

Role of Mind–Body Intervention on Lipid Profile: A Cross-sectional Study

Abstract

Background: Yoga is a combination of physical-breathing and meditative techniques that assist in the unification of the mind–body, which improves the quality of life. It was shown that long-term Yoga practitioners had superior control over respiratory rate, reduced stress and anxiety, and a better-controlled lipid profile. **Purpose:** We aimed to investigate the lipid profile of long-term yoga practitioners who were practicing yoga for more than 1 year in comparison with the nonyoga group. **Methods:** A nationwide survey was conducted in which the long-term yoga practitioners ($n = 76$) and nonyoga practitioners ($n = 80$) were recruited for assessment for the lipid parameters. **Results:** The mean (standard deviation) values of both groups were within normal range with serum cholesterol at 189.715 ± 20.4 and 180.88 ± 29.7 and triglycerides at 216.72 ± 92.5 and 207.665 ± 88.3 , low-density lipoprotein at 126.65 ± 18.5 and 120.775 ± 26.5 , and high-density lipoprotein at 47.17 ± 6.6 and 44.99 ± 7.0 , respectively, in yoga and no-yoga groups. **Conclusion:** The lipid profile values were similar in yoga and nonyoga practitioners in the 2017 survey.

Keywords: Meditation, mind–body intervention, physical activity, practitioners, yoga

Introduction

According to the World Health Organization, approximately 2 million people died per year due to physical inactivity and sedentary lifestyle^[1] which causes various diseases such as diabetes, obesity, depression, anxiety, cardiovascular disorder, and neurological impairment. Therefore, maintaining a healthy and physically active lifestyle is an important aspect to prevent illnesses in the present scenario. Studies have shown the evidence of improving the lifestyle of the individuals by practicing yoga.^[2,3]

Regular and long-term practice of Yoga improves flexibility, strength, and strengthens the immune system.^[4] Yoga improves the quality of life and also improves the lipid profile. Mahesh *et al.* 2018 found a significant effect of Sudarshan kriya on blood lipid level in hypertensive participants.^[1,5] Alterations in the ratio of high-density lipoprotein (HDL) and low-density lipoprotein (LDL), is one of the major risk factors for many non-communicable diseases such as cardiovascular disease, diabetes, and polycystic ovarian syndrome. Earlier randomized controlled studies have

shown that practicing yoga-based mind–body techniques can normalize elevated concentrations of lipid values as compared to control groups.^[5,6] Studies have also reported the lipid profile normalizing effect of yoga in long-term practitioners.^[7]

Yoga is known to bring about a calm state of mind which is the basis for stress reduction and biochemical homeostasis that reflects on the lifestyle and also the lipid profile.^[8-10] The observation of significantly lower resting metabolic rate by Chaya *et al.* in regular long-term practitioners of integrated yoga (yogic postures, *pranayama*, and meditation) based lifestyle in inmates of a residential university seems to point to the mechanism of yoga's effect of calming down the mind that may reflect on lipid profile. Hemispheric synchrony of high-amplitude gamma waves in the electroencephalographic of long-term meditators,^[11] positive spiritual experiences reported by long-term meditation practitioners diagnosed with breast cancer,^[12] and the health benefits reported by long-term practitioners of workplace yoga across rural and urban India^[13] point to the holistic approach of yoga.

We planned to compare the lipid profile values of self-reported long-term yoga

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practitioners with nonyoga practitioners in the cohort of respondents to the query related to yoga practice, in a nation-wide survey planned as a diabetes prevention program.

Methods

This study is part of a pan-India diabetes control study (Niyantrita Madhumeha Bharata Abhiyaan). A subset of 156 respondents in which 76 were yoga practitioners and 80 were nonyoga practitioners [Figure 1]. The study group included all respondents who had reported practicing yoga for more than 1 year in their answers to a query “Do you practice Yoga? If “Yes” mark how long you have been practicing yoga (duration inYears)” in the survey form. We have not segregated data on the basis of hemoglobin A1C, but we have segregated data on the basis of duration of self-reported yoga practice in whom blood lipid profile values were available.

