



COMPARISON OF LIPID PROFILE BETWEEN MIDDLE AGED YOGA PRACTITIONERS AND NON PRACTITIONERS

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Abstract:

The purpose of the study was to compare the "Lipid Profile between Middle Aged Yoga Practitioners and Non-practitioners. **Method:** The study was conducted on 60 (N=60) middle aged male people from the Rishikesh, Uttarakhand India, age ranging from 40 to 45 years. Out of 60, the 30 subjects were practicing different types of Yogic exercises like Asana and Shatkarmas and remaining 30 subjects were not practicing any types of yogic exercises. The necessary data on lipid profile (Total blood Cholesterol, Triglycerides, High Density Lipoprotein (HDL) and Low Density Lipoprotein (LDL)) were collected by administration of laboratory tests. The tests were administered after giving them instruction and taking consent from the subjects. Lipid profile test were taken place after 8 to 10 hours of fasting. It was hypothesized that there would be significant difference of lipid profile between Middle Aged Yoga Practitioners and Non-practitioners. The data collected on each lipid profile parameters (Total blood Cholesterol, Triglycerides, High Density Lipoprotein (HDL) and Low Density Lipoprotein (LDL)) was analyzed by independent "t" test. The level of significance for testing the hypothesis was set at 0.05. $P < 0.05$. **Findings:** The mean values and standard deviation of total blood Cholesterol of Yoga Practitioners and Non-practitioners were 181.43 ± 13.91 mg/dl and 271.06 ± 18.56 mg/dl respectively. The analysis of the data shows significant difference of total blood Cholesterol between Yoga Practitioners and Non-practitioners ($t_{cal} = 21.15 > t_{tab} = 2.009$). In case of Triglycerides, the mean and standard deviation of Triglycerides level of Yoga Practitioners and Non-practitioners were 141.30 ± 5.72 mg/dl and 299.63 ± 14.48 mg/dl respectively. The analysis of the data showed significant difference of Triglycerides level between Yoga Practitioners and Non-practitioners ($t_{cal} = 10.90 > t_{tab} = 2.009$). The mean and standard deviation of High Density Lipoprotein (HDL) level of Yoga Practitioners and Non-practitioners were 61.47 ± 2.29

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mg/dl and 34.97 ± 2.91 mg/dl respectively. The analysis of the data showed significant difference of High Density Lipoprotein level between Yoga Practitioners and Non-practitioners ($t_{cal}=39.25 > t_{tab}=2.009$). The mean and standard deviation of Low Density Lipoprotein (LDL) level of Yoga Practitioners and Non-practitioners were 116.20 ± 12.57 mg/dl and 161.23 ± 7.28 mg/dl respectively. The analysis of the data showed significant difference of Low Density Lipoprotein (LDL) between Yoga Practitioners and Non-practitioners ($t_{cal}=16.98 > t_{tab}=2.009$). The result showed that yoga Practitioners have better lipid profile as compare to non- Practitioners. Regular yoga practices decrease the risk of coronary heart diseases.

Keywords: yoga, lipid profile, blood cholesterol, triglycerides, high density lipoprotein, low density lipoprotein

1. Introduction

India is being called the diabetic capital of the world, with over 30 million diabetic individuals. Population-based studies showing the prevalence of type 2 diabetes in different parts of India have recently been reviewed (Ramachandran et al., 1988) and shows that the prevalence has risen five-fold from 2.1% in 1975 to 12.1% in 2000, According to diabetes atlas published by the International Diabetes Federation (IDF) and The World Health Organization (WHO) has predicted that by the year 2025, the maximum prevalence of diabetes would be in India and every 4th diabetic will be an Indian (Pan et al. 1997).

Mondal S., Kundu B., Saha S. (2014) were conducted to assess the effect of 12 weeks of yoga therapy on blood sugar and lipid profile in elder women. Methods: Twenty elderly (age range 50 to 70 years) women were recruited from two old age home and randomly divided into two groups (n=10) of yogic practice group and control group. Yogic practice group were subjected to regular yoga practice (Asanas, Kriyas, Pranayamas) for 12 weeks (3 sessions per week, 45 minutes per session), while the control group did not participated any regular activity. The dependent variables were fasting plasma glucose, post-prandial blood sugar, total cholesterol, triglycerides, low density lipoprotein, very low density lipoprotein and high density lipoprotein and were examined before and after 12 weeks of yogic intervention in both groups. Results: A significant ($p \leq 0.05$) decrease in fasting plasma glucose, post-prandial blood sugar, total cholesterol, triglycerides, low density lipoprotein and very low density lipoprotein; with a significant ($p \leq 0.05$) increase in high density lipoprotein level from its initial value; while showing insignificant result in control group. Conclusions: It may be concluded that adoption of yoga on long term basis would bring proper control of blood sugar and lipid profile levels in elderly women.

