Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/bhk1fq86

EFFECT OF YOGIC PRACTICES AND DIET MODIFICATION ON LDL AMONG HYPERTENSIVE MIDDLE-AGED WOMEN

Shinu Patinhara Malammal[1*], Saheedha A[2], Sunil Alphonse[3], Sanith N V[4], Sudheesh V S[5], Hemalatha V[6]

[1]Assistant Professor, Department of Physical Education, Govt College Madappally, Calicut, pmshinu@gmail.com
[2]Faculty of Yogic Science and Therapy, Meenakshi Academy of Higher Education & Research, Chennai
[3]Assistant Professor, Government College of Physical Education Kozhikode, Kerala.
[4]Assistant Professor, Department of Physical Education, Govt Arts and Science College Nadapuram, Calicut.
[5]Assistant Professor, Department of Physical Education, NMSM Govt College Kalpetta, Wayanad.
[6]Associate Professor, Dept of Physical Education, Vimala College, Thrissur.

***Corresponding Author:** Shinu Patinhara Malammal
*Assistant Professor, Department of Physical Education, Govt College Madappally, Calicut, pmshinu@gmail.com

ABSTRACT
The present random group experimental study was designed to find out the effect of yogic practices on LDL (low density lipoprotein) among hypertensive middle-aged women. It was hypothesized that there would be significant difference on LDL (low density lipoprotein) among hypertensive middle-aged women due to yogic practice than the control group. To achieve the purpose of the study, forty five (N=45) hypertensive middle aged women residing in Kozhikode city aged between 35 to 45 were selected randomly and divided into three equal groups and named Yoga group (n=15), Yoga and Diet group (n=15) and control group (n=15). Training period of the study was six weeks, six days of practice in one week and each session duration is maximum one hour in the morning. The control group was kept in active rest. Pre-test and post-test were conducted for Experimental and control group before and after the training programme using LDL test in laboratory. Statistical analysis has been done using t test to find out differences between the groups. It was concluded that there was significant reduction in LDL (low density lipoprotein) of the group which underwent yogic practices and diet control and yogic practice group than the control group.

Key words: Yogic practices, LDL (low density lipoprotein), Diet control,

1 INTRODUCTION
Modern lifestyle and unhealthy food habits causes life style disease like Blood pleasure, Diabetics mellitus, Heart diseases and Obesity. Among the life style diseases and metabolic disorders obesity possesses is one of the leading places. Obesity causes either by over eating or sedentary life style, in both cases the energy is not utilizing by the body and as a result of this excess energy stores in the body as adipose tissue under the skin which leads to other health hazards.

Social determinants of hypertension are important and Indian states with greater urbanization, human development and social development have more hyper tension. there is poor association of hypertension prevalence with health care availability although there is positive association with healthcare access and quality. the health system in India should focus on better hypertension screening and control to reduce cardio vascular and mortality. [1]

concept and practice of yoga originated in India several thousand years ago. The founders were great saints and sages. the grab yogis have national interpretation to their experiences of yoga and bought about a scientific and practical method within everyone's each. today yoga no longer is restricted to permits of saints and sages, it has taken its place in everyday life and has aroused. The worldwide awakening and acceptance in the last decade. the science of yoga and its techniques have now been re oriented to suit psychological needs and life styles.

Lipoproteins transfer lipids (fats) around the body in the extracellular fluid, making fats available to body cells for receptor-mediated endocytosis.[2][3] Lipoproteins are complex particles composed of multiple proteins, typically 80–100 proteins per particle (organized by a single apolipoprotein B for LDL and the larger particles). A single LDL particle is about 220–275 angstroms in diameter, typically transporting 3,000 to 6,000 fat molecules per particle, and varying in size according to the number and mix of fat molecules contained within.[4] The lipids carried include all fat molecules with cholesterol, phospholipids, and triglycerides dominant; amounts of each varying considerably.

The conventional interpretation of cholesterol levels holds that higher levels of LDL particles pose increased risk of cardiovascular disease. LDL particles are thought to invade the endothelium and become oxidized, since the oxidized forms would be more easily retained by the proteoglycans. This view has been challenged as inaccurate and based on flawed research methodology.[5] The issue remains controversial and vigorously contested in the literature.

The significance of this study is to improve the knowledge and to provide a systematic approach of yogic practices with comparative advantages of diet which is turn is useful to assess the degree of improvement in the women's general health.

- The study may also be useful for women of yoga and serves as a guide to demonstrate the importance of yogic practices in the overall development of women.
- The study would help the yoga therapist working in hospitals and rehabilitation center to assess the present standing of hypertensive middle-aged women.
- This study would further motivate for further research on the related variables.

Hypotheses

It is hypothesized that there would be significant differences between yogic practices and control group on LDL among hypertensive middle-aged women.

