

Study of biochemical profile before and after Sudarshan Kriya Yoga (SKY) in type 2 diabetes mellitus patients

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Abstract

Background: The diabetes epidemic is rapidly increasing in many countries, with the documented increase most dramatic in low- and middle-income countries. A large proportion of diabetes cases are preventable. Simple modifications in lifestyle have been shown to be effective in preventing or delaying the onset of type 2 diabetes. **Objectives:** The present study was aimed to find out the effect of two months practice of SKY in maintaining lipid profile and blood sugar among type 2 diabetes mellitus patients. **Materials and Methods:** The present study was carried out at Kurnool medical college, Kurnool city, Andhra Pradesh. The 50 study subjects were selected from the medicine department op. **Results:** Significant decrease in FPG, total cholesterol, LDL, and a significant increase in HDL, and non significant changes in triglycerides and VLDL in Type 2 DM cases. **Conclusion:** SKY showed a significant statistical decrease in the values of lipid profile and plasma glucose levels among Type 2 DM patients compared with diabetic controls. So SKY appears to be a cost-effective, adjuvant therapy for controlling plasma glucose levels and improving lipid profile among Type 2 DM patients.

Key Words: Sudarshan Kriya Yoga (SKY), Pranayama, Omkar meditation, bhastrika.

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INTRODUCTION

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.¹ Yogic life style, yogic attitudes and various yogic practices help man to strengthen his body and mind. living a happy and healthy life on all planes is possible through the unified practice of sudarshan kriya yoga along with asana and

pranayama when performed consciously and with awareness². India, a country experiencing rapid socio economic progress and urbanization. Contributes a considerable share of the global diabetes burden. Studies of different parts of India have demonstrated escalating prevalence of diabetes not only in urban population but also in rural setup due to life style parameters. Stress has been known to play important role in diabetes by elevating blood glucose levels and increase the odds of developing certain complications such as CAD and stroke³. World Health Organization report, India has the highest number of people with diabetes in the world, with an estimated 32 million, which is set to increase to a staggering 80 million i.e., an increase of 160% by the year 2030. Ravi Shankar Guruji, the founder of the art of living foundation, designed a yogic package based on rhythmic breathing exercise called as Sudarshan Kriya Yoga (SKY). SKY is a technique which helps in relaxation and also improves uptake of oxygen by cells and in turn, regulates glucose metabolism in diabetic

patients⁴. Several studies have demonstrated the short and long-term usefulness of yoga in the treatment of type 2 DM patients. SKY may have therapeutic implication in the adjunctive (non-pharmacological) management of type 2 DM patients. So the present study was aimed to find out the effect of two months practice of SKY in maintaining lipid profile and fasting plasma glucose in type 2 DM patients.

MATERIALS AND METHODS

The present study was carried out at Kurnool medical college, Kurnool city, Andhra Pradesh. A total of 50 study subjects were selected for this study and divided into controls (25 subjects) and cases (25 subjects) from the medicine department of Kurnool Medical college and hospital. This study approved by institutional ethical committee and investigations were carried out in the biochemistry laboratory, Kurnool government general hospital. Study subjects underwent art of living basic course of 6 days [total 20-24 hrs] Duration, consisting of pranayama, Omkar meditation, bhastrika, and Sudarshan kriya by a trained teacher. Following the course, home practice consists of 3 stage pranayama, bhastrika, Omkar meditation followed by short Sudarshan Kriya consisting of three rounds of cycles. Each round consists of long, medium, short cycles. The whole home practice takes around 25-30 minutes. All the patients were on prescribed medications. Observations about clinical examinations, and biochemical profile done before undergoing the course. These patients practiced pranayama, bhastrika, Sudarshan Kriya at home for two months under the guidance of art of living teacher. The same parameters repeated after two months of practice.

Collection of Blood Sample: Blood samples (about 5ml) were collected after a 8-12 hour overnight fast under aseptic conditions, dispensed into clean, dry tubes and allowed to clot and care is taken to procure serum. Informed consent was taken from study subjects for tests performed, and the study approved by the institutional ethical committee. Investigations are carried out on the serum samples by standard kit methods, and analyses performed on ERBA RA-150 semi-auto analyzer, in the biochemistry laboratory, government general hospital, Kurnool.

Parameters Measured: In the present study following parameters were investigated:

1. Total Cholesterol
2. Triglycerides
3. HDL- Cholesterol
4. Fasting plasma glucose.

Serum total cholesterol was measured by CHOD – PAP method^{5,6,7,8,9}, Triglycerides were measured by GPO Trinder method^{6,7,8,9,10}, HDL- Cholesterol measured by

Phosphotungstic acid method^{6,7,8,9,11}, and the values of LDL and Very-low-density lipoprotein cholesterol (VLDL) can be calculated by using Friedewald's equation^{6,7,8,9,12} as follows;

- LDL – Cholesterol = total cholesterol – (HDL Cholesterol + triglycerides/ 5)
- VLDL-C = Triglycerides/5.

Plasma glucose was measured by GOD-POD method.

Exclusion Criteria: Cancer patients, Myocardial Infarction patients, Cerebrovascular accident patients, Epileptic patients, schizophrenia patients, pregnant women, Chronic Obstructive Pulmonary Disease (COPD) patients, and other primary illness patients, hypertensive patients excluded from this study.