Study design

This was a cross-sectional prospective two-armed controlled study that compared long-term yoga practitioners with age- and gender-matched control group. The detailed study design is already published.^[14]

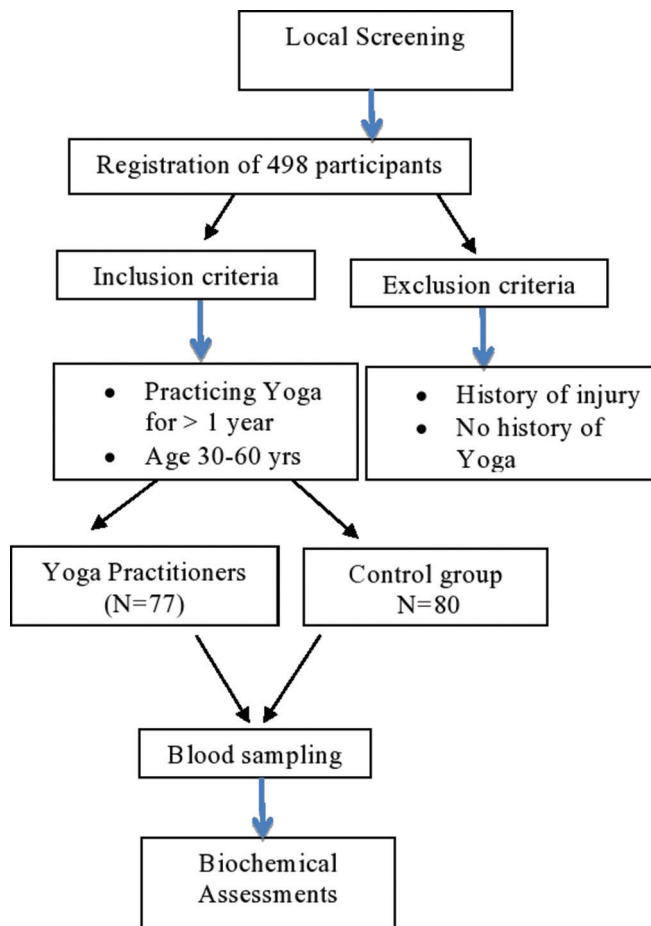


Figure 1: Details of screening participants along with inclusion and exclusion criteria

Selection criteria

Individuals of both genders in the age range of 30–60 years after detailed assessments were recruited. The data of only those participants who self-declared the duration of yoga practice, but may not have mentioned the details of specific asanas or meditation they were practicing, were used for analysis.

Prior written informed consent in local language (Hindi) was obtained from all participants

Ethical approval was obtained from the Institutional Ethical Committee of the Indian Yoga Association (IYA). Central Trial Registry of India (CTRI) Registration was done registration number – trial REF/2018/02/017724.^[15]

Statistical analysis

IBM Corp. Released 2015. IBM SPSS Statistics for Windows, Version 23.0. (Armonk, NY: Based in Chicago, SPSS Inc) was used for statistical analysis. ANCOVA test was used to compare the two groups, namely the intervention group (Yoga practice for more than 1-year duration) and the age-matched control group (no Yoga practice). Subgroup comparisons were done by segregating those with abnormal values (above the cutoff value of the range provided by the laboratory for total cholesterol [TC], triglycerides [TG], LDL, and below for HDL). Subgroup analysis was also done using ANCOVA. Participants were recruited for the study between age groups of 30 and 60 years; the mean \pm standard deviation (SD) for the two groups was 51.25743 ± 7.350329 and 47.575 ± 7.847881 in the Yoga practitioners group and control group, respectively.

Results

Figure 1 shows the study profile. Of the 498 who had responded to the query related to yoga during the first round of house-to-house screening in the randomly selected urban and rural clusters, 342 individuals did not respond to the blood tests.