2 REVIEW OF LITERATURE

Low density lipoprotein (LDL) cholesterol is known as ''bad'' cholesterol because excessive accumulation causes cardiovascular diseases, such as heart attacks and strokes. Therefore, there is a great emphasis on specific management of the LDL cholesterol in order to support general cardiovascular health. In this literature review, two lifestyle modifications of yoga and diet control have been examined regarding their effects on LDL cholesterol outlines different studies' results.

Yoga entails physical exercises, breathing practices and meditation: an overview of effects on physical and mental health and lipid profiles. Many other studies support the argument to practice yoga frequently, because practice can lead to lowering of LDL cholesterol. Another study by Sathyaprabha and her colleagues tried to establish the role of yoga in altering lipid profiles in CAD patients. After operation of 12 weeks of yoga practice was carried out the researchers noticed that the participants had a significant decrease of total cholesterol and LDL. These improvements the authors linked to the influence of stress, which is released through yoga and an ability of regulation the balance of the autonomic nervous system and inflammatory markers linked with lipid metabolism.

There is additional evidence on the effects of yoga as part of Cramer et al (2014) meta analysis of the effects of yoga on cardio metabolic risk markers of which reduction of LDL was seen. Physically

active people especially those who practiced yoga had a lower LDL cholesterol when compared to the group that did not practice any form of exercise. Altogether the authors of both studies opined that in light of their findings, yoga could be used as an adjunct therapy for controlling cholesterol and averting cardiovascular disorders, especially if done on a daily basis.

Dietary Control and Low Density Lipid Lowering Nutritional modifications have been accepted for several years as one of the most important aspects of cholesterol control. A well balanced diet can have almost 30% reduction in low density cholesterol, where the focus has to be on the kind of fats, fibers and plant foods. In one of the studies by Kris-Etherton et al (2005) the impact of monounsaturated fats like olive oil and soluble fiber from foods such as oats and beans on LDL cholesterol was looked at. This study showed that people developed lower LDL upon embracing this diet proving the sayings, 'We are what we eat' in managing cholesterol. Moreover, current guidelines by the American Heart Association (2020) on the approach to dietary management to lower LDL cholesterol includes reducing intake of the saturated fats: increasing the consumption of omega-3 fatty acids: and embracing the plant-forward diet. Such dietary changes assist in lowering of LDL cholesterol formation in the liver and upsurge of elimination of LDL particles from circulation hence resulting to better lipid profile. Impact of Yoga with Controlled Diet The interaction of the effects of yoga and diet control on LDL cholesterol has also been reviewed. Coping with cardiovascular risk factors that accompany hyperlipidemia, Sharma et al. (2013) recently explored the combined impact of yoga and changes in nutrition. According to the study, the two intervention arms that involved doing the yoga practice together with adopting a heart-healthy diet thus has much bigger decrease in their LDL cholesterol than the single intervention group. Meanwhile, this suggests that the combination of both changes to ones lifestyle can be more effective in terms of lipid control.

Similarly, Khatri et al. (2015) in a RCT investigated the impact of yoga intervention with dietary modification on lipids profile among middle aged individuals. It was concluded that the group which did yoga and took low fat high fiber diet diet had lowered LDL cholesterol values as compared to the groups which received either interventional alone.

In general, yoga and diet control have positive impact in lowering the levels of LDL cholesterol, research indicating that their integration may further improve the effects. Yoga in conjunction with stress reduction and enhanced autonomic modulation to affect cholesterol might help, but there is no question that dietary changes involving reduction of saturated fats and increases in fiber would seem to be basic to effecting changes in cholesterol levels. Further studies should be directed toward the identification of interaction between these interventions and other factors, and both shorter and longer-term effects of such treatments for different ethnic populations.

3 METHODOLOGY

It deals with selection of subject, selection of subjects, selection of variables, method used for the study, materials used for the study. Orientation of subjects and statistical technique used.

To facilitate the study 45 subjects has selected at random. subjects have divided in to three groups; each group contained 15 hypertensive middle-aged women. the first group was considered as yogic practice group (n=15) and second group was yogic practice with diet modification group (n=15) and third group was considered as control group (n=15) who has not received any kind of practices.

Independent Variables

1. Yogic Practices
2. Diet Modification

Dependent Variables

LDL (low density lipoprotein)

Statistical Techniques

The data collected from the subjects were treated statistically to find out the significant differences among the experimental group and control group. Normality of data method was followed. The

statistical technique used to analyze was Analysis of Covariances (ANCOVA) to find out the adjusted mean difference among the Experimental Group-I, Experimental Group-II and the Control Group. Scheffe's Post Hoc Test was used to find out the paired mean differences. The quantitative data of the different variables were statistically interpreted to analyze the effect of yogic practices on selected certain risk factors among middle aged hypertensive women.