Statistical Analysis: The collected data were analyzed by SPSS software version 14.0. All results presented as the mean ± standard deviation (SD). A p-value of <0.05 was considered significant.

RESULTS

In the present study, total 50 subjects divided into two groups, 25 controls and 25 cases (type 2 DM patients) with the age range of 30 – 60 years. Out of 25 controls 15 (60%) were males and 10 (40%) females, and in 25 type 2 DM patients, 13 (52%) were males and 12 (48%) females as shown in table 1.

Table 1: Gender-wise distribution of study subjects

Gender	Cases	Controls
Male	13(52%)	15(60%)
Female	12(48%)	10(40%)
Total	25(100%)	25(100%)

Table 2: Comparison of FPG levels at baseline and after 2 months in diabetic controls

Parameters	Mean ± SD		Paired t- test	P – value
	Before	After		
FPG	152.6± 9.202	149.8± 7.856	1.293	>0.05 [#]

NS[#] = Not Significant

The mean and S.D before and after SKY of FPG, are respectively, 152.6 ± 9.202, 149.8 ± 7.856 and P value is not significant (P >0.05).

Table 3: Comparison of lipid profile at baseline and after 2 months in diabetic controls

CONTROLS				
Parameters	MEAN ±SD		Paired t-test	P – value
	Before	After		
TC	187.9±9.561	185.8±10.51	1.739	>0.05 [#]
TG	187.4±10.57	189.1±11.02	1.122	>0.05 [#]
HDL-C	43.88±4.746	42.8±3.253	1.543	>0.05 [#]
VLDL-C	37.44±2.103	37.8±2.236	1.120	>0.05 [#]
LDL-C	106.6±12.62	105.2±11.42	0.8936	>0.05 [#]

NS[#] = Not Significant

The mean, S.D values, before and after SKY for TC are 187.9±9.561, 185.8±10.51, for TG 187.4±10.57, 189.1±11.02, for HDL-43.88±4.746, 42.8±3.253, for VLDL-C 37.44±2.103, 37.8±2.236, for LDL-C 106.6±12.62, 105.2±11.42, P value is not significant for five parameters (P >0.05).

Table 3: Comparison of the fasting plasma glucose levels before and after SKY in type 2 DM cases.

Parameters	Mean ± SD		Paired t- test	P – value
	Before	After		
FPG	156 ± 9.38	142.64 ± 10.04	19.97	<0.0001

S* = Significant

The mean and S.D values, before and after are 156 ± 9.38 and 142.64 ± 10.04, and P value is highly significant (P <0.0001).

Table 4: Comparison of lipid profile before and after SKY in diabetic cases

Parameters	CASES		Paired t-test	P – value
	Mean ±SD			
	Before	After		
TC	187.72 ±12.167	177.6±10.016	13.28	<0.0001*
TG	179.56±13.512	177.64±11.686	1.431	>0.05 [#]
HDL-C	43.36±4.517	47.28±3.593	11.03	<0.0001*
VLDL-C	36±2.708	35.48±2.293	1.669	>0.05 [#]
LDL-C	108.04±14.125	94.92±11.287	13.03	<0.0001*

S* = Significant, NS[#] = Not Significant

The mean, S.D values, before and after SKY for Total cholesterol are, 187.72 ±12.167, 177.6±10.016, and for HDL-C are 43.36±4.517, 47.28±3.593, and for LDL-C are 108.04±14.125, 94.92±11.287, and the P value is highly significant for three parameters (P <0.0001). The mean, S.D values, before and after SKY For Triglycerides 179.56±13.512, 177.64±11.686, and for VLDL-C 36±2.708, 35.48±2.293, and P value is not significant for two parameters (P >0.05).

DISCUSSION

Sudarshan Kriya yoga is a unique stress relieving technique contains cyclic breathing process along with bhastrika, pranayama, and Omkar meditation. SKY is an advanced form of cyclical breathing at a variant rate, slow, medium and fast¹³. The present study reveals that significant decrease in fasting plasma glucose after the practice of SKY for two months in type 2 diabetic patients. Similar findings were observed by Vedamurthachar A *et al.*³ and Vaishali *et al.*¹⁴. Geetha *et al.*¹⁶, sreechakradhar *et al.*¹⁷. The present study shows the significant decrease in total cholesterol, LDL, and a substantial increase in HDL, and non-significant changes in triglycerides and VLDL in type 2 DM patients. Results of our study found significant improvement in lipid Profile parameters after SKY. The growth in the lipid

profile parameters after yoga could be due to increased hepatic lipase and lipoprotein lipase at the cellular level, which affects the metabolism of lipoprotein and thus increase uptake of triglycerides by adipose tissues. Better ability to overcome stress can cite as a possible mechanism for improvement in lipid profile¹⁵. Thus our study reveals that SKY exerts its effect on various facets of blood pressure control and lipid profile. However, further extensive and long-term studies are needed to prove these findings and understand the underlying mechanism involved.

CONCLUSION

SKY showed a significant statistical decrease in the values of lipid profile and fasting plasma glucose levels among type 2 DM patients compared with diabetic controls. So SKY appears to be a cost-effective alternative technique for controlling FPG and improving lipid profile among type 2 DM patients.

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