

# Effect of sudarshankriya yoga on lipid profile

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## Abstract

**Introduction:** The word “yoga” itself is derived from the Sanskrit word meaning “union,” which is a philosophy that connects the body, breath, and mind to maintain energy balance. Yoga, an ancient Indian science, has been practiced as a healthy way of life. **Aims and Objectives:** To study Effect of Sudarshankriya Yoga on Lipid Profile **Methodology:** The present study was approved by the Institution Ethical Committee. This was a cross sectional comparative study carried from November 2012 to June 2014. This study was conducted to see the changes in cardio-respiratory parameters and lipid profile in SKY. The study was conducted on 100 normal healthy individuals in the age group of 25-40 yrs belonging to either sex. Subjects were selected from various centers in Latur (Maharashtra), where Sudarshankriya is taught. Centrifuge machine used was of REMI-8C company with serial no. EGLC-6600 Autoanalyser used was Model XL-300 of Erba Mannheim company used for the estimation of Lipid profile. Statistical analysis done by using paired t-test to determine the significance of different parameters by using SPSS package data software. Data was presented as mean $\pm$  standard deviation (SD). **Result:** Total Cholesterol after practicing SKY was significantly decreased than before practicing SKY. HDL cholesterol after practicing SKY was significantly increased than before practicing SKY. LDL Cholesterol after practicing SKY was significantly decreased than before practicing SKY. VLDL cholesterol after practicing SKY was significantly decreased than before practicing SKY. Triglycerides after practicing SKY was significantly decreased than before practicing SKY. **Conclusion:** From this study it is concluded that the Sudarshankriya Yoga improves Lipid Profile.

**Keywords:** Sudarshankriya Yoga(SKY), Lipid Profile.

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Received Date: 10/10/2015 Revised Date: 22/11/2015 Accepted Date: 08/12/2015

## Access this article online

Quick Response Code:



Website:  
[www.medpulse.in](http://www.medpulse.in)

DOI: 20 February  
2016

healthy mind.<sup>3</sup> According to world health organization (WHO) ‘good health’ is certainly more than just absence of disease. It reflects mental, physical, social and spiritual state of an individual and his or her general wellbeing<sup>4</sup> the ultimate aim of medical science is attainment of optimum physical and mental health for the individual. The ultimate aim of yogic practices is also the same, viz physical and mental wellbeing. The difference, however, lies in the methodologies and modalities to achieve those ends.<sup>5</sup> Many scientific studies in India and abroad have focused on beneficial effects of Yoga on central nervous system, hormonal balance, cardiovascular system and respiratory system.<sup>6</sup> There are several well-known effects of yoga practice, such as an enhanced sense of well-being, better physical endurance, favorable change in the body mass index and body composition, as well as definite changes suggestive of stress reduction.<sup>7</sup> The various styles of yoga that people use for health purposes typically combine physical postures, breathing techniques, and meditation or relaxation to achieve physical fitness and psychological wellbeing<sup>8</sup> in yoga, there is a definite emphasis on respiration and respiratory

## INTRODUCTION

The word “yoga” itself is derived from the Sanskrit word meaning “union,” which is a philosophy that connects the body, breath, and mind to maintain energy balance.<sup>1</sup> Yoga, an ancient Indian science, has been practiced as a healthy way of life. Recently, yoga has been adopted as an approach to health within alternative medicine. Relaxation exercises aim at reducing stress, and thereby help prevent these unwanted outcomes<sup>2</sup>. It’s a valuable gift of the Indian Vedic philosophy to the modern world. Yoga is way of life aiming to promote healthy body and

control. In ancient Indian texts on spirituality, the process of breathing is considered important for a spiritual aspirant to reach his or her ultimate goal.<sup>7</sup> One such technique, Sudarshan Kriya Yoga (su = proper, darshana = vision, kriya = purifying action) is a rhythmic breathing technique, based on ancient vedic tradition. It is introduced as a part of art of living workshop designed by H.H. Sri SriRavishankar.<sup>8</sup> Sudarshan Kriya Yoga has a sound scientific basis and is an ideal tool for improving the health. The practice of yoga has beneficial effect on biochemical and physiological functions.<sup>10</sup> Sudarshan Kriya Yoga is said to heal and purify from within and is a natural and noninvasive technique.<sup>11</sup> Respiratory diseases are on rise, leading to increased morbidity and mortality. It's due to change in life style, personal habits and environmental pollution.<sup>12</sup> Cardiovascular diseases are the leading cause of morbidity and mortality in developed and developing countries.<sup>13</sup> Autonomic imbalance with sympathetic over activity leads to hypertension, arrhythmias and metabolic dysfunction.<sup>14</sup> Autonomic nervous system consists of two limbs; sympathetic nervous system and parasympathetic nervous system. Although individual asan and pranayam practices can selectively affect sympathetic or parasympathetic nervous system, the overall effect of yoga practice is to bring a state of parasympathetic dominance.<sup>15</sup> Sudarshankriya is a unique rhythmical breathing process that normalizes sympathetic nervous system activity and increases parasympathetic system tone thereby affecting the cardio-respiratory parameters.<sup>16</sup> This study is conducted to see the effect of SudarshanKriya Yoga (SKY) on Lipid Profile.