Snehalatha & Ramachandran (2009) said that India has more diabetics than any other country in the world, according to the International Diabetes Foundation.

According to recent estimates, approximately 51 million people was diabetes in 2010 and by 2030, 87 million people is expected to have diabetes in India.

Surendra, B. (2016) was conducted study 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.

Shantakumari, N., et al., (2013) were conducted study to assess the effectiveness of yoga in the management of dyslipidemia in patients of type 2 diabetes mellitus. This randomized parallel study was carried out in Medical College Trivandrum, Kerala, India. Hundred type 2 diabetics with dyslipidemia were randomized into control and yoga groups. The control group was prescribed oral hypoglycemic drugs. The yoga group practiced yoga daily for 1 h duration along with oral hypoglycemic drugs for 3 months. The lipid profiles of both the groups were compared at the start and at the end of 3 months. After intervention with yoga for a period of 3 months, the study group showed a decrease in total cholesterol, triglycerides and LDL, with an improvement in HDL. Yoga, being a lifestyle incorporating exercise and stress management training, targets the elevated lipid levels in patients with diabetes through integrated approaches.

Prasad K. V. V. et al., (2006) were conducted study on normal healthy volunteers, 41 men and 23 women, to evaluate the impact of Pranayama and Yoga asanas on blood lipid profiles and free fatty acids, in two stages. In stage-I, Pranayama was taught for 30 days and in stage-II, yogic practices were added to Pranayama for another 60 days. A Significant reduction was observed in triglycerides, free fatty acids and VLDL-cholesterol in men and free fatty acids alone were reduced in women at the end of stage-I. A significant elevation of HDL-cholesterol was seen only in the men at the end of stage-I. At the end of stage-II, free fatty acids increased in both men and women, and women demonstrated a significant fall in serum cholesterol, triglycerides, LDL-and VLDL-cholesterol. The results indicated that HDL-cholesterol was elevated in men with Pranayamam, while triglycerides and LDL-cholesterol decreased in women after yoga asanas. The results of the present study indicate that Pranayama and yoga asanas can

be helpful in patients with lipid metabolism disorders such as coronary artery disease, diabetes mellitus and dyslipidemia etc.

Gadham, J., et al. (2017) said that hypertension is a major chronic lifestyle disease and an important public health problem worldwide. Mind-body therapies i.e., the transcendental meditation and Yoga have raised interest as they represent an alternative to medication; also contribute to an increased feeling of empowerment for patients in preventing and treating hypertension. Yoga, as a therapeutic regimen, has been shown to be useful to individuals with cardiovascular diseases and diabetes. The objective of our study is to study the effect of Pranayama and certain Yogic Asana's on BP, BMI & lipid profile. 50 male subjects in the age group of 35-55 years were randomly selected based on exclusion criteria. BP, BMI and lipid profile was estimated before any intervention. They were subjected to pranayama and other Asana's for a period of 3 months. After 3 months of Yoga intervention, BP, BMI and lipid profile was estimated. They observed a statistically significant decrease in Systolic BP, Diastolic BP and BMI after 3 months of Yoga training. Also, we observed a decrease in total cholesterol, VLDL, triglycerides and an increase in HDL cholesterol which is not statistically significant. A significant decrease in systolic blood pressure and diastolic blood pressure in subjects who have practiced Yoga, Asanas along with pranayama technique for 3 months duration.

Yoga is an ancient traditional Indian spiritual, psychological and physical exercise practice that has been studied for several decades for its role in the management of numerous chronic heart diseases. It is a form of physical activity consisting of various postures (Asana) and breathing techniques (Pranayama). Yogic exercises have therapeutic benefits for people with a wide range of health conditions. Lipids are a group of fats and fat-like substances which are very valuable constituents of the cells in our body. They are very important source of energy. Cholesterol and triglycerides are the two important lipids. Cholesterol and triglycerides are transported and circulated into the blood through lipoprotein particles. Each lipoprotein particle is a combination of cholesterol, phospholipids, triglycerides and protein molecules. High-density lipoproteins (HDL) are considered as good cholesterol and low-density lipoproteins (LDL) is considered as bad cholesterol. High-density cholesterol carries cholesterol to the liver from various parts of your body. Liver functions by eliminating the cholesterol out of the body. HDL helps in moving the cholesterol away from your arteries. The increased amount of HDL helps in reducing the risk of coronary heart disease. LDL gets attached to the walls of arteries and clogs them. This leads to a condition called atherosclerosis. Total cholesterol is the sum of both HDL and LDL. With the help of total cholesterol and HDL the values, total cholesterol-to-HDL ratio can be derived with which coronary heart disease and stroke can be diagnosed.

A lipid profile is a blood test that measures the amount of cholesterol and fats called triglycerides in the blood. These measurements give the doctor a quick snapshot of what's going on in your blood. Cholesterol and triglycerides in the blood can clog arteries making you more likely to develop heart disease. Thus, these tests can help

predict your risk of heart disease and allow you to make early lifestyle changes that lower cholesterol and triglycerides.

2. Methods

2.1 Subjects

60 (N=60) middle aged male people, age ranging from 40 to 45 years were selected from the Rishikesh, Uttarakhand India. Out of 60, the 30 subjects were practicing different types of Yogic exercises like Asanaa, Pranayama and Shatkarmas and remaining 30 subjects were not practicing any types of yogic exercises. The people who were not practicing any types of yogic exercises considered as sedentary people because they were not also physically active.

2.2 Hypothesis

It was hypothesized that there would be significant difference of lipid profile between Middle Aged Yoga Practitioners and Non-practitioners.

2.3 Collection of data

The necessary data on lipid profile (Total blood Cholesterol, Triglycerides, High Density Lipoprotein (HDL) and Low Density Lipoprotein (LDL)) were collected by administration of laboratory tests. The tests were administered after giving them instruction and taking consent from the subjects. Lipid profile test were taken place after 8 to 10 hours of fasting.

2.4 Criterion Measures

The LDL, HDL, triglyceride and total cholesterol level were measured by the pathology expert of pathology lab by collection of the blood sample from the vein. The blood sample was collected after 8 to 10 hours of fasting.

Table 1: Lipid Profile Parameters

Sr. No	Biochemical parameters	Tests	Unit of Measurement
1.	Low Density Lipoprotein (LDL)	Laboratory test	Mg/dl
2.	High Density Lipoprotein (HDL)	Laboratory test	Mg/dl
3.	Triglycerides	Laboratory test	Mg/dl
4.	Total cholesterol	Laboratory test	Mg/dl

2.5 Statistical Analysis

In order to compare the Lipid Profile panel between Middle Aged Yoga Practitioners and Non-practitioners, the independent “t” test was used. The level of significance for testing the hypothesis was set at 0.05 level of significance ($p < 0.05$).

3. Findings

Findings pertaining to each of the variables of Middle Aged Yoga Practitioners and Non-practitioners which were subjected to the 't' ratio has been given in Table 2 to 5.

Table 2: Significant Difference of the Mean of Total Blood Cholesterol between Yoga Practitioners and Non-Practitioners

Total Blood Cholesterol		
	Yoga Practitioners	Non-practitioners
Mean	181.43	271.06
SEM	2.54	3.39
Stand. Dev.	13.91	18.56
n	30	30
t	21.15*	
degrees of freedom	58	
critical value	2.009	

Table 2 reveals that mean and standard deviation with regard to total blood cholesterol of Middle Aged Yoga Practitioners and Non-practitioners, which were recorded 181.43±13.91 mg/dl and 271.06±18.56 mg/dl respectively. The analysis of the data showed significant difference of total blood Cholesterol between Yoga Practitioners and Non-practitioners ($t_{cal}=21.15 > t_{tab}=2.009$). So the results showed that Yoga Practitioners have lower level of blood cholesterol as compare to Non-practitioners.

Table 3: Significant Difference of the Mean of Triglycerides between Yoga Practitioners and Non-Practitioners

Triglycerides		
	Yoga Practitioners	Non-practitioners
Mean	141.30	299.63
SEM	1.04	79.32
Stand. Dev.	5.72	14.48
n	30	30
t	10.90*	
degrees of freedom	58	
critical value	2.009	

Table 3 indicated that mean and standard deviation with regard to Triglycerides level of Middle Aged Yoga Practitioners and Non-practitioners, which were recorded 141.30±5.72 mg/dl and 299.63±14.48 mg/dl respectively. The analysis of the data showed significant difference of Triglyceride level between Yoga Practitioners and Non-practitioners ($t_{cal}=10.90 > t_{tab}=2.009$). So the results showed that Yoga Practitioners have lower level of Triglyceride level as compare to Non-practitioners.

Table 4: Significant Difference of the Mean of High Density Lipoprotein (HDL) between Yoga Practitioners and Non-Practitioners

High Density Lipoprotein (HDL)		
	Yoga Practitioners	Non-practitioners
Mean	61.47	34.97
SEM	0.42	0.53
Stand. Dev.	2.29	2.91
n	30	30
t	39.25*	
degrees of freedom	58	
critical value	2.009	

Table 4 also indicates that mean and standard deviation with regard to High density lipoprotein level of Middle Aged Yoga Practitioners and Non-practitioners, which were recorded 61.47±2.29 mg/dl and 34.97±2.91 mg/dl respectively. The analysis of the data showed significant difference of High density lipoprotein level between Yoga Practitioners and Non-practitioners ($t_{cal}=39.25 > t_{tab}=2.009$). So the results showed that Yoga Practitioners have high level of High density lipoprotein level as compare to Non-practitioners.

Table 5: Significant Difference of the Mean of Low Density Lipoprotein (LDL) between Yoga Practitioners and Non-Practitioners

Low Density Lipoprotein (LDL)		
	Yoga Practitioners	Non-practitioners
Mean	116.20	161.23
SEM	2.29	1.33
Stand. Dev.	12.57	7.28
n	30	30
t	16.98*	
degrees of freedom	58	
critical value	2.009	

Table 5 reveals that the mean and standard deviation with regard to Low density lipoprotein level of Middle Aged Yoga Practitioners and Non-practitioners, which were recorded 116.20±12.57 mg/dl and 161.23±7.28 mg/dl respectively. The analysis of the data showed significant difference of Low density lipoprotein level between Yoga Practitioners and Non-practitioners ($t_{cal}=16.98 > t_{tab}=2.009$). So the results showed that Yoga Practitioners have low level of low density lipoprotein level as compare to Non-practitioners.

4. Discussion

Broadly speaking, Yoga is an ancient mind-body discipline that originated in India. It is a combination of breathing exercises, various body postures, and meditation. Yoga has been used for centuries in India to treat a variety of medical conditions. There are many

types of yogic exercises ranging from meditative exercises to stretching. Presently yoga is regularly used as a form of meditation and low-impact exercise. Lot of research studies have shown that practicing yoga can have many health benefits such as treatment of insomnia, anxiety, high blood pressure, high blood sugar, and osteoarthritis etc. Recently some clinical studies have recommended that yoga can also help to reduce levels of total blood cholesterol, triglycerides and low density lipoprotein. Cholesterol is a lipid found in the bloodstream that is considered as harmful for the body. Cholesterol is also highly essential for normal functioning and maintenance of the body. Cholesterol is required to build membranes and membrane fluids. It is also known to play an important role in the synthesis of Vitamin D and hormones such as progesterone, estrogen and testosterone. Too much cholesterol in the blood can cause blockage of arteries and leads to heart related diseases. Some research studies indicate that total cholesterol levels were reduced by up to 30%. Levels of low-density lipoproteins (LDL) or "bad" cholesterol were lowered between 14% and 35%. In some studies, triglyceride levels were lowered by up to 11% and HDL levels were increased by up to 12%.

Yoga practitioners used to do daily yogic practices like Yogasana, Shatkarmas and Meditation. These yogic exercises cause a modest reduction of body fat and body weight. Losing weight can lower blood-fat levels so the weight loss leads to lowered cholesterol level, LDL levels and triglyceride levels as well. The people who were not practicing any types of yogic exercises considered as sedentary people because they were not also physically active. Lack of yogic exercises and physical activity causes increase of blood cholesterol, triglycerides level and low density lipoprotein and lowers the levels of high density lipoprotein. Pranayama like Kapakbhati prayanama and anulom vilom prayanama increases the metabolic rate and reduces weight. It also stimulates the abdominal organs and improves digestive tract functioning. The chakrasana, Ardha matsyendrasana, paschimotasana, sarvangasana, shalabhasana, etc massages the abdominal organs and helps treat constipation. It also improves the functioning of the liver and thus helps to reduce excess fat and cholesterol. Yoga can also play a major role in regulating and balancing HDL and LDL levels. Some research studies have also supported the findings. The study conducted by Gadham, J., et al. (2017), Mondal S, Kundu B, Saha S (2014), Surendra, B. (2016), Shantakumari, N., et al. (2013) and Prasad KVV, et al. (2006) has supported the findings of this research study.

4.1 Discussion of Hypothesis

In the light of findings of the study, the hypothesis that there would be significant difference of lipid profile between Middle Aged Yoga Practitioners and Non-practitioners diurnal was accepted.

5. Conclusions

Within the limitations of the study, it is concluded that:

- 1) The analysis of the data showed significant difference of total blood Cholesterol between Yoga Practitioners and Non-practitioners. So the results showed that Yoga Practitioners have lower level of blood cholesterol as compare to Non-practitioners.
- 2) The analysis of the data showed significant difference of Triglyceride level between Yoga Practitioners and Non-practitioners. So the results showed that Yoga Practitioners have lower level of Triglyceride level as compare to Non-practitioners.
- 3) The analysis of the data showed significant difference of High density lipoprotein level between Yoga Practitioners and Non-practitioners. So the results showed that Yoga Practitioners have high level of High density lipoprotein level (Good cholesterol) as compare to Non-practitioners.
- 4) The analysis of the data showed significant difference of Low density lipoprotein level between Yoga Practitioners and Non-practitioners. So the results showed that Yoga Practitioners have low level of low density lipoprotein level (Bad cholesterol) as compare to Non-practitioners.

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