

## Research Article

# Impact of sudarshan kriya yoga on mean arterial blood pressure and biochemical parameters in medical students

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## ABSTRACT

**Background:** Yogic life style and various yogic practices help man to strengthen his body and mind. Yogic breathing is defined as a manipulation of breath movement. The practice of yoga has beneficial effect on biochemical and physiological functions.

**Methods:** This study was planned to see the effect of sudarshan kriya yoga on blood pressure and biochemical parameters in medical students at medical college. The study conducted on 30 medical students of age 18-21 years, at LLRM Medical College, Meerut, U.P (India) over a period of three months.

**Results:** The result showed that yoga had beneficial effect on blood pressure, blood glucose level and cholesterol level. The mean blood pressure shows highly significant reduction after 3 months of yoga practice. It was also found that there is significant improvement in Lipid Profile parameters after sudarshan kriya yoga practices.

**Conclusions:** Living a happy and healthy life on all planes is possible through the unified practice of sudarshan kriya yoga (SKY) along with asana and pranayam. The practice of SKY seems to be beneficial on mean blood pressure and biochemical parameters in normal healthy individuals. This unique breathing practice is a potent energizer.

**Keywords:** SKY, Blood pressure, blood glucose, Cholesterol

## INTRODUCTION

Yoga, an ancient Indian science has been practiced as a healthy way of life. Yoga origins have been traced as far as 8000 years ago.<sup>1</sup> Over many centuries' different forms of yoga developed. Recently, yoga has been adopted as an approach to health within alternative medicine.<sup>2</sup> Modern man is the victim of stress and stress related disorders which threaten to disrupt life totally.<sup>3</sup>

Yogic life style, yogic attitudes and various yogic practices help man to strengthen his body and mind. Yogic breathing is defined as a manipulation of breath movement. One specific form of these breathing

exercises is sudarshan kriya yoga (SKY) which is shown to have favourable effects on the mind-body system. "Su" means proper, "darshan" means vision and "Kriya" is a purifying practice. SKY is unique breathing process which is said to heal and purify from within and is a natural and non invasive technique.<sup>4</sup>

SKY practice improves vagal activity and therefore decreases mean blood pressure. This is associated by improving vagal tone and by decreasing sympathetic discharge.<sup>5</sup> Improvement in both sympathetic and parasympathetic reactivity may be the mechanism that is associated in those practicing the slow breathing exercises.<sup>6</sup>

The practice of yoga has beneficial effect on biochemical and physiological functions.<sup>3</sup> Yoga had beneficial effect on body weight, blood pressure, blood glucose level and cholesterol level.<sup>7</sup> SKY has a sound scientific basis and is an ideal tool for improving the health. However to put yoga on a firm scientific pedestal and popularize it among the general public, we planned to undertake a study of the effect of SKY on Mean Blood pressure and biochemical parameters including total serum cholesterol and blood sugar.

## METHODS

The present study was conducted in the department of physiology at LLRM Medical College, Meerut, U.P (India) over a period of three months on 30 medical students of both sexes. The age range was 18-21 years. The students volunteered themselves after an orientation session in the campus. The protocol for this study was approved by the Institutional Ethical committee. The participants gave informed consent after the study design was fully explained.

**Inclusion criteria:** Students who are healthy, non smoker, without cardio-respiratory diseases and not performing any other exercise were included

**Exclusion criteria:** Students having history of allergy, any chest disease or deformity, bronchial asthma, cigarette smoking, hypertension and diabetes mellitus documented by history, clinical examination and chest X-ray were excluded in this study. Baseline vitals were measured before the beginning of sudarshan kriya yoga (SKY) practice. The students did not have any exams or any academic burden during baseline investigations. The mean blood pressure, total cholesterol and blood sugar were measured and recorded. All the parameters were recorded on 7<sup>th</sup>, 30<sup>th</sup> and 90<sup>th</sup> day of beginning of SKY. The data collected was subjected to standard statistical analysis.