The data available on 156 participants aged between 30 and 60 years were part of this study. Of these, 76 were in the Yoga practitioners group (46 females and 30 males), and 80 participants were in the control group (50 females and 30 males).

Table 1 shows the demographics of the control and yoga practitioners group.

Table 2 shows the mean and SD values and the comparison of biochemical parameters of Yoga practitioners and the control group. There were no significant differences found in cholesterol ($P = 0.23$), triglyceride ($P = 0.63$), HDL ($P = 0.53$), and LDL ($P = 0.83$).

Table 3 shows the mean and SD values and the comparison of biochemical parameters of Yoga practitioners and the control group. There were no significant differences

found in cholesterol ($P = 0.29$), triglyceride ($P = 0.97$), HDL ($P = 0.36$), and LDL ($P = 0.41$). On subgroup analysis also, there was a nonsignificant difference between groups in those with abnormal or normal values.

Discussion

The current study focuses on a group of Indian long-term Yoga practitioners in order to understand differences in lipid profiles in comparison to nonyoga practitioners.

We compared the data in individuals in a healthy or at-risk range of lipid profile values and found no significant difference between the two groups.

TG and LDL–nonsignificant difference between groups could be because there were very few with dyslipidemia in both yoga and control groups. It is known that exercise is beneficial in reducing dyslipidemia. The control group also may have practiced exercise as they were responsible persons who were careful to respond to this query as nonyoga practitioners as compared to the large cohort who had not responded to this query at all.

TC – the mean values were only marginally higher even those who had abnormal values above 200mg/dl.

HDL – mean values of HDL in those >45 mg/dl seem to be better in the yoga group although nonsignificant between groups.

Our earlier published study in a well-planned funded RCT in diabetes individuals had shown that although both groups had a significant reduction in bad cholesterol, there was a significantly better increase in HDL. This present study which was a community-based screening (unlike an RCT) also seems to support our earlier observation.^[14,16]

HDL which is considered as good cholesterol helps in the clearance of “bad cholesterol” from the blood stream. Upregulation of HDL also stabilizes weight and hence is preventive for obesity and related disorders. It has been shown through studies that HDL and its protein component apolipoprotein A I (apoA-I) increase glucose uptake and synthesis of glycogen in skeletal muscle cells through insulin-independent pathways. It also enhances glycolysis and mitochondrial oxidative phosphorylation in skeletal muscles.^[17] HDL is also found to be downregulated in Type 2 diabetes mellitus and high HDL is found to be a strong, consistent and independent predictor of cardiovascular events.^[18]

Yoga and breathing practices have been known to stabilize the HDL secretion and hence can be a preventive for diabetes and related metabolic disorders.^[19] Also, through enhancement in HDL, yoga may also prevent cardiovascular diseases.^[20]

The sedentary lifestyle is known as a major causative factor of disease progression in obesity, dyslipidemia, diabetes, hypertension, stress, depression, and many more. The main cause of all these has been established to be the unhealthy lifestyle including wrong eating pattern, lack of physical activity, sleep disorders, stress, and depression.^[21] Regular exercise, yoga asanas, pranayama, and meditation have been shown to prevent and correct these abnormalities^[22,23] Studies point to the beneficial effect of yoga in maintaining physiological balance of lipid profile parameters^[6,24,25] and prevention of the related cardiac complications.^[26] Other

Table 1: Demographics of the control and yoga practitioner groups

Characteristics	Control group		Yoga practitioners	
	Female	Male	Female	Male
Gender	50	30	46	30
Age	47±1	47±1	48±1	51±1

Table 2: Analysis of whole group yoga and control group

Variables	Yoga group (n=76)	Control group (n=80)	P
Cholesterol	189.715 ± 20.4	180.88 ± 29.7	0.23
Triglyceride	216.72 ± 92.5	207.665 ± 88.3	0.63
HDL	47.17 ± 6.6	44.99 ± 7.0	0.53
LDL	126.65 ± 18.5	120.775 ± 26.5	0.83

