

Impact of Yoga-based lifestyle on Lipid profile level in Dyslipidaemia with Prehypertension

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Introduction

Dyslipidaemia is the imbalance of lipids, including triglycerides, high-density lipoprotein, low-density lipoprotein cholesterol (LDL-C), and cholesterol.[1] Dyslipidaemia has been closely linked to the Pathophysiology of CVD.[2] Over the past 20 years, the prevalence of cardiovascular disease (CVD) has alarmingly increased in India. [2]. Earlier studies [3] concluded that an elevated level of LDL-C is a root cause of atherosclerosis.

When compared to Western populations, Indians not only have a higher chance of acquiring atherosclerotic cardiovascular diseases (ASCVD), but they also experience the condition at a younger age, in a more severe form, and with worse results. [4]

In India, access to healthcare is also poor, and the cost of treating ASCVD is still

high.[4] For all these reasons, there is a need for preventive measures and cost-effective ways should come forward to solve this increasing health problem.

The yogic lifestyle provides a cost-effective therapy and is preventive in nature. This preventive aspect is also looked after by the preventive social medicine department in modern medicine.[5] Yoga practices reduce the fat content in the blood. Bad Cholesterol (LDL) rises related to stress also. Stress also triggers inflammation that lowers your HDL, or “good,” cholesterol, which helps clear out extra LDL.[6] Yoga is the best way to relieve stress. Sudarshan Kriya as a part of Yoga therapy has been demonstrated to reduce serum cholesterol levels.[7] Another study on women showed that yoga reduced TC and LDL-C significantly, but had no significant effect

on TG, HDL-C, and CRP.[8] In comparison to non-meditators, Raja-yoga meditation practitioners who had been practicing for more than 5 years had lower levels of TC, TG, LDL, VLDL, and FBS and higher levels of HDL.[9]

Certain Asanas and Pranayama practices in yoga have been shown to have no significant positive effects on dyslipidaemia which have significantly increased in HDL cholesterol reduced BMI cholesterol, VLDL, triglycerides, and both systolic and diastolic blood pressure.[10]

Previous research on yoga and lipid profiles did not include prehypertensive participants who had adopted a yoga-based lifestyle. In the current study, a new yoga module was implemented in the spiritual setting, with just minor food content changes.

We hypothesized that a 30-day yoga-based change in lifestyle would have a significant impact on the levels of the lipid profile.

2. Materials and Method

Design: Pre-Post study design performed on adult participants.

Initially, 60 subjects were taken in simple setting with various medical statuses but close to abnormal lipid profiles. Inclusion and exclusion criteria were applied as part of the researcher's focus of study.

Inclusion Criteria: Gender; Male=21, Female= 21, Age limit = 30-60 years, B.P. level = Sys.120-139, Dyst.- 80-89 mmHg. Blood lipid parameters: -= Total cholesterol, Triglyceride, HDL cholesterol, LDL cholesterol.

Exclusion Criteria: The subjects suffering from HTN stage -2 /Severe HTN / Hypotensive, DM- T1 or T2, Hypothyroidism/Hyperthyroidism, asthma, TB, and normal TG level were excluded. Finally, 42 subjects (Male 21, Female 21 having dyslipidaemia with

prehypertension) out of 60 were selected for this study.

Instruments: All the instruments and tools used in this study are below:

Different grades of automatic Pipettes, Water bath, Centrifuge machine, RA-50 Biochemistry analyser, Stopwatch, Sphygmomanometer, and Stethoscope.

Determination of serum lipid profile:

Estimation of cholesterol in serum by Modified Roeschlaus method- the formation of Quinoneamine, using kit manufactured by Siemens, 1998 in India.

Estimation of HDL cholesterol in serum by the method of Burstein et al manufactured by ERBA diagnostic Ltd. India.

Determination of Triglyceride in serum by the formation of Quinoneamine or by calculating the intensity of chromogen. Using a kit manufactured by ERBA diagnostic Mannheim Germany GMB.