## MATERIAL AND METHODS

The present study was approved by the Institution Ethical Committee. This was a cross sectional comparative study carried from November 2012 to June 2014. This study was conducted to see the changes in cardio-respiratory parameters and lipid profile in SKY. The study was conducted on 100 normal healthy individuals in the age group of 25-40 yrs belonging to either sex. Subjects were selected from various centers in Latur, (Maharashtra) where Sudarshankriya is taught. The informed written consent was taken from study group after explaining the procedure to them. Individuals interested in practicing SKY regularly were selected. The subjects were submitted to a standard questionnaire, examined clinically as outlined in the proforma before performing the procedure. Healthy subjects in the age group of 25-40 years belonging to either sex. No history of smoking, No history of alcohol intake, No past or present history of cardiorespiratory illness, Study group was trained in SKY. Included into study. Whereas Subjects suffering

from cardio-respiratory disease and not fitting into above mentioned age groups. With History of smoking, History of alcohol intake, History of active sports training, previous experience of yoga, History of major medical illness. Excluded from study. Centrifuge machine used was of REMI-8C company with serial no.EGLC-6600. Autoanalyser used was Model XL-300 of Erba Mannheim company used for the estimation of Lipid profile. The data collected during the present study from subjects before and after SKY were arranged in a tabular form and analyzed statistically by using categorical variables. These variables were compared by using paired t-test to determine the significance of different parameters by using SPSS package data software. Data was presented as mean $\pm$  standard deviation (SD).

## RESULT

**Table 1:** Showing mean values of total cholesterol before and after doing sudarshankriya yoga

	Mean (mg/dl)	SD	df	t value	P value	Significance
Before	172.18	4.22	99	57.11	<0.001	Significant
After	158.29	2.90				

Mean and standard deviation of Total Cholesterol before practicing SKY was  $172.18 \pm 4.22$  and the mean and standard deviation of Total Cholesterol after practicing SKY was  $158.29 \pm 2.90$ . By applying paired t test, we found that, Total Cholesterol after practicing SKY was significantly decreased than before practicing SKY.

**Table 2:** Showing mean values of hdl cholesterol before and after doing sudarshankriya yoga

	Mean (mg/dl)	SD	df	t value	P value	Significance
Before	47.99	2.42	99	-13.49	<0.001	Significant
After	56.08	6.23				

Mean and standard deviation of HDL cholesterol before practicing SKY was  $47.99 \pm 2.42$  and the mean and standard deviation of HDL cholesterol after practicing SKY was  $56.08 \pm 6.23$ . By applying paired t test, we found that, HDL cholesterol after practicing SKY was significantly increased than before practicing SKY.

**Table 3:** Showing mean values of LDL Cholesterol before and after doing SudarshanKriya Yoga

	Mean (mg/dl)	SD	df	t value	P value	Significance
Before	106.97	8.60	99	66.35	<0.001	Significant
After	91.99	7.93				

Mean and standard deviation of LDL Cholesterol before practicing SKY was  $106.97 \pm 8.60$  and the mean and standard deviation of LDL Cholesterol after practicing SKY was  $91.99 \pm 7.93$ . By applying paired t test, we found that, LDL Cholesterol after practicing SKY was significantly decreased than before practicing SKY.

**Table 4:** Showing mean values of VLDL cholesterol before and after doing SudarshanKriya Yoga

	Mean (mg/dl)	SD	df	t value	P value	Significance
Before	19.66	1.65	99	115.64	<0.001	Significant
After	16.97	1.55				

Mean and standard deviation of VLDL cholesterol before practicing SKY was  $19.66 \pm 1.65$  and the mean and standard deviation of VLDL cholesterol after practicing SKY was  $16.97 \pm 1.55$ . By applying paired t test, we found that, VLDL cholesterol after practicing SKY was significantly decreased than before practicing SKY.

**Table 5:** Showing mean values of Triglycerides before and after doing SudarshanKriya Yoga

	Mean (mg/dl)	SD	df	t value	P value	Significance
Before	98.34	8.26	99	115.64	<0.001	Significant
After	84.85	7.79				

Mean and standard deviation of Triglycerides before practicing SKY was  $98.34 \pm 8.26$  and the mean and standard deviation of Triglycerides after practicing SKY was  $84.85 \pm 7.79$ . By applying paired t test, we found that, Triglycerides after practicing SKY was significantly decreased than before practicing SKY.

