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EFFECT OF SUDARSHAN KRIYA YOGA ON PHYSIOLOGICAL VARIABLES IN MEDICAL STUDENTS

***Nisar Ahmad¹, Raj Kumar Goel² and Lalita Chaudhary³**

¹*Department of Physiology, Hind Institute of Medical Sciences, Barabanki, U.P.*

²*Department of Pharmacology, Hind Institute of Medical Sciences, Barabanki, U.P.*

³*Department of Physiology, LLRM Medical College, Meerut, U.P.*

**Author for Correspondence*

ABSTRACT

In recent times, it has been found that yoga practices improve general health and fitness. Medical professionals are much attracted towards study on yoga these days. We have studied the effect of Sudarshan Kriya Yoga (SKY) practice on respiratory rate, heart rate and blood pressure in medical students. We measured physiological parameters before and after SKY practice. The present study was conducted on 30 medical students, who came voluntarily as subjects for the study. Their age ranged between 18 to 21 years. Respiratory rate, Heart rate and blood pressure (BP) were measured in supine position. B.P. was measured using mercury sphygmomanometer. Resting vitals were found to be decreased. From this study we conclude that yoga practice can be advocated to improve cardio-respiratory efficiency for healthy individuals.

Keywords: *Sudarshan Kriya Yoga (SKY), Physiological parameters, Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Mean Blood Pressure (MBP)*

INTRODUCTION

Relaxation exercises aim at reducing stress, and thereby help prevent unwanted outcomes. One of the widely used relaxation practices is yoga and yogic breathing exercises. Yoga origins have been traced as far as 8000 years ago (Feuerstein, 1998). Over many centuries' different forms of yoga developed. They have been used to restore and maintain health and to elevate self awareness and consciousness. Breathing is considered to be a regulator of the autonomic nervous system and consequently of mental processes as Swami Rama stated "controlling the breath and thus calming the nerves is a prerequisite to controlling the mind and the body" (Sandvik, 1993). 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. 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. Heart rate increases during inspiration and decreases during expiration, this is known as sinus arrhythmia. Recordings from cardiac autonomic nerves reveal that neural activity increase in sympathetic fibers during inspiration and increases in vagal fibers during expiration. Sinus arrhythmia is exaggerated when vagal tone is enhanced (Rowland, 2005). SKY practice improves vagal activity and therefore decreases baseline heart rate and blood pressure. This is associated by improving vagal tone and by decreasing sympathetic discharge (Janssen, 2010). Improvement in both sympathetic and parasympathetic reactivity may be the mechanism that is associated in those practicing the slow breathing exercises (Telles, 1993). This exercise helps the person to relax, eliminates waste gases from the body and increases stamina and endurance (Madanmohan, 2003).

MATERIALS AND METHODS

The present study 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

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this study was approved by the Institutional Ethical committee. The participants gave informed consent after the study design was fully explained.

Exclusion Criteria

Subjects 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 respiratory rate, heart rate, systolic blood pressure and diastolic blood pressure were measured and recorded. The mean blood pressure was calculated and recorded. All the parameters were recorded on 7th, 30th and 90th day of beginning of SKY. The data collected was subjected to standard statistical analysis

RESULTS AND DISCUSSION

Results

The results are summarized in Tables. Tables depict mean and standard deviation, range, confidence interval and p value of different parameters i.e .RR, HR, SBP, DBP and MBP. The parameters were recorded as baseline and after 7th, 30th, and 90th day of beginning of SKY.

Table 1: Change in Respiratory Rate (breath/min) in Subjects (n=30) following Sudarshan Kriya Yoga (SKY)

| | Mean ± SD | Range | Confidence Interval | p value with reference to basal |
|---------------|-------------|------------|---------------------|---------------------------------|
| Basal | 17.5±1.87 | 14.0 to 22 | 16.83 to 18.23 | |
| After 7 days | 16.8 ± 1.74 | 13.0 to 20 | 16.12 to 17.43 | <0.001** |
| After 30 days | 16.0 ± 1.53 | 13.0 to 19 | 15.53 to 16.57 | <0.001** |
| After 90 days | 14.3± 1.32 | 12.0 to 16 | 13.84 to 14.83 | <0.001** |