## RESULTS

The mean blood pressure shows highly significant reduction after 3 months of yoga practice (Table 1). Our study found significant improvement in Lipid Profile parameters after SKY practices (Table 2). Result of this study also showed that yoga had beneficial effect on Blood glucose level (Table 3).

**Table 1: Change in mean arterial blood pressure (mmhg) in subjects (n=30) following SKY.**

	Mean±SD	Range	Confidence interval	p value with reference to basal
Basal	93.5±4.46	78 to100	91.82 to 85.15	
After 7 days	92.8±4.42	78 to 100	91.15 to 94.45	<0.002*
After 30 days	91.7±4.32	76 to 98.7	90.07 to 93.30	<0.001*
After 90 days	90.3±4.33	74 to 96.7	88.70 to 91.94	<0.001*

\* Highly Significant

**Table 2: Change in serum cholesterol (mg/dl) in subjects (n=30) following SKY.**

	Mean±SD	Range	Confidence interval	p value with reference to basal
Basal	188±24.4	150 to 238	178.6 to 196.8	
After 7 days	187±23.7	152 to 230	177.7 to 195.4	NS
After 30 days	182±21.3	146 to 230	174.2 to 190.2	<0.001 *
After 90 days	180±20.5	144 to 224	172.8 to 188.1	<0.001*

\*Highly significant

**Table 3: Change in blood sugar (mg/dl) in subjects (n=30) following SKY.**

	Mean±SD	Range	Confidence interval	p value with reference to basal
Basal	86.3±6.29	74.0 to 100.0	83.92 to 88.61	
After 7 days	85.36±5.53	76.0 to 98.0	83.27 to 87.40	<0.02#
After 30 days	82.7±6.46	70.0 to 94.0	80.32 to85.15	<0.001*
After 90 days	82.8±6.03	70.0 to 98.0	80.55 to 85.05	<0.001*

# Significant; \*Highly significant.

## DISCUSSION

By doing SKY practices body gets enough oxygen which can alleviate cellular metabolism. Sudarshan kriya is a

rhythmic breathing and relaxation technique helpful in improving cellular oxygen uptake and in turn glucose metabolism. Reductions in mean blood pressure indicate a shift in the balancing components of autonomic nervous system towards the parasympathetic activity which was

reported by Santha Joseph et al and Anand BK et al.<sup>8,9</sup> This modulation of autonomic nervous system activity might have been brought about through the conditioning effect of yoga on autonomic functions and mediated through the limbic system and higher areas of central nervous system were reported by Selvamurthy et al.<sup>10</sup>

The result showed that yoga had beneficial effect on blood pressure, blood glucose level and cholesterol level which has also been seen in the study by Yang et al.<sup>7</sup> The practice of yoga is associated with significant decrease in cholesterol among subjects with cardiovascular diseases, atherosclerosis, angina, hypertension and type 2 Diabetes at different duration of yoga.<sup>7,11</sup>

The improvement in the lipid profile parameters after yoga could be due to increased hepatic lipase and lipoprotein lipase at cellular level, which affects the metabolism of lipoprotein and thus increase uptake of triglycerides by adipose tissues as seen by Singh et al.<sup>12</sup> Better ability to overcome stress can be cited as possible mechanism for improvement in lipid profile.<sup>13</sup>

A Vedamurthachar et al found evidence that yoga can improve many physiological indicators of insulin resistance including glucose tolerance and insulin sensitivity.<sup>14</sup> Sudarshan kriya is a rhythmic breathing and relaxation technique helpful in improving cellular oxygen uptake and in turn glucose metabolism. Chandra et al also found fall in blood sugar after yoga training.<sup>15</sup>

## CONCLUSION

Living a happy and healthy life on all planes is possible through the unified practice of sudarshan kriya yoga (SKY) along with asana and pranayam. The practice of SKY seems to be beneficial on mean blood pressure and biochemical parameters in normal healthy individuals. The sudarshan kriya is therefore a purifying practice, whereby one receives a proper vision of one's true self. This unique breathing practice is a potent energizer.

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