Calculation of LDL (low density lipoprotein):

$$\text{LDL cholesterol (mg/dl)} = \text{Total cholesterol} - (\text{HDL} + \text{Triglyceride}/5)$$

Intervention

In this study selected yogic practices- Asana, Pranayama, and Sithilikarana, are applied to 42 subjects. The practice was done 90 minutes daily for 30 days including various Asana and Pranayama. [Table-1]

During one month of intervention, an ayurvedic morning routine and a simple, Sattvic diet regimen are also followed along with yogic practices. It is said, "Food is responsible for good health as well as disease." [11] In yoga texts also, the right diet regimen is necessarily recommended along with yogic practices.

Participants had simple, fresh, vegetarian food. Additionally, approx. 10-gram-soaked flax seeds and 100-gram sprouts

were taken by subjects in the morning breakfast for 1 month.

The intervention was done under the supervision of a medical doctor and Yoga expert.

Participants lived an ashrama life for the whole 30 days at Shanti Kunj, Haridwar, India.

Statistics Analysis

Collected pre and post-data from participants were analysed using a dependent t-Test at the 0.01 Level of significance.

3. Result

Level of HDL was increased and a significant reduction in Triglyceride was found from baseline to day 30. There was a reduction but no significant effect seen in LDL-C and Total Cholesterol levels of participants in 30 days. [Table- 2]

A little change in Blood Pressure too was observed after the 30 days of intervention. [Table- 3].

4. Discussion

Mean and SD values for HDL of pre & post group are 42.48, 54.24, and 10.61, 7.99 respectively. It is observed that $|t| = 5.74 > t_c = 2.42$. (One-tailed hypothesis) Obtained t value (5.74) is greater than critical value which is $t_c = 2.42$ at $DF = 82$ and 0.01 level of significance. It showed that the difference between the mean is significant.

The mean values for TG of pre and post-group are 185.38 and 135.1 respectively. SD of pre-test and post-test are 54.85 and 37.50. Obtained t value (4.9) is greater than the critical value which is $t_c = 2.42$. It showed the difference between pre and post-mean was significant. The above observation confirmed that there was a

statistically significant effect on HDL and Triglyceride levels due to the yoga-based lifestyle modification in the participated group.

Mean values for Total cholesterol of pre and post-test are 160.14 and 154.36 respectively. SD of pre and post-tests are 31.64 and 24.38. It is observed that $|t| = 0.9388 < t_c = 2.42$. (One-tailed hypothesis) Obtained t value (0.9388) is less than the critical value which is $t_c = 2.42$. It showed that the difference between the mean is not significant. Overall yoga practices remain beneficial. Flaxseed Meal is high in fibre, a significant amount of which is soluble (20%), in the form of gums and mucilage. In addition to accounting for the laxative effect of flax meal, soluble fibre is known to have potent cholesterol-lowering qualities.[12]

Mean values for LDL of pre and post-test are 77.43 and 75.79 respectively. SD of pre and post-test are 25.42 and 30.31. It is observed that $|t| = 0.2691 < t_c = 2.42$. (One-tailed hypothesis). It shows that difference between the mean is not significant. From the above observations, although it was showing a reduction in LDL and total cholesterol levels but didn't show a significant change due to yoga-based lifestyle modification. The stretching mechanism of Asana improves circulation. Earlier research on correlating yoga practices to arterial stiffness showed a reduction in stiffness which could help in reducing morbidity due to cardiovascular incidences.[13] Shavasana and pranayama remain effective to calm the mind and bring a stress-less state. Earlier studies done for a long period of intervention of yoga showed significant changes in some variables of lipid profile. Most of them were more than 30 days of intervention. Our study showed that 30 days of

intervention remained successful when yoga or simple lifestyle adjustments, such as adding some healthy ingredients to breakfast, were implemented. The environment of yoga is conducive to changing one's thoughts and behaviour. Shanti Kunj, an ashrama for spiritual sadhana and training, has a yogic atmosphere that is favourable of mental and behavioural transformation.

5. Conclusion

By yoga-based lifestyle, there was a statistically significant effect on the participants having abnormal Triglyceride and HDL levels. Whereas there was no significant effect seen on total cholesterol level and LDL. This may be due to having more normal values of LDL and Total cholesterol in pre-test samples. Nevertheless, the overall reduction was just marginal. But the impact on blood pressure was also clearly demonstrated. Yoga practice combined with simple lifestyle changes can help individuals regulate their lipid profiles, and adopting

these holistic behaviours may help avoid dyslipidaemia. Additional research is advised with a control group, using a sample of the specific abnormal range and longer yoga intervention. An observation regarding spiritual ambiance and yoga routine as potential influencing aspects may be interesting.