** Highly Significant

Table 2: Change in Heart rate (Beat/ Min) in Subjects (n=30) following Sudarshan Kriya Yoga (SKY)

| | Mean ± SD | Range | Confidence Interval | p value with reference to basal |
|---------------|------------|----------|---------------------|---------------------------------|
| Basal | 78.8±5.54 | 70 to 90 | 76.76 to 80.90 | |
| After 7 days | 78.1±4.72 | 70 to 86 | 76.37 to 79.90 | < 0.05* |
| After 30 days | 77.9 ±4.08 | 70 to 86 | 76.41 to 79.46 | NS |
| After 90 days | 75.3 ±4.68 | 70 to 86 | 73.59 to 77.08 | < 0.001** |

* Significant

** Highly Significant

Table 3: Change in Systolic Blood Pressure (mm Hg) in Subjects (n=30) Following Sudarshan Kriya Yoga (SKY)

| | Mean ± SD | Range | Confidence Interval | p value with reference to basal |
|---------------|------------|------------|---------------------|---------------------------------|
| Basal | 121 ± 6.10 | 106 to 130 | 118.6 to 123.4 | |
| After 7 days | 120 ± 5.82 | 106 to 128 | 117.7 to 122.0 | <0.001** |
| After 30 days | 118 ± 5.42 | 106 to 124 | 115.5 to 119.6 | <0.001** |
| After 90 days | 116± 5.49 | 100 to 122 | 113.6 to 117.7 | <0.001** |

** Highly Significant

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As shown in the Tables, after 7th day of beginning of SKY practices, the change in heart rate was significant (<0.05) but change in respiratory rate, systolic, diastolic and mean blood pressure was highly significant. The change in heart rate, respiratory rate, systolic, diastolic and mean blood pressure was highly significant after 30th and 90th day of starting the same as shown in table 1, 2, 3, 4 and 5. Scientific researchers have established that the physical parameters such as Respiratory rate, Heart Rate and Blood Pressure are influenced by Yoga practices.

Table 4: Change in Diastolic Blood Pressure (mm Hg) in Subjects (n=30) Following Sudarshan Kriya Yoga (SKY)

| | Mean ± SD | Range | Confidence Interval | p value with reference to basal |
|---------------|-------------|----------|---------------------|---------------------------------|
| Basal | 80.2 ± 4.47 | 64 to 86 | 78.53 to 81.87 | |
| After 7 days | 79.5 ± 4.54 | 64 to 86 | 77.84 to 81.23 | <0.005** |
| After 30 days | 78.3 ± 4.30 | 62 to 84 | 76.73 to 79.94 | <0.001** |
| After 90 days | 78.5 ± 3.60 | 64 to 84 | 77.19 to 79.88 | <0.005** |

** Highly Significant

Table 5: Change in Mean Blood Pressure (mm Hg) in Subjects (n=30) Following Sudarshan Kriya Yoga (SKY)

| | Mean ± SD | Range | Confidence Interval | p value with reference to basal |
|---------------|-------------|------------|---------------------|---------------------------------|
| Basal | 93.5 ± 4.46 | 78 to 100 | 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

Discussion

The study emphasizes the effect of sudarshan kriya yoga on physiological variables in medical students. Significant improvement in physiological variables observed after 90 days of yoga training, indicates a shift in the balancing components of autonomic nervous system towards the parasympathetic state. Joshi (1992) and Telles (1993) found significant reduction in respiratory rate, after short term yoga practices. The present study also showed statistically significant reduction in respiratory rate (Table 1). Khanam (1996), Udupa (2002) and Bharashankar (2003) observed statistically significant reduction in heart rate after short term Yoga training. The present study also showed statistically significant fall (Table 2) in heart rate (3 beats/min after 90 days). Bharshankar (2003) and Gandhi (2006) found statistically significant decrease in both SBP and DBP after Yoga training. Kalwale (2006) observed significant decrease in SBP after one month of pranayama training, but no change in DBP. There was a reduction observed in SBP, DBP and Mean Arterial Blood Pressure in our study (Table 3, 4 & 5). During SKY practices, the load on heart due to sympathetic arousal is also minimized resulting in an improvement in cardiovascular parameters. This should bring about a hypometabolic state (Young, 1998) resulting in decreased heart rate and blood pressure. Thus SKY practices by modifying sympathetic over activity result in a lowering of respiratory and cardiovascular variables. It relaxes the volunteers and thereby decreases arterial tone and peripheral resistance. This may be another reason for fall in blood pressure (Anand, 1991). The decreased blood pressure was associated with increased vagal tone and reduced sympathetic activity (Pal, 2004). A Sudarshan Kriya Yoga (SKY) technique causes a change in body physiology by altering various parameters that are governed by the autonomic nervous system. Sudarshan Kriya Yoga practice may be used to improve cardio-respiratory efficiency. We recommend that future studies include large group of patients. However the study may also be extended to patients.

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