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## Short term effect of Sudarsan Kriya Yoga on physiological and psychological Homeostatic among older women

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### Abstract

Yoga techniques specially 'Sudarsan Kriya' have historically been found to enhance well-being, mood, attention, mental focus, and stress tolerance and these factors were direct related to maintain human's homeostatic, physiological as well as psychological homeostatic. The purpose of the study is to find out the short time effect of 'Sudarsan Kriya' Yoga on physiological and psychological homeostatic among older women. Basically, the researcher selected Thirty (N=30) older women as the subjects for the study through a '15- day's 'Sudarsan Kriya' Yoga course, namely 'Art of Living' organised by a Dharamsala located at Maynaguri, Jalpaiguri District, West Bengal, India. The age group of the subjects was ranged from 56-68 years. To measure the homeostatic condition the researcher selected Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP) and Resting pulse rate (RPR) as physiological homeostatic variables and Mental Stress Level (MSL) as psychological homeostatic variables. To measure the Physiological Variables like SBP and DBP 'Digital Blood Pressure Monitor' (Omron's Automatic Blood Pressure Monitor, HEM-7130-L) was used. For RPR, the pulse rate were taken in the early morning just after the wakeup but till they were on bed. Put the middle and index finger to either on wrist or carotid artery in subject's neck. Counted how many beats occur in 30 seconds, and multiply that number by 2. This was the resting pulse of the subjects. On the other hand MSL was measured by 'Stress indicator questionnaire', developed by "The Counselling Team International". All data were collected two times initially and after 15 - days 'Sudarsan Kriya' Yoga course completed. The collecting data were calculated by using descriptive statistic and "t" test and level of significance was set at 0.05 levels. There were significant difference exist on SBP, DBP and MSL among older women as because Cal "t" value (2.62, 3.41 and 3.53) are higher than Tab "t" <sub>0.05(58)</sub> value (2.000), and there was no significant difference exist on RPR as because Cal "t" value (1.00) is lower than Tab "t" <sub>0.05(58)</sub> value (2.000). The initially and after treat mental mean and standard deviation have been found for SBP - 157.7±14.53 and 148.13±13.20, DBP - 91.17±5.01 and 86.80±4.81, RPR - 85.93±6.21 and 84.30±6.18, MSL - 131.76±20.86 and 114.70±15.50.

**Keywords:** Sudarsan Kriya Yoga, Systolic Blood Pressure (SBP), Diastolic Blood Pressure (DBP), Resting pulse rate (RPR), Mental Stress Level (MSL), Carotid artery.

### 1. Introduction

Yoga an ancient Indian science has been adopted as an approach to health within alternative medicine and designed to bring balance and health to the physical, mental, emotional, and spiritual dimensions of the individual. Yoga relaxation exercise aim at reducing stress, and thereby help prevent these unwanted outcomes. Yogic breathing pranayama are regularly recommended for relaxation<sup>[17]</sup>, stress management, control psycho physiological states, and to improve organ function. Yogic breathing, defined as a manipulation of breath movement, has been shown to positively affect immune function, autonomic nervous system imbalances, and psychological or stress-related disorders<sup>[21]</sup>. One specific form of this breathing exercise is sudarsan kriya yoga (SKY) which is shown to have favourable effects on the mind body system. SKY is a type of cyclical controlled breathing practice with roots in traditional yoga that provides relief for depression, and it is taught by the nonprofit Art of Living Foundation, designed by Sri Sri Ravi Shankar. It has four distinct components. Detailed descriptions of the four main SKY breathing techniques are as follows: Ujjayi or "Victorious Breath, During Bhastrika or "Bellows Breath, Om and Sudarshan Kriya.

Homeostasis can be defined as a property of an organism or system that helps to maintain its parameters within a normal range of values. It is a key to life, and failures in homeostasis can lead to diseases like hypertension. Homeostasis is a key concept in understanding how our

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body works. It means 'keeping things constant', and comes from two Greek words homeo, meaning 'similar' and stasis, meaning 'stable' [1].

Yoga postures specially Sudarsan Kriya Yoga (SKY) and breathing exercises largely stimulate homeostatic functions of the body through their regulatory activation of endocrine and autonomic nervous systems of the human body [2]. High blood pressure is a medical condition in which the pressure of the blood pushing against the blood vessel walls is persistently high. High blood pressure forces the heart to work harder to pump blood throughout the body. High blood pressure can lead to heart attacks, strokes, and other unhealthy cardiovascular events [3]. Traditionally treatment has been medication, diet, exercise, and no smoking or alcohol. The good news is that recent studies and reviews have shown there's a lot you can do to keep your blood pressure within a healthy range, including starting yoga practice.

People's heart rate differs depending on age, health and fitness. A normal resting heart rate is between 60 and 100 beats per minute, and for athletes it may 40 beats per minute. Practicing yoga every day can significantly reduce your heart rate in addition to help you lose weight, increase your respiratory function, increase muscle tone and improve blood circulation. The extent to which yoga can reduce heart rate and improve health depends on your age and fitness level [6, 7].

'Emotional and mental homeostasis', this principle of homeostasis is not just for the physical body but also applies to thoughts and emotions. Indeed, when we repress our emotions, thoughts and feelings, a tension build-up occurs sooner or later, and creates a kind of discomfort within that prompts the individual to release this internal pressure. When we do not allow our emotions to be lived freely and evacuated, they return to stay in our cells and more or less cause long term illness, whose sole purpose is to restore balance in the body. It is therefore essential to regularly release these emotions without repressing them. This way, the body does not need to cause disease to remove the toxins resulting from the suppression of emotions and feelings [8].

The Researcher thinks that after a short time Sudarsan Kriya Yoga practices the older women possesses a stable physiological and mantel homeostatic condition. That was the researcher's interest to find out the effect of Sudarsan Kriya Yoga on homeostatic condition among older women, for that reason the researcher took up this study. The result of the research work would be useful for future research in the field of physical education and sports.

## 2. Methodology

In order to find out the effect of 'Sudarsan Kriya' Yoga on Homeostatic condition among older women, the researcher selected Thirty (N=30) older women as the subjects for the study through a '15- day's 'Sudarsan Kriya' Yoga course, namely 'Art of Living' organised by a Dharamsala located at Maynaguri, Jalpaiguri District, West Bengal, India. The age group of the subjects was ranged from 56-68 years. To analyse the homeostatic condition the researcher selected the following variables:

### 2.1 Physiological Homeostatic Variables

- Systolic and Diastolic blood.
- Resting pulse rate.

### 2.2 Psychological Homeostatic Variables

- Mental stress.

To measure the Physiological Variables like Systolic and Diastolic blood pressure 'Digital Blood Pressure Monitor'

(Omron's Automatic Blood Pressure Monitor, HEM-7130-L) was used. For resting pulse rate, the pulse rate were taken in the early morning just after the wakeup but till they were on the bed. Put the middle and index finger to either on wrist or carotid artery in subject's neck. Count how many beats occur in 30 seconds, and multiply this number by 2. This was the resting pulse of the subjects.

On the other hand mental stress (Psychological Variables) was measured by 'Stress indicator questionnaire', developed by "The Counselling Team International". To calculate the stress level of an individual, a stress indicators questionnaire was used. The questionnaire was shows how stress affects different parts of life. To measure the stress level there was a table given by "The Counselling Team International". In the questionnaire there were five groups which indicate five different parts of a life. Every group there were few questions for assessing the stress level of that particular group. The researcher was firstly make understand the subjects about the meaning of the questions and was requested to give answer of each question carefully. Every answer had some mark which was calculated in last and shows the exact stress level of that particular person. The answers of all subjects were accordingly recorded by investigator. Scoring: For scoring, the total marks of each question were calculated and treated as the score of that particular group. Like that the marks of every group were calculated [25].

*The Norms as Stated by "The Counselling Team International"*

	Very Low	Medium	High	Very High	Danger
Physical Indicator	22	30	38	48	54+
Sleep Indicator	05	08	10	12	14+
Behavioral Indicator	18	27	36	45	50+
Emotional Indicator	21	29	37	46	55+
Personal Indicator	09	15	20	25	30+

All Physiological and Psychological Homeostatic variables were mesure two times initially and after 7 – days 'Sudarsan Kriya' Yoga course completed. To find out the effect of '15-day's 'Sudarsan Kriya' Yoga the collecting data were calculated by using descriptive statistic and "t" test and level of significance was set at 0.05 levels.

## 3. Analysis of Data

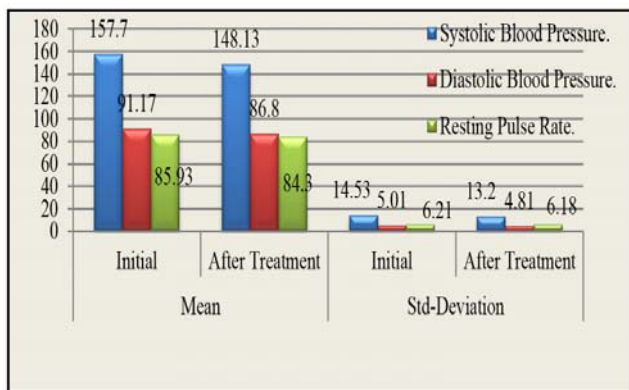
To find out the effect of short term 'Sudarsan Kriya' Yoga on Physiological and Psychological Homeostatic condition among older women, 'Blood pressure' (Systolic and Diastolic blood pressure), 'Resting Pulse Rate', and 'Stress Level' ("The Counselling Team International" questionnaire) were measure on the subjects respectively two times; initially and after short term 'Sudarsan Kriya' Yoga course completed;. For the analysis of the present study, data were collected both times on physiological and psychological variables and 'Descriptive Statistic' (Mean and Standard deviation) and "t" test were applied at 0.05 level of Significant and it is presented in the tables.

*The mean, standard deviation and t-Ratio of obtained data belonging to Physiological Homeostatic variables as measured by 'Systolic Blood Pressure', 'Diastolic Blood Pressure' and 'Resting Pulse Rate' of older women have been presented following table-1.*

**Table 1:** The mean, standard deviation and t-Ratio of Systolic & Diastolic Blood Pressure and Resting Pulse Rate among older women initially and after ‘Sudarsan Kriya’ Yoga course completed (15 days treatment).

Variables	Mean		Std-Deviation		t-Ratio
	Initial	After Treatment	Initial	After Treatment	
Systolic Blood Pressure.	157.7	148.13	14.53	13.20	2.62*
Diastolic Blood Pressure.	91.17	86.80	5.01	4.81	3.41*
Resting Pulse Rate.	85.93	84.30	6.21	6.18	1.0 Ns

Table value-  $t_{0.05(58)} = 2.000$ , \* = Significant, NS=Not- Significant.



**Fig 1:** Mean and Standard deviation of Systolic blood pressure, Diastolic blood pressure and Resting Pulse Rate among older women initially and after ‘Sudarsan Kriya’ Yoga course completed (15 days treatment).

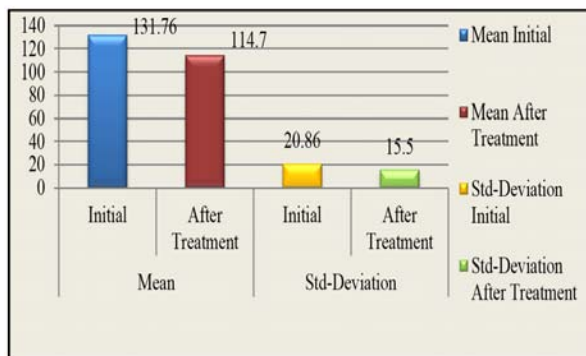
**3.1 Findings:** From this findings clearly revealed that, there were significant difference exist on Systolic Blood Pressure and Diastolic Blood Pressure among older women after 15-days ‘Sudarsan Kriya’ Yoga course completed, as because Cal “t” value (2.62 and 3.41) are higher than Tab “t” 0.05(58) value (2.000). But in case of ‘Resting Pulse Rate’ there was no significant difference exist as because Cal “t” value (1.00) is lower than Tab “t” 0.05(58) value (2.000). It is evident from Figure-1 shows that the mean and standard deviation among older women initially and after 15-days ‘Sudarsan Kriya’ Yoga course completed, on Systolic Blood Pressure, Diastolic Blood Pressure and Resting Pulse Rate has been found  $157.7 \pm 14.53$  and  $148.13 \pm 13.20$  (Systolic Blood Pressure),  $91.17 \pm 5.01$  and  $86.80 \pm 4.81$  (Diastolic Blood Pressure) and  $85.93 \pm 6.21$  and  $84.30 \pm 6.18$  (Resting Pulse Rate).

The mean, standard deviation and t-Ratio of obtained data belonging to Psychological Homeostatic variables as measured by ‘Stress Level’ of older women have been presented following table-2

**Table 2:** The mean, standard deviation and t-Ratio of ‘Stress Level’ among older women initially and after ‘Sudarsan Kriya’ Yoga course completed (15 days treatment).

Variables	Mean		Std-Deviation		t-Ratio
	Initial	After Treatment	Initial	After Treatment	
Stress Level	131.76	114.70	20.86	15.50	3.53*

Table value-  $t_{0.05(58)} = 2.000$ , \* = Significant, NS=Not- Significant.



**Fig 2:** Mean and Standard deviation of Stress Level (Psychological Homeostatic) among older women initially and after ‘Sudarsan Kriya’ Yoga course completed (15 days treatment).

**3.2 Findings:** From this findings clearly revealed that, there was a significant difference exist on ‘Stress Level’ among older women after 15-days ‘Sudarsan Kriya’ Yoga course completed, as because Cal “t” value (3.53) was higher than Tab “t” 0.05(58) value (2.000). It is evident from Figure-2 shows that the mean and standard deviation among older women initially and after 7-days ‘Sudarsan Kriya’ Yoga course completed, on ‘Stress Level’ has been found  $131.76 \pm 20.86$  and  $114.70 \pm 15.50$ .

**4. Results and Discussion**

Yoga is well known as the ancient lifestyle approach for healthy mind and healthy body. In this study for the case of Physiological Homeostatic, there were significant difference exist on both Systolic and Diastolic blood pressure and on the other hand no significant difference exist on Resting Pulse Rate among older women, and in comparison of mean and standard deviation of Systolic and Diastolic blood pressures, and Resting Pulse Rate, there were all ways show a decline after 15 – days ‘Sudarsan Kriya’ Yoga course. After analysed collected data researcher found that, there was also a significant difference exist on Psychological Homeostatic, means Mantel Stress Level among older women, and in comparison of mean and standard deviation of Stress Level there was also all ways show a decline.

A research has been done based on 70 studies, published between 1970 and 2004 on the effects of yoga on insulin resistance and cardiovascular disease. This study provide evidence that yoga can improve many physiological indicators of cardiovascular disease, lipid profiles, anthropometric characteristics, blood pressure, oxidative stress, coagulation profiles, sympathetic activation, and cardiovascular function. Sudarshan kriya yoga (SKY) includes meditation, pranayam, yogasanas, art of living knowledge points including living in the present moment and above all Sudarshan Kriya; a cycle of breaths. By SKY body gets a lot of oxygen which can alleviate cellular metabolism and help to maintain the physiological homeostatic.

Another study published on December, 2011 in ‘Research Journal of Chemical Sciences’, by Vedarthachar A., Anita R. Bijoor, Agte Vaishali, Swathi Reddy and Lakshmi B. The title of that study was ‘Short term effect of Sudarshan Kriya Yoga on lipid and hormone profile of type 2 diabetic patients’. This study provide evidence that short term effect of advanced SKY has indicated beneficial action on lipid profile and some stress hormones like cortisol and prolactin and further systematic studies using large sample and multiple locations are needed to confirm these results [11].

A research done by Vaishali V. Agte, Madhavi U. Jahagirdar and Kirtan V. Tarwadi, in 'Indian J Physiol Pharmacol' 2011, in titled 'The effects of sudarshan kriya yoga on some physiological and biochemical parameters in mild hypertensive patients', they have been found that, Sudarshan Kriya Yoga practice for two months as complementary therapy on 26 mild hypertensives and 26 apparently healthy adults (30–60 y), In the hypertensives, there was a significant decrease in diastolic blood pressure ( $P<0.01$ ), serum urea ( $P<0.01$ ) and plasma MDA (malondialdehyde adducts) as oxidative stress marker ( $P<0.05$ ). Other parameters; viz.; plasma levels of cholesterol, triglycerides, glucose, did not change significantly ( $P>0.1$ )<sup>[12]</sup>.

An another study done by Amy Paturel, yoga professor at California State University at San Bernardino, in titled 'Yoga in Your 50s, 60s. Yoga in Your 50s, 60s and 70s — and Beyond', in *AARP the Magazine*, October/November 2013, he has been said that "Yoga has a powerful effect on stress and hypertension and can help people reduce the amount of medication they need"<sup>[5]</sup>.

According to a study published in the *Journal of Clinical Hypertension*, persons who practiced yoga six hours a week for 11 weeks, they reduced their systolic blood pressure — the top number — by an impressive 33 points, compared with 4 points for a control group.

## 5. Conclusion and Recommendations

**5.1 Conclusion:** Within the limitation of the present study the following Conclusions were drawn on the basis of obtaining results. It was as because Yoga techniques have historically been found to enhance well-being, mood, attention, mental focus, and stress tolerance and these factors were direct related to maintain human's homeostatic, physiological as well as psychological homeostatic, that is why from the above result and related reviews the researcher can conclude that daily practice will maximize the benefits in both physiological and psychological homeostatic condition. Sudarshan kriya yoga (SKY) is a type of cyclical controlled breathing practice with roots in traditional yoga that provides relief for depression. As stress and depression has a positive relation with human physiological condition that means blood pressures level, resting pulse rate etc. That is why; the result had shown a decline characteristic of all physiological and psychological homeostatic variables among older women after short time 'Sudarsan Kriya' Yoga course completed.

**5.2 Recommendations:** On the basis of the findings of the present study, the following recommendations are made: a) Similar study may be conducted with male subjects or different age and level of participation with large populations. b) Further study can be taken up by using other measuring methods on above mentioning certain physical and physiological variables. c) Similar study may be conducted on psychological, anatomical and sociological parameters. d) Similar study may be conducted on larger subjects with same or other variables. e) The present study will helpful for farther research in the field of physical education and sports physiology.

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