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ORIGINAL ARTICLE

Effect of Sudarshan Kriya yoga on prehypertension and stage 1 hypertension

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ABSTRACT:

Introduction: Yoga is a holistic practice that aims to bring together our mental, physical, and spiritual aspects in order to achieve a sense of unity and balance. SudarshanKriya (SDK) is an effective rhythmic breathing method that has an impact on the mental, bodily, and spiritual aspects. **Material and method:**Participants were enrolled by gaining their informed permission and willingness. There were 50 participants in the study, with 29 males and 21 females. These participants had prehypertension (systolic blood pressure between 119mmHg and 140mmHg, and diastolic blood pressure between 79mmHg and 90mmHg), as well as Stage I hypertension (systolic blood pressure between 139mmHg and 160mmHg, and diastolic blood pressure between 89mmHg and 100mmHg). The participants were between the ages of 30 and 50, and were not taking any antihypertensive medication. This could be because they were non-compliant, had adverse drug reactions, or were unwilling to take allopathic medicines.**Result:**There were no negative responses in any of the participants who were enrolled (n=50). Additionally, the weekly check-in Kriya sessions of extended duration did not have any negative consequences. Table II displays the average systolic blood pressure (SBP) of 138.95mmHg at the beginning, which decreased by approximately 8.58 mmHg after 6 weeks (averaging at 122.49 mmHg). The fall continued with another 7.730mmHg reduction after 12 weeks (averaging at 135.72mmHg).The average diastolic blood pressure (DBP) was 84.46 mmHg, indicating a decrease of approximately 5.1 mmHg after 6 weeks (average 83.25 mmHg) and a further decrease of 3.5 mmHg after 12 weeks (average 79 mmHg).The decrease at every point of follow-up is statistically extremely significant at all phases. A larger decrease has been found in both systolic blood pressure (SBP) and diastolic blood pressure (DBP) during the first 6 weeks compared to the following 6 weeks over the follow-up period.**Conclusion:**SudarshanKriya Yoga is generally safe and can be used effectively to treat prehypertension and Stage I hypertension, either alone or in combination with anti-hypertensive medicines, as determined by the treating physician. The use of SKY appears to have positive effects on average blood pressure and metabolic indicators in those who are in good health.

Keywords: SudarshanKriya Yoga, hypertension, Stage I hypertension, blood pressure

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INTRODUCTION

The term "yoga" and the English word "yoke" come from the Sanskrit root "yuj," which implies togetherness. Yoga is a practice that aims to achieve a balanced connection between our mental, physical, and spiritual aspects, as well as a sense of unity between our personal awareness and the collective awareness of the universe.[1] SudarshanKriya (SDK) is an effective rhythmic breathing method that has an impact on the mental, bodily, and spiritual aspects.[2] Sri SriRavishankar has created this unique yogic programme called SudarshanKriya Yoga (SKY). He is moreover the creator of the Art of Living charity. SKY is centred around a rhythmic breathing technique known as SudarshanKriya (SK), which incorporates Pranayam (breathing exercises) that include ujjayi breathing (breathing that involves the throat). In addition, it highlights the significance of prayers, asanas, meditation, a vegetarian satvic (pure) diet, and participatory conversations for attitude training based on 'Art of living knowledge points.[3]The United States is experiencing a notable issue of increasing stress levels. The average levels of stress rose to 5.1 in 2015, up from 4.9 in 2014 (American Psychological Association, 2016). The primary sources of stress for individuals in the United States are job pressure, financial concerns, health, and relationships (Statistic Brain, 2016). Moderate stress can serve as a motivator to live life, but excessive stress can lead to heightened muscle tension, elevated blood pressure, and increased heart rate.[4]Yoga comes from the Sanskrit term 'yuj' which signifies 'to connect'. Yoga is an age-old Indian practice that promotes overall well-being, including physical, mental, social, and spiritual aspects in harmony with the universe. In recent times, yoga has been embraced as a method for promoting health in the field of Complimentary and Alternative Medicine.[5]It has been traditionally used as an ancient Indian discipline for a healthy lifestyle.