4 DATA ANALYSIS AND RESULTS

The data collected from all the groups was statistically analyzed by applying t test. In all the cases level of confidence was fixed at .05 for significance. Degree of freedom is 14 within the group and 28 between the groups.

The data collected on Life Satisfaction using questionnaire before and after the experimental period from both the groups has been statistically analyzed and presented in the following tables.

Table I Analysis of Co-Variance (ANCOVA) of the Means for Low-Density Lipoprotein (values in mg/dL)

Test	Experimental Group-I	Experimental Group-II	Control Group	Source of Variance	Sum of Squares	Degrees of Freedom	Mean Squares	Obtained F-ratio
Pre Test	139.93	139.60	140.33	**B**	4.04	2	2.02	**0.203**
				W	417.87	42	9.95	
Post Test	123.60	130.00	139.73	**B**	1979.91	2	989.96	**107.57***
				W	386.53	42	9.20	
Adjusted Post Test	12161	130.21	139.51	**B**	1906.99	2	953.50	**95.29***
				W	242.96	41	5.93	
Mean Gain	16.33	09.60	-0.60					

***Significant at 0.05 level of confidence. (Table F-value at 0.05 level of confidence for (2, 42 and 2, 41) = 3.22, 3.23)**

As shown in the Table, the obtained F value on the scores of pre-test means 0.203 is less than the required F value 3.22, which proved that the random assignment of the subjects were successful and their Low-Density Lipoprotein before the training were equal and there was no significant differences. The obtained F value on the scores of post-test means 107.57 is greater than the required F-value 3.22, which proved that the differences between the post-test means of the subjects among different groups was significant.

Taking into consideration of the pre-test means and post-test means, adjusted post-test means were determined and Analysis Co-Variance was done. The obtained F value 95.29 was greater than the required F value of 3.23, which proved that the groups differ significantly in the adjusted post-test means.

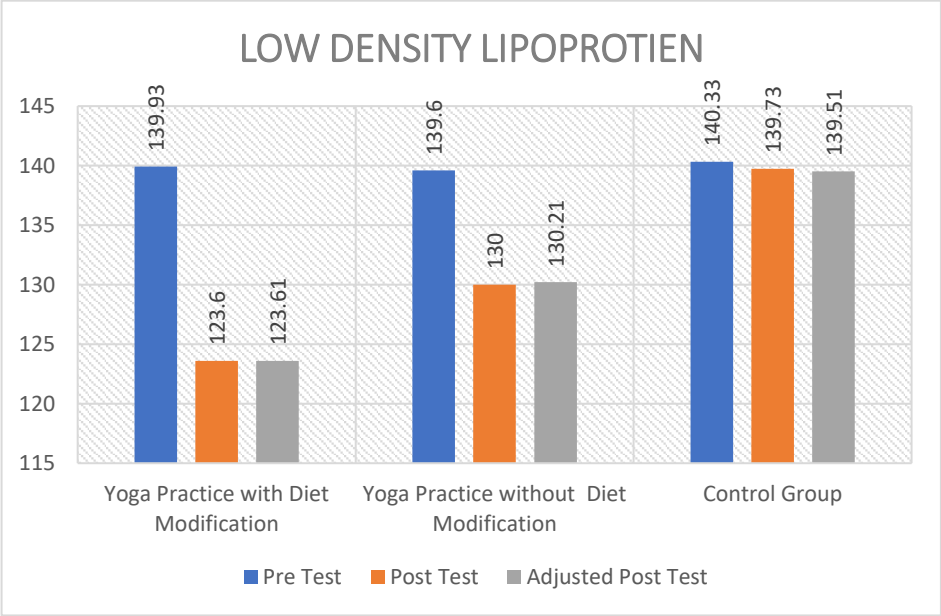
Since significant difference was recorded in the adjusted post-test means, the results were subjected to Post Hoc analysis using Scheffe's Confidence Interval test. The results are presented in the Table 2.

Table 2 Showing Scheffe's Post Hoc Test for Low-Density Lipoprotein (values in mg/dL) *Significant at 0.05 level of confidence.