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Conflict of interest

There is no conflict of interest.

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Table 1: Name, and duration of various Asana and Pranayama included in yoga practices.

Practice Duration	
Asana	
Sandhi Sanchalana- Part 1	10 minutes
TTK*	10 minutes
Shashankasana	10 minutes
Bhujanga Asana	10 minutes
Supta Udarakarshan	10 minutes
Shavasana	10 minutes
Pranayama	
Nadishodhana	10 minutes
Bhramari	10 minutes
Pranakarshana* *	10 minutes

*(Tadasana-Tiryak tadasana-Katichakrasana)

**Pranayama cum Meditation, (Time duration, mentioned above, is approx.)

Table 2: Lipid Profile (mg/dl) before and after 30 days of intervention (mean±SD)

	HDL	Triglyceride	Total Cholesterol	LDL
Before	42.48±10.61	185.38±54.85	160.14±31.64	77.43±25.42
After	54.24±7.99	135.1±37.50	154.36±24.38	75.79±30.31

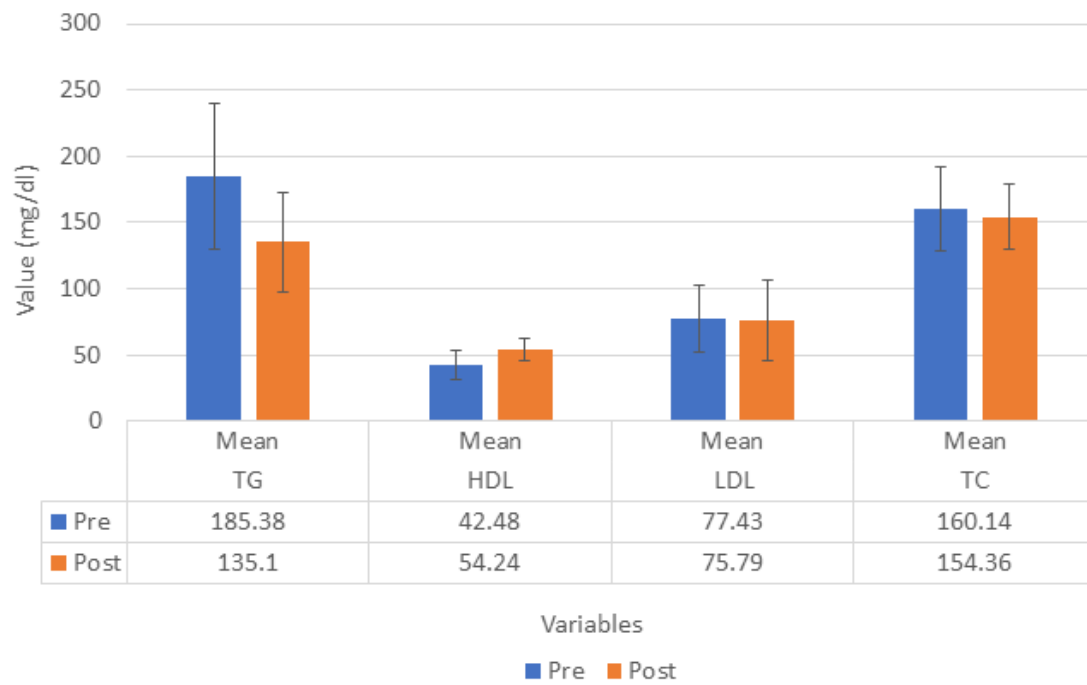
Table 3: Blood Pressure (mm Hg) before and after 30 days.

B.P.	Systolic	Diastolic
Before	135	83
After	128	81

Table 4: Obtained t values and DF from the calculation

	HDL	Triglyceride	Total Cholesterol	LDL
DF	82	82	82	82
t value	5.740	4.90	0.938	0.2691

Fig.1: Before and after lipid profiles status in participants



X axis- lipid profile variables; Y axis- mean value in mg/dl. Each variable has pre and post-values with their SD represented by the error bar.