The origins of yoga may be traced back around 8000 years.[6]This may reduce sympathetic activity, resulting in a drop in heart rate, respiration rate, blood pressure, and so on.[7]It is discovered to be efficient in enhancing well-being (boost immune system, cleanse body, decrease stress) and tranquilly of mind (decrease

stress, alleviate depression, enhance creativity, improve brain function).[8]In persons who are in good health, beneficial effects on lipid profile and pulmonary functioning have been shown after 8 days of exercising SKY.[9]Some of the advantages of regularly practicing SKY include decreased depression, anxiety, and PTSD (Post-traumatic stress disorder), as well as improved cardio-respiratory function, such as lower heart rate, lower blood pressure, and better cholesterol levels. Additionally, it can also enhance antioxidant status and immune system function (Descilo, et al., 2010; Narnolia, et al., 2014).[10]The overall occurrence of high blood pressure in India is 29.8% (26.733). The estimated percentage for Urban Eastern India is 34.5% (32.6-36.5).[11]Various types of yoga have evolved over the centuries. In recent times, individuals have embraced yoga as a method for promoting health in the realm of alternative medicine.[12]SKY guides you to a state of deep meditation when your body, mind, and breath synchronise, connecting you to the inner source of life. One of the few factors that contribute to a feeling of calm alertness is an increase in parasympathetic drive.[13]

MATERIAL AND METHOD

This is a study that was carried out in the Department ofPsychiatry . Individuals visiting the Cardiology department in our institute were selected based on referrals. Participants were enlisted by acquiring their informed consent and willingness. There were 50 participants in the study, consisting of 29 males and 21 females. These participants had prehypertension (systolic blood pressure between 119mmHg and 140mmHg, and diastolic blood pressure between 79mmHg and 90mmHg), as well as Stage I hypertension (systolic blood pressure between 139mmHg and 160mmHg, and diastolic blood pressure between 89mmHg and 100mmHg). The participants were between the ages of 30 and 50, and were not taking antihypertensive medication due to reasons such as non-compliance, adverse drug reactions, or a preference for alternative medicine. Subjects having additional conditions such as cancer, heart disease, arthritis, asthma, COPD, epilepsy, TB, any infectious disease, liver/kidney disease, pregnancy, or BP≥160/100 mmHg, were not included. Additionally, individuals living more than 20 km away from the Art of Living Centre were not registered. Before beginning the intervention, the resting blood pressure was measured using a manual sphygmomanometer. They were instructed in SKY at the Art of Living (AOL) Centre for a period of 5 days by trained teachers under our supervision. A different hand gesture was used for Bhastrika as recommended by the AOL teacher. After that, they were instructed in Short Kriya for daily practice at home and Long Kriya in the Centre every Sunday. In addition, they were recommended a satvic vegetarian diet, prayers, yogasanas, guided meditations, and an attitude based on Sri Sri's knowledge points. They were requested to keep a logbook documenting their daily practice details, experiences during Kriya, and any obstacles encountered. The blood pressure was monitored at the conclusion of each day during the 5-day period to assess for any negative effects. Subsequently, during the subsequent Long Kriya sessions at 6 weeks and 12 weeks, the resting blood pressure was measured before to the session in order to eliminate the possibility of any immediate effects from Long Kriya that could potentially cause neurohumoral alterations and affect blood pressure. Compliance was documented based on self-reporting, without any incentives for consistency or punishment for non-compliance. The subjects adhere to a minimum of 5 days each week. An analysis was conducted, which included a brief Kriya practice and a Long Kriya follow-up session at least every two weeks. The statistical analysis was conducted using SPSS software (version 21.0).

RESULT

Although 50 participants were enrolled in the study, only 25 were included in the analysis because we strictly followed the criteria for inclusion in the analysis (Table I). A higher proportion of girls experienced a decline in both the number and percentage of dropouts. The most frequent cause for dropout or non-compliance, as reported by the participants, was "work pressure," followed by "difficult/long procedure." The number of students leaving the programme is higher during the initial six weeks. None of the participants (n=50) experienced any negative responses. The weekly follow up Long Kriya sessions also did not have any negative impacts. Table II displays the average systolic blood pressure (SBP) at different time points. At the beginning (baseline), the mean SBP was 138.95mmHg. After 6 weeks, there was a decrease of approximately 8.58 mmHg, resulting in a mean SBP of 122.49 mmHg. The fall continued at 12 weeks, with an additional decrease of 7.730mmHg, resulting in a mean SBP of 135.72mmHg.The average diastolic blood pressure (DBP) was 84.46 mmHg, indicating a decrease of approximately 