Adjusted post-test mean for			Mean Difference	Critical Difference at 0.05 level of Confidence
Yogic Practices with diet modification	Yogic Practices without diet modification	Control Group		
123.61	130.21	-	6.60*	3.97
-	130.21	139.51	9.30*	3.97
123.61	-	139.51	15.90*	3.97

The multiple mean comparisons showed in Table-IX proved that there existed significant difference between the adjusted post-test means of Simplified Kundalini Yogic Practices with diet modification, Simplified Kundalini Yogic Practices without diet modification and the Control Group. There was significant difference between Simplified Yogic Practices with diet modification and Simplified Kundalini Yogic Practices without diet modification. The obtained pre, post and adjusted post-test mean values are presented through bar diagram in the following figure

Figure 1: Bar Diagram Showing Pretest, Post-Test and Adjusted Post-Test Mean Values on Low-Density Lipoprotein (values in mg/dL)



5 DISCUSSION ON THE FINDINGS

The obtained F value 160.90 was greater than the required F value of 3.23. This proved that there was significant difference among the adjusted post-test values due to Six weeks of Yogic Practices with diet modification and Yogic Practices without diet modification on the Biochemical Variable of Low-Density Lipoprotein. This is in line with the study conducted by **Hartley L (2014) and Ramos-Jiménez A (2009).**

The above Table shows the Scheffe's confidence interval value of Low-Density Lipoprotein among Yogic Practices with diet modification group, Yogic Practices without diet modification group and the Control group.

From the Table, it is clear that the adjusted post-test mean value of Yogic Practices with diet modification, Yogic Practices without diet modification and Control Group were 123.61, 130.21, and 139.51 respectively

The mean differences between Yogic Practices with diet modification and Yogic Practices without diet modification, Yogic Practices without diet modification and Control Group, and Yogic Practices with diet modification and Control Group were 6.60, 9.30, and 15.9 respectively. The required

Scheffe's confidence interval to be significant at 0.05 level of confidence was 3.97.
The mean differences between Yogic Practices with diet modification and Yogic Practices without diet modification, Yogic Practices without diet modification and Control Group, and Yogic Practices with diet modification and Control Group were greater than the required confidence interval and hence it is significant.

6 CONCLUSION

The present study was carried out to analyse the effect of yogic exercise, and diet control on low density lipoprotein. Subjects of the study was hypertensive middle aged women residing in urban region. With the use of statistical tools like ANCOVA, Post-hoc test etc, this study was able to prove that there is significant difference in LDL between yogic practice and diet control group, and yogic practice only group. It was concluded that the group which did yogic practice and diet control had lowered LDL cholesterol values while comparing to the group which underwent yogic practice alone. On the basis of the findings and conclusions of the study, the following recommendations were made.

1. Similar study may be conducted to find out other effect of yoga practices on other parameters related to hyper tension
2. Studies may be conducted by modifying Yogic practices to find out better result, possibly.
3. Similar study may be conducted among the Male population and among different age groups.
4. The study may be extended to find out the effect Yoga Practices on other physical, physiological and psychological parameters.

References

1. Alcocer, L., & Cueto, L. (2008). Hypertension, a health economics perspective. *Therapeutic Advances in Cardiovascular Disease*, *2*(3), 147–155. https://doi.org/10.1177/1753944708090572
2. American Heart Association. (2020). *Recommendations for a healthy diet to reduce LDL cholesterol*. Retrieved from www.heart.org
3. Chockalingam, A. (2008, June). World Hypertension Day and global awareness. *The Canadian Journal of Cardiology*, *24*(6), 441–444. https://doi.org/10.1016/S0828-282X(08)70617-2
4. Cramer, H., Lauche, R., Haller, H., & Dobos, G. (2014). A systematic review and meta-analysis of yoga for cardiovascular risk factors. *European Journal of Preventive Cardiology, 21*(4), 561–577. https://doi.org/10.1177/2047487314522185
5. Elliott, W. J. (2003, October). The economic impact of hypertension. *Journal of Clinical Hypertension, 5*(3 Suppl 2), 3–13. https://doi.org/10.1111/j.1524-6175.2003.02463.x
6. Gillespie, C., Kuklina, E. V., Briss, P. A., Blair, N. A., & Hong, Y. (2011). Vital signs: Prevalence, treatment, and control of hypertension, United States, 1999–2002 and 2005–2008. *Morbidity and Mortality Weekly Report, 60*(4), 103–108.
7. Khatri, A., & Bhatia, S. (2015). Yoga and dietary modifications for cardiovascular health. *Journal of Clinical Lipidology, 9*(4), 572–578. https://doi.org/10.1016/j.jacl.2015.06.004
8. Kris-Etherton, P. M., Harris, W. S., & Appel, L. J. (2005). Fish consumption, fish oil, omega-3 fatty acids, and cardiovascular disease. *Circulation, 112*(1), 30–38. https://doi.org/10.1161/CIRCULATIONAHA.104.510122
9. Sathyaprabha, T. N., Radhakrishnan, S., & Saritha, R. (2009). The effects of yoga on the lipid profile in individuals with coronary artery disease. *Indian Journal of Physiology and Pharmacology, 53*(3), 221–226.
10. Sharma, R., Pandey, R. M., & Bhopal, R. (2013). Effects of yoga and diet in reducing cardiovascular risk factors: A randomized controlled trial. *International Journal of Yoga, 6*(1), 47–53. https://doi.org/10.4103/0973-6131.105266