HDL = High-density lipoprotein, LDL = Low-density lipoprotein

Table 3: Subgroup analysis based on cutoff for abnormal values

Variables	Yoga group	No-yoga group	P	Yoga group	No-yoga group	P
Cholesterol	n=31	n=44	0.29	n=45	n=36	0.18
	≤200 mg/dl	≤200 mg/dl		>200 mg/dl	>200 mg/dl	
Triglyceride	n=60	n=57	0.56	n=16	n=17	0.97
	≤200 mg/dl	≤200 mg/dl		>200 mg/dl	>200 mg/dl	
HDL	n=42	n=54	0.78	n=34	n=26	0.36
	≤45 mg/dl	≤45 mg/dl		>45 mg/dl	>45 mg/dl	
LDL	n=53	n=65	0.41	n=23	n=15	0.41
	≤130 mg/dl	<130 mg/dl		>130 mg/dl	>130 mg/dl	
	98.23±20.22	88.95±27.42		156.25±24.35	146.71±14.77	

HDL=High-density lipoprotein, LDL=Low-density lipoprotein

studies^[27] also point to the beneficial effects of physical exercises in ameliorating dyslipidemia by upregulating HDL levels and downregulating LDL and TGL;^[28] it has been reported that HDL seems to play a key role in maintaining triglyceride levels.^[29] Further, Kumari *et al.*, 2013,^[30] looking at the mechanism points out that Yoga practices may improve the lipid profile in by elevating hepatic lipase activity which may facilitate better triglyceride metabolism in the adipose tissue.^[30]

Reasons for no difference

Our study has found significantly higher HDL levels; however, no other lipid parameters have shown any differences between the two groups. HDL increased has been found to be the protective factor to reduce the risk of disease such as cardiovascular disorder, obesity, coronary heart disease, hyperlipidemia, or hypolipidemia.^[31] However, HDL level is inversely proportional with obesity and weight loss.^[32] So, practicing yoga can be beneficial to cure/delay the onset of disease and maintain the body parameters in the defined manner in older ages. Yoga-based lifestyle intervention can be used as a complementary therapy to decrease the risk of cardiovascular disorders.

Azami *et al.*, 2019, explored that Yoga enhances fatty acids in blood plasma which further facilitates elevated level of blood flow which results in the production of energy. In addition, physical activity like Yoga augmented fatty acid-binding protein which played the major role in regulating the activity of fatty acids by elevating the cell substrates. Subsequently, Yoga also plays the mitigating role in increasing and decreasing levels of lipolysis and fatty acids, respectively.^[33] It was concluded that long-term practice might be responsible for improving health parameters. A regular practice of Yoga has neuroprotective effects. There were some limitations in this study as we were unable to decipher a particular neurological/physiological pathway which could have helped in maintaining optimum functioning of the body as this study was self-declared and specific details about the type of yoga, daily duration of yoga, timing of doing the yogic practice were not obtained. Also, the number of participants was small.

Our findings are preliminary because this was a retrospective self-declared data during a community-based screening for diabetes. The information such as the components of yoga, frequency of practice, and duration of the individual sessions etc were not available. However, further prospective randomized controlled trials are needed to objectively assess the outcome of long-term Yoga practice.

Conclusion

This comparison of lipid profile values in a small cohort of self-declared Yoga practitioners (more than 1 year) and nonyoga practitioners showed no significant difference between groups. However, might be the specifically

designed Yoga protocols; targeting lipid parameters could help in improving the lipid profile of the individual.

Ethical statement

The ethical approval was taken from the Institutional Ethical Committee of IYA. The study was registered on CTRI (Registration Number– Study REF/2018/02/017724).

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Conflicts of interest

There are no conflicts of interest.

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