years.

Criteria for exclusion: Subjects on antioxidant drugs, Subjects already doing any type of yoga or meditation. Subjects performing exercise, Subjects with addictions (smoking, tobacco chewing, and alcohol intake), hypertension, diabetes mellitus, unstable angina pectoris, left ventricular failure, cardiomegaly, ventricular arrhythmia, or any other systemic diseases were excluded

Informed consent: Subjects were informed regarding the nature and scope of the study and written consent was obtained from them.

Ethical Clearance: Clearance was obtained from Institutional Ethical Committee of the Viswabharathi Medical College.

Questionnaire: For collection information self-administered questionnaire was used. Questionnaire was provided to study subjects and they filled in the responses. Information obtained from self-administered questionnaire was ascertained by interviewing the study subjects.

Design: It is a single group design, where the participants were assessed for determination of lipid profiles one day prior and one day after experimental period to record the effects of yoga, if any.

Collection of blood sample & Measurement of lipid Profile. For the purpose of collection of data subjects were asked to report at early morning one day prior and one day after experimental period. From each subject 3ml of blood was obtained from an antecubital vein using a tourniquet after an overnight fasting in a clean dry glass bottle. After one hour the serum was separated by centrifugation. Total cholesterol, Triglycerides and high density lipoprotein (HDL) were carried out using the separated serum from the subjects by enzymatic method while low density lipoprotein (LDL) and very low density lipoprotein were determined by using Friedwald's equation [26]**.** The enzymatic assessment was done by using biochemical assay kits prescribed for the Analyzer BA 88 of Nicholas Company.

Yoga Training: All subjects were taught Pranayama and yogasana for 90 days by yoga teacher. Every day Pranayama practices were practiced for 45 min and Yogasanas were practiced for 45 min.

Pranayama consisted of Bastrika, Kapalabhati, Bahya pranayama, Anuloma and viloma, Bhramari pranayama, Udgeetha pranayama and Ujjayee pranayama

The yogasanas practiced were *Uttanasana, Mandukasana, Ustrasana, Yogamudra, Matsyendrasana, Paschimottanasana, Bhujangasana, Sarvangasana, Halasana, Uddiyana, Ardhamatsyendrasna, Dhanurasana, Shalabhasana, Sarpasana and Chakrasana*.

The above tests were repeated after 90 days i.e post intervention

Statistical analysis and Inference: The data obtained was analyzed to arrange the data statistically to get the mean values and to present the data graphically for better comprehension.

The statistical measures are: Mean and standard deviation. Degree of significance was calculated using the paired t-test while comparing.

RESULTS

LIPID PROFILE:

1] TOTAL CHOLESTEROL: The average decrease in the total cholesterol was from 188.73mg/dl to 178.63mg/dl. This decrease after yogic practice was found to be statistically significant

2] TOTAL TRYGLYCERIDES: The average decrease in the Total Triglycerides was from 135.03mg/dl to 125.13mg/dl. This decrease in the T.G after yogic practice was found to be statistically significant

3] LDL CHOLESTEROL: The average decrease in the LDL cholesterol was from 129.80mg/dl to 113.43mg/dl. This decrease in the LDL cholesterol after yogic practice was found to be statistically significant

4] VLDL CHOLETEROL: The average decrease in the VLDL cholesterol was from 27.01mg/dl to 25.01mg/dl. This decrease after yogic practice was found to be statistically significant

5] HDL CHOLESTEROL: The average increase in the HDL cholesterol was from 35.83mg/dl to 39.80mg/dl. This increase in the HDL cholesterol after yogic practice was found to be statistically significant

Table 1. Comparison of lipid profile before and after yoga

PARAMETER	**MEAN±SD**		***P VALUE***
mg/dl	**Before yoga**	**After yoga**	
Total *Cholesterol*	188.73±27.4	178.63±24.5	<0.001 S
Total Triglycerides	135.03±28.9	125.13±27.1	<0.001 S
LDL Cholesterol	129.8±27.3	113.43±21.8	<0.001 S
VLDL Cholesterol	27.07±6.1	25.10±5.5	<0.001 S
HDL Cholesterol	35.83±1.8	39.80±3.6	<0.001 S

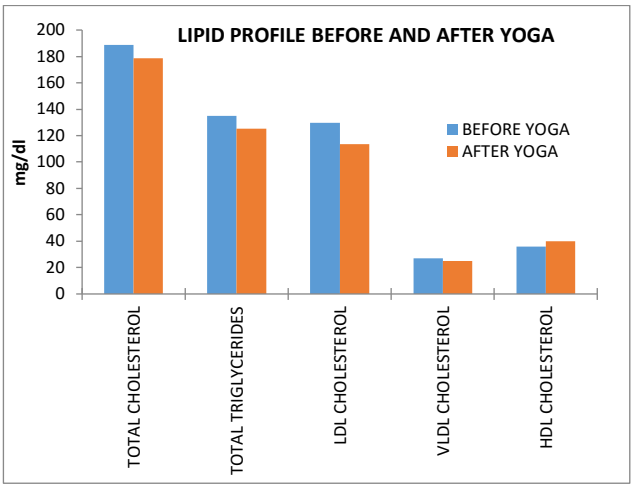

Figure 1. Lipid profile before and after yoga

DISCUSSION

The present study is in agreement with the following studies:

Karamblekar et al [1977] reported significant decrease in the LDL cholesterol and increase in the HDL cholesterol after the short term yogic training on serum cholesterol level [18].

Aygen (1979) measured serum cholesterol levels at the beginning and end of an eleven-month period for twelve Hypercholesterolemic subjects who practiced TM. Eleven Hypercholesterolemic controls who did not practice the technique were similarly followed for thirteen months. Paired comparisons showed a significant reduction in fasting serum cholesterol levels for those subjects who practiced meditation. The cholesterol mg per 100 ml for the meditation group was 254 at the start and 225 at the end of the period, and for the control group it was 259 at the start and 254 at the end of the period [19].

Bagga et al [1981] studied forty female medical students who practiced yoga and reported that their average serum total cholesterol decreased from 196mg/dl to 164.7mg/dl [20].

Bagga et al. (1981) studied forty female medical students who practiced TM and yoga, and reported that their average serum cholesterol decreased from 196.3 mg/dl to 164.7 mg/dl [20].

Naruka, J. S., Mathur, R., and Mathur, A. in 1986 studied the effects of Pranayam practice on fasting blood glucose and serum cholesterol. There is significant decrease in triglycerides, VLDL cholesterol, LDL cholesterol and increase in HDL cholesterol [21].

Chitgeri and Mellikini in 1986 found decrease in the cholesterol levels in medical students undergoing yoga training for a period of 6 weeks for 1 hour daily [22].

Schmidt T, Wijga A, Von Zur Muhlen A, Brabant G, Wagner TOF in 1997has studied the changes in cardiovascular risk factors and hormones during a comprehensive residential three month kriya yoga training. There is significant reduction in body mass index and LDL cholesterol [23].

Mahajan AS, Reddy KS, Sachdeva U in 1999 suggested that regular practice of yoga has shown to improve serum lipid profile in the patients with known ischaemic heart disease as well as in healthy subjects [24].

Vyas and Dikshit in 2002 compared the lipid profile of practicing Raja yoga meditation with the non meditators. Lipid profile showed a significant lowering of serum cholesterol as compared to non meditators [25].

The conclusive information of improvement of lipid profile by yogic practices in the normal healthy individuals will be implied on lipid metabolism disorder patients in the form of yogic therapy and these studies will be carried out on patients.

Prasad et al [2006] reported significant decrease in the total cholesterol, total triglycerides, IDL cholesterol and significant increase in the HDL cholesterol after 3 months of yogic practice [16].

Hence it can be inferred that Pranayama and Asanas play an important role in the modification of blood lipid profile.

It is known that decreased concentrations of plasma HDL-CHOLESTEROL lead to increased risk of coronary heart disease whereas rise in its value exerts a protective effect [10].

It seems quite probable that increased physical activity leads to lowered plasma triglyceride concentrations and ultimately increased HDL cholesterol. Physical activity and HDL appear to be linked via HDLs role in triglyceride metabolism [27].

The effect of yogic exercise on the body mass showed a significant decrease in the fold thickness in normal volunteers at the end of the study. The present study consisting of a low intensity muscle stretches and breathing practices had show significant changes in the lipid profile. The reduction in triglycerides and increase in HDL-cholesterol could be due to hydrolysis of TG-rich lipoproteins.

The significant changes in lipid profile observed in this study might be due to the yoga practices and lecture series. It is believed that yoga brings balance between sympathetic and parasympathetic activity [28]. Thus it may help in reducing stress which in turn might have brought favorable changes in lipid profile. Cholesterol rises greatly with stress. Yoga relieves the stress and there by cholesterol level is declined. Chronic sympathetic Nervous system over activity has been implicated as a factor capable of elevating and maintaining increased serum cholesterol levels independent of dietary measures. Regular practice of relaxation technique that contribute most likely through a reduction in adrenergic activity [19].

CONCLUSION

The Present study had demonstrated the efficacy of Pranayama and Yogasanas on lipid profile in normal healthy volunteers. Yoga practises may be helpful in lipid metabolism disorder patients

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