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EFFECT OF SUDARSHAN KRIYA YOGA ON BLOOD PRESSURE IN PREHYPERTENSIVE POPULATION IN AGE GROUP 30 - 39 YEARS - AN EXPERIMENTAL STUDY

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ABSTRACT **Context:** Prehypertension, defined as a blood pressure of 120–139/80–89 mmHg, is a designation chosen to identify individuals at high risk of developing hypertension, so that both patient and clinician are alerted to this risk ; can work to intervene and prevent or delay development of the disease. Sudarshan Kriya Yoga (SKY) is a rhythmic breathing technique designed to enhance mental, physical, and spiritual well-being. This study aims to find effect of Sudarshan Kriya Yoga on Blood Pressure in prehypertensive population in age group 30-39 years in duration of 4 weeks. **Method and Material:** A pre and post experimental study design was employed with 46 participants divided into control and intervention groups. The intervention group practiced Sudarshan Kriya Yoga daily for 30 minutes. Control group received lifestyle modification advice. Blood pressure measurements were taken before and after the intervention period using a sphygmomanometer. Statistical analysis including paired t-tests within groups and unpaired t-tests between groups was performed to assess changes in systolic and diastolic blood pressure. **Results:** Both systolic and diastolic blood pressure showed significant reductions in the intervention group after the 4-week period of Sudarshan Kriya Yoga practice. The control group, receiving lifestyle modification advice, showed non-significant changes in diastolic blood pressure but significant changes in systolic blood pressure. Comparison between groups revealed significantly greater reductions in both systolic and diastolic blood pressure in the intervention group compared to the control group. **Conclusion:** Sudarshan Kriya Yoga demonstrated effectiveness in reducing blood pressure in individuals with prehypertension aged 30-39 years after 4 weeks of practice. These findings support the potential use of Sudarshan Kriya Yoga as a non-pharmacological intervention for blood pressure management in this population.

KEYWORDS : Prehypertension, Hypertension, Blood pressure, Sudarshan Kriya Yoga, Yoga

INTRODUCTION

The term Blood pressure refers to the force exerted by blood against the walls of arteries as it circulates through the body. Hypertension is characterized by persistently elevated blood pressure.[1] Hypertension is classified as [2]:

BP Classification	Systolic BP (mmHg)		Diastolic BP (mmHg)
Normal	<120	and	<80
Prehypertension	120-139	or	80-89
Stage I Hypertension	140-159	or	90-99
Stage II Hypertension	≥ 160	or	≥ 100

Prehypertension is a designation chosen to identify individuals at high risk of developing hypertension, so that both patient and clinician are alerted to this risk and can work to intervene and prevent or delay development of the disease.[2] Sudarshan Kriya Yoga (SKY) is a rhythmic breathing technique designed to enhance mental, physical, and spiritual well-being ; comprising of;

Ujjayi or "Victorious Breath": This involves slow breath techniques, typically 2–4 breaths per minute. It emphasizes increasing airway resistance during both inspiration and expiration, allowing for controlled airflow. Each phase of breath cycle is prolonged to a specific count, leading to a subjective experience of physical and mental calmness coupled with alertness.

1. **Bhastrika or "Bellows Breath"**: In this, air is rapidly inhaled and forcefully exhaled at rate of approximately 30 breaths per minute. It initially induces a state of excitation followed by a sense of calmness.
2. **Chanting "Om":** Participants chant the sound "Om" three times with a very prolonged expiration. This is believed to have spiritual significance, inducing a sense of peace and harmony.
3. **Sudarshan Kriya:** This is the advanced form of cyclic ,rhythmic breathing, incorporating slow, medium, and fast cycles.[5]

MATERIALS AND METHODOLOGY:

This is an experimental study conducted in yoga centres in Pune. The sample size was of 46 individuals. People in age group 30-39 years, having BP ranging between 120-139/80-89 mmHg were included while People having other cardiovascular complications (Myocardial Infarction, Ischemic Heart Disease, etc.);Pregnant females; Major illness (diabetes , kidney disorders);People doing lifestyle modifications (DASH diet, aerobic exercises, etc.);People taking medications for prehypertension were excluded. Based on inclusion and exclusion criteria, Samples were selected through purposive sampling. Blood pressure was checked with sphygmomanometer and documented. Participants were divided into two groups. Group A (Intervention Group) practiced Sudarshan kriya yoga while Group B (Control Group) was advised lifestyle modification. Blood pressure was checked again after 4 weeks.

Data Analysis:

Data was analyzed using graph pad. Paired t test was used to compare the difference between pre and post treatment values of blood pressure within the groups. Post treatment comparison between groups A and B was done using Unpaired t test. The *p*-value was kept as <0.05.

RESULTS:

The pre and post within group analysis using paired t test revealed a statistically significant difference among both the groups between pre and post systolic blood pressure ; statistically insignificant difference in control group between pre and post diastolic blood pressure ; statistically significant difference in intervention group between pre and post diastolic blood pressure.

Table 6: Post Systolic Blood Pressure comparison between Groups A and B

SBP	Control Grp		Intervention Grp		Mean	T	P	Signifi
PS	Mean	SD	Mean	SD	diff.	Value	Value	cant
Scale	131.57	5.930	125.52	5.751	6.05	3.508	0.0011	Yes

Table 7: Post Diastolic Blood Pressure comparison between Groups A and B

DBP	Control Grp		Intervention Grp		Mean	T	P	Signi
PS	Mean	SD	Mean	SD	diff.	Value	Value	ficant
Scale	83.043	3.183	82.000	1.809	1.565	2.065	0.0448	Yes

The post inter group analysis using unpaired t test revealed a significant difference in between both groups systolic and diastolic blood pressure. The mean value of post treatment Systolic and Diastolic Blood Pressure in Group A is greater than Group B indicating more improvement in Group A than Group B.

DISCUSSION:

The researches suggest that reduction in BP through SKY is achieved through:- Autonomic and Stress Response Systems: SKY strengthens, balances, and stabilizes both the autonomic nervous system (ANS) and the stress response systems. This involves enhancing parasympathetic tone while reducing sympathetic tone, thereby promoting overall balance in ANS activity.

Chemoreflex Sensitivity: SKY decreases sensitivity to chemoreflexes, which are involved in regulating blood pressure and respiratory responses to changes in blood chemistry.

Baroreflex Response : It improves baroreflex sensitivity, which helps in maintaining stable blood pressure by responding effectively to changes in blood pressure.

Vagal Stimulation: Through practices like Ujjayi breathing and chanting "om", SKY enhances vagal tone and promotes parasympathetic dominance. This shift contributes to relaxation and reduced sympathetic activation.

Cortical and Thalamic Effects: SKY balances cortical areas by synchronizing thalamic nuclei. This synchronization helps in quieting cortical areas associated with executive functions like anticipation and worry, promoting a state of mental calmness.

Limbic System Activation: SKY activates the limbic system, leading to stimulation of forebrain reward systems and emotional release. This activation supports feelings of well-being and relaxation.

Prolactin and Oxytocin Release: SKY increases the release of prolactin and oxytocin, hormones associated with feelings of calmness, social bonding, and emotional stability.

These physiological effects of SKY work synergistically to reduce BP, enhance relaxation responses, and improve overall mental and emotional well-being. The combination of breathing techniques, chanting, and cyclical breathing patterns in SKY provides a holistic approach to health that integrates both physiological and psychological benefits.

CONCLUSION:

In this study, pre intervention assessment and post intervention assessment showed significant reduction in systolic and diastolic blood pressure. The Sudarshan Kriya Yoga proved to be effective for reducing blood pressure after doing it for a period of 4 weeks However, further research is needed to fully understand the mechanisms underlying these effects and to determine the long-term benefits of Sudarshan Kriya Yoga for this condition.

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