



SRI SRI INSTITUTE FOR ADVANCED RESEARCH

Art of Living Research Wing

A White Paper Series on Sudarshan Kriya Yoga

A White Paper on Sudarshan Kriya Yoga and Hypertension

Introduction

Overview of Hypertension

Blood pressure is defined as the resistance or pressure offered by the blood flow on the arterial walls. Arteries are blood vessels that carry the blood from heart to different parts of the body. When the amount of blood pumped from the heart is high and the arterial walls are very narrow, the pressure exerted on the arterial walls tends to increase also known as hypertension. Hypertension, also known as high blood pressure (HBP), is a long-term medical condition prevalent in the world. According to WHO, an estimated 1.13 billion people worldwide have hypertension, most (two-thirds) living in low- and middle-income countries.

High blood pressure is classified into primary (essential) hypertension or secondary hypertension. About 90–95% of cases of hypertension are classified as primary, defined as arising due to nonspecific lifestyle and genetic disorders. The remaining 5–10% of cases are categorized as secondary high blood pressure, defined as high blood pressure arising due to an identifiable cause, such as chronic kidney disease or an endocrine disorder.

Hypertension can be classified as stage 1,2 or extensive crisis

Stage 1 hypertension (mild)- This is when the blood pressure consistently ranges from 130-139 mm Hg systolic and 80-89 mm Hg diastolic. This stage is treated as mild hypertension and can be corrected with lifestyle changes

Stage 2 hypertension- This is when systolic pressure is consistently 140 mm Hg or greater and diastolic pressure is 90 mm Hg or greater. This can be managed with lifestyle changes along with few medications

Stage 3 hypertension (Hypertension crisis)- This is when the blood pressure exceeds 180/120 mm Hg. This is a critical condition and requires medical attention immediately.

Measure and Diagnosis

For most adults, normal blood pressure at rest is within the range of 100–120 millimeters mercury (mmHg) systolic and 60–80 mmHg diastolic. Blood pressure is traditionally measured by a device known as a sphygmomanometer, with an arm cuff that measures the diastolic and systolic pressure using mercury. Blood pressure can also be measured through many digital monitor equipment.

Risk factors for Hypertension

Hypertension also known as silent killer is a chronic non communicable ailment having atypical signs and symptoms that often goes unnoticed. This physiological phenomenon is usually triggered by various lifestyle changes as enlisted below:

Stress- Stress is one of the major causes of hypertension. A surge in blood pressure is a normal response to stress. The body releases hormones like adrenaline as a part of stress-induced 'fight or flight' response. Adrenaline released during stress makes the heart beat faster, pumping more blood and blood pressure rises as a way of helping the body cope with the situation. However, under chronic or constant stress, cortisol hormone produces a similar physiological response, creating a long standing rise in blood pressure, known as hypertension.

Obesity- Obesity related to increased storage of adipose tissue (fat) in the body, slows down the cardiorenal and metabolic functions in the body, thus leading to a cascade of issues including hypertension.

Diet and Lifestyle-

Diet plays an important role in causing high blood pressure. Most packaged food contains sodium as a preservative and high amounts of sodium in the food, including salt, leads to excess water into the blood and electrolyte imbalance. This increase in volume of the blood

raises the pressure in arteries leading to high blood pressure. Constant intake of ultra processed foods can lead to increased sodium levels in the body also causing hypertension. Additionally, sedentary lifestyle and consumption of unhealthy fats can cause hardening of the arteries and plaques in the system thereby narrowing of the blood vessels. This narrowing can further lead to increase in blood pressure causing the vessels to burst or clot.

Complications due to Hypertension

Hypertension is one of the main risk factors for cardiovascular diseases leading to stroke and other diseases like ischemic heart disease. Increased pressure in the blood vessels can burst or clog the vessels in the brain causing a stroke. Further, the blocking of coronary heart vessels, major blood vessels supplying oxygen to the heart, due to plaque formation and increased blood pressure may lead to weakening of heart muscles causing ischemic heart disease. Long-term high blood pressure is a major risk factor for coronary artery disease, stroke, heart failure, atrial fibrillation, peripheral arterial disease, vision loss, chronic kidney disease, and dementia. High blood pressure can damage the heart, vital organs and arteries over time. This damage can increase the risk of developing heart and circulatory diseases.

Management and cure for Hypertension

One of the global targets for non-communicable diseases is to reduce the prevalence of hypertension by 25% by 2025. Lifestyle changes and medications can lower blood pressure and decrease the risk of health complications. Lifestyle changes such as weight loss, physical exercise, decreased salt intake, reducing alcohol intake, and a healthy diet can help in the management of hypertension. Mind body interventions like SKY can also play a role in management of hypertension. They relax the mind and body, reduce stress and thus play an important role in the management of hypertension as stress is one of the major contributors to hypertension

Sudarshan Kriya Yoga (SKY)

Sudarshan Kriya Yoga is a technique taught by the Art of Living Foundation in more than 180 countries with more than 6 million practitioners across the globe. It is taught in various modules across various age groups in different parts of the world.

SKY is a cyclic rhythmic breathing technique with its roots in traditional yoga. The 25 minutes process includes three yogic components – pranayama, Om chanting and Sudarshan Kriya. The pranayama is done using the Ujjayi breath. Ujjayi involves experiencing the conscious sensation of the breath touching the throat. This slow breathing technique is performed at a rate of 2–4 breaths per minute (bpm). This technique improves lung capacity, allowing more air to pass through the lungs. ‘Om’ is chanted three times with prolonged exhalation. Lastly, Sudarshan Kriya rhythmic breathing is done in two variations: long SKY, which is done under Gurudev Sri Sri Ravishankar’s recorded instruction, and short SKY, which can be done at home taking slow (20 bpm), medium (40–50 bpm), and fast (60–80 bpm) breaths. The entire technique is done in a seated posture with eyes closed.

Research studies on Sudarshan Kriya Yoga (SKY) and Metabolism

Modern man is the victim of stress and stress related disorders threaten to disrupt life. Hypertension, also known as the silent killer, is one of the most important public health problems worldwide. The following are the studies that measure the impact of SKY on Hypertension.

1. Sudarshan Kriya Yoga’s immediate benefits in treating mild hypertension

Agte et al.^[1] studied the effect of SKY on blood pressure. 26 mild hypertensives and 23 healthy adults, between the ages of 30–60 years, were included in the study to assess the merit of Sudarshan Kriya Yoga practice as a complementary therapy in addition to medication for hypertension. Study data was collected prior to, and after 2 months of SKY practice. The most compelling observation, common to the majority of the study parameters, was that higher values were lowered, normal values were unaltered and lower values were increased to normality. In those with high blood pressure, i.e hypertensives, there was a significant decrease (4.1% in women and 5.4% in men) in diastolic blood pressure, serum urea (15.5% in women and 19.14% in men) and plasma MDA (malondialdehyde adducts), which is a marker for

oxidative stress (22.38% in women and 18.8% in men). The study results demonstrated the positive impact of SKY on the health of hypertensives, as well as of normal controls, by normalizing the blood pressure, urea measurements, and keeping the oxidative stress (MDA) at a minimum.

Summary: In a study on 26 mild hypertensives and 23 healthy adults between 30–60 years of age, subjects were compared for their blood pressure before and after 2 months of SKY to evaluate the influence of Sudarshan Kriya Yoga practice as complementary therapy in addition to medication for hypertension. In the population suffering from hypertension, there was a significant decrease (4.1% in women and 5.4% in men) in diastolic blood pressure, serum urea (15.5% in women and 19.14% in men) and plasma MDA (malondialdehyde adducts), an oxidative stress marker, immediately after the practice of SKY. A normal blood pressure helps prevent cardiovascular complications, while normal serum urea levels indicate healthy renal function. By keeping oxidative stress at minimum, the risk of heart disease due to hypertension is lowered. By positively impacting all these parameters, SKY supports heart health for its practitioners.

2. Long term effects of SKY on metabolic markers in hypertensive patients

Narnolia et al.^[2] studied the effect of SKY on metabolic and cardiovascular parameters in patients with hypertension. 100 patients between the ages of 30-70 years, both men and women, suffering from hypertension were included in the study. All the patients were on prescribed antihypertensive medication, and were randomized into intervention and control groups of 50 patients each. Before starting the intervention, parameters like body mass index (BMI), systolic and diastolic blood pressure, pulse rate, lipid profile (TC, TG, HDL, LDL and VLDL) and anxiety scores were recorded for each patient. The same set of parameters were obtained after 3 months of SKY practice. A reduction in BMI by 7%, systolic blood pressure by 4.5% and diastolic blood pressure by 6.2%, anxiety scores by 90.3% and total cholesterol by 13.2% was observed in the study group after 3 months of SKY practice. No significant changes were seen in the markers for the control group who only took medication for hypertension. It is possible that SKY reduced the blood pressure through reducing anxiety. Anxiety scores were reduced by 90%, which highlights the anti-anxiety and relaxation effect of the SKY technique.

Summary: 100 patients suffering from hypertension were studied for improvement in blood pressure after 3 months of SKY practice. 50 patients took SKY intervention whereas 50 others acted as control. Reduction in systolic blood pressure by 4.5% and in diastolic by 6.2%, and 90.3% reduction in anxiety scores was noted in adult patients with hypertension after 3 months practice of SKY compared to the control group which did not show any change in outcomes measured over the course of 3 months. Most of the risk factors contributing to cardiovascular problems are minimized by SKY as demonstrated by this study. The study also highlights the long-term benefits of SKY on metabolic markers.

3. Reduction Of Blood Pressure In Hypertensive Clients

Uncontrolled hypertension exacerbates the danger of developing serious medical issues, including heart attack and stroke. Patel and Dhaya.^[3] studied the effectiveness of SKY in reducing blood pressure among hypertensive clients in selected rural health centers. 60 participants, older than 30 years of age (30 in the control group and 30 in the experimental group) were included in the study. The experimental group was similar in age, diet, BMI (Body Mass Index) and lifestyle to the control group. Blood pressure was recorded before and immediately after the SKY intervention. The experimental group showed a reduction of 15.3% in systolic pressure and 16.5% in diastolic pressure post SKY practice. There was no change in blood pressure in the control group.

Summary: A large percentage of the Indian population suffers from hypertension. This can be a risk factor for poor heart health and also cause sudden death. After SKY practice, a 15.3% reduction in systolic blood pressure and 16.5% reduction in diastolic blood pressure was noted among rural hypertensive subjects.

Summary of Research findings

1. Hypertension is one of the major metabolic disorders causing many fatal conditions such as stroke, ischemic heart disease, renal failure, eye complications etc. Due to its vast associated complications and atypical signs and symptoms, hypertension is known as a silent killer.

2. Major contributor to increased blood pressure, hypertension, is increased stress and dietary patterns. These two predisposing factors are a major reason for hypertension in adults today and can be countered by lifestyle corrections.

3. Many mind-body interventions including Sudarshan Kriya have been explored as an alternate remedy to reduce stress levels and stabilize the blood pressure among individuals.

4. In a study on 26 mild hypertensives and 23 healthy adults between 30–60 years of age, subjects were compared for their blood pressure before and after 2 months of SKY to evaluate the influence of Sudarshan Kriya Yoga practice as complementary therapy in addition to medication for hypertension. In the population suffering from hypertension, there was a significant decrease (4.1% in women and 5.4% in men) in diastolic blood pressure, serum urea (15.5% in women and 19.14% in men) and plasma MDA (malondialdehyde adducts), an oxidative stress marker, immediately after the practice of SKY. A normal blood pressure helps prevent cardiovascular complications, while normal serum urea levels indicate healthy renal function. By keeping oxidative stress at minimum, the risk of heart disease due to hypertension is lowered. By positively impacting all these parameters, SKY supports heart health for its practitioners.

5. 100 patients suffering from hypertension were studied for improvement in blood pressure after 3 months of SKY practice. 50 patients took SKY intervention whereas 50 others acted as control. Reduction in systolic blood pressure by 4.5% and in diastolic by 6.2%, and 90.3% reduction in anxiety scores was noted in adult patients with hypertension after 3 months practice of SKY compared to the control group which did not show any change in outcomes measured over the course of 3 months. Most of the risk factors contributing to cardiovascular problems are minimized by SKY as demonstrated by this study. The study also highlights the long-term benefits of SKY on metabolic markers.

6. A large percentage of the Indian population suffers from hypertension. This can be a risk factor for poor heart health and also cause sudden death. After SKY practice, a 15.3% reduction in systolic blood pressure and 16.5% reduction in diastolic blood pressure was noted among rural hypertensive subjects.

Conclusion

The body is governed by a variety of physiological processes that maintains equilibrium and well-being of the individual. Modern day lifestyle patterns with major stress levels have created disharmony in the physiological and metabolic processes. One of the major metabolic

disorders is that of hypertension caused due to a long standing spike in blood pressure. Many scientific studies have pointed out stress and sedentary lifestyle as a major predisposing factor for hypertension. Sudarshan Kriya Yoga reduces stress and anxiety levels in the body thereby lowering the blood pressure in individuals. This modulates the blood pressure thereby helping the individuals to cope up with various complications caused by hypertension such as stroke, cardiovascular disease and renal failures. SKY is an important lifestyle modifying technique that can be integrated in day-day life creating a happy and healthy individual.

About Sri Sri Institute for Advanced Research

Sri Sri Institute for Advanced Research (SSIAR) is the research wing of The Art of Living, founded under Ved Vignan Maha Vidya Peeth (VVMVP) Trust. SSIAR's mission is to apply the science of Global Ancient Knowledge Systems to the challenges of today. Its vision is to become an internationally renowned center of excellence for scientific enquiry into Global Ancient Knowledge Systems.

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