## DISCUSSION

In the present study 100 normal healthy individuals in the age of 25-40 yrs were selected. They underwent the practice of SKY for 3 months. Cardio-respiratory parameters such as heart rate, systolic blood pressure, diastolic blood pressure, pulmonary function tests and lipid profile were measured before and after the practice of SKY. Comparative analyses were done for the effect of 3 months of SKY practice on these parameters. Table (1) compares total cholesterol before and after practicing SKY. It was found that mean of total cholesterol before practicing SKY was 172.1 and mean of total cholesterol after practicing SKY was 158.2 and there was statistically significant decrease in total cholesterol with p value <0.001. Table (2) Compares the HDL - cholesterol before and after practicing SKY. It was found that mean of HDL – cholesterol before practicing SKY was 47.99 and mean of HDL – cholesterol after practicing SKY was 56.08 and there was statistically significant increase in HDL – cholesterol with p value < 0.001. Table (3) Compares the LDL- cholesterol before and after practicing SKY. It was found that mean of LDL- cholesterol before practicing SKY was 106.9 and mean of LDL- cholesterol after practicing SKY was 91.9 and there was statistically significant decrease in LDL- cholesterol with p value < 0.001. Table (4) Compares the VLDL- cholesterol before and after practicing SKY. It was found that mean of VLDL- cholesterol before practicing SKY was 19.66 and

mean of VLDL- cholesterol after practicing SKY was 16.97 and there was statistically significant decrease in VLDL- cholesterol with p value < 0.001. Table (5) Compares the triglyceride before and after practicing SKY. It was found that mean of triglyceride before practicing SKY was 98.34 and mean of triglyceride after practicing SKY was 84.8 and there was statistically significant decrease in triglyceride with p value < 0.001. Our results are supported by similar finding of studies of Geeta H *et al*(2002)<sup>17</sup>, Anjum Sayyed *et al*. (2010)<sup>18</sup> and Mungal Shreechakradas U.*et. al.* (2013).<sup>19</sup> However similar finding were found in different types of Yoga practices by Udupa K.N. *et al*. (1972)<sup>20</sup> S.C. Manchandra *et.al.* (2000)<sup>21</sup> and RashmiVyas *et al* (2002)<sup>22</sup>. All these changes in lipid profile were due to the following reason:  
**Stress relaxation:** SudarshanKriya Yoga produces relaxation and decreases stress as proved by increased alpha activity in EEG in SKY practitioners.<sup>23</sup> SKY is a unique breathing process not practiced as a single technique but is integrated with asanas, pranayama, meditation and attitude training. Various kinds of Yoga practices such as pranayama, meditation and shavasana are also known to reduce the stress.<sup>24,25</sup> Stress causes increase in level of hormones like cortisol, adrenaline, noradrenaline, growth hormone. These hormones increase lipolytic activity leading to the increased levels of total cholesterol, triglyceride, LDL-cholesterol, VLDL-cholesterol and decreases HDL-cholesterol. These hormones mobilize lipid stores of adipose tissue and liver to meet extra caloric requirement during stress.<sup>26</sup> SKY reduces the stress therefore there is reduction in level of hormones like cortisol, adrenaline, noradrenaline, growth hormone. This causes decreased mobilization of lipid stores of adipose tissue and liver, thus causing reduction in the level of total cholesterol, triglyceride, LDL-cholesterol, VLDL-cholesterol and increases HDL-cholesterol. Decrease in sympathetic activity: Sympathetic stimulation releases norepinephrine which acts on fat cell via beta adrenergic receptors to increase lipolysis. Due to increased lipolysis there is increase in level of serum of total cholesterol, triglyceride, LDL-cholesterol, VLDL-cholesterol.<sup>27</sup> Yoga lifestyle result in decreased sympathetic activity and increased parasympathetic activity.<sup>28</sup> SKY is a unique rhythmical breathing process that normalizes sympathetic system activity and increases parasympathetic system tone. Therefore in Yogic Lifestyle decreased sympathetic activity may result in decreased lipolysis and thus decrease the level of total cholesterol, triglyceride, LDL-cholesterol, VLDL-cholesterol. Reduction in lipid peroxidation and increased lipoprotein and hepatic lipase: Increased lipid peroxidation increases total cholesterol, LDL – cholesterol, VLDL – cholesterol, TGS and

decreased HDL – cholesterol, concentration.<sup>29</sup> In SKY practitioners there is improved status of antioxidant e.g. SOD (Superoxide Dismutase) glutathione and decreased level of MDA (malondialdehyde).<sup>30</sup> All these changes decreases lipid peroxidation. Yogic breathing exercises decrease lipid peroxidation as evidenced by decreased level of MDA in plasma.<sup>31</sup> Thus decrease in lipid peroxidation in SKY supports decrease in serum total cholesterol TG, LDL – Cholesterol, VLDL – cholesterol and increase in HDL – cholesterol. The improvement in lipid profile parameters after yoga could be due to increased hepatic lipase and lipoprotein lipase at cellular level, which affects the metabolism of lipoproteins and thus increase uptake of triglycerides by adipose tissue.<sup>32</sup>

## CONCLUSION

From this study it is concluded that the Sudarshan Kriya Yoga improves Lipid Profile.

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Source of Support: None Declared

Conflict of Interest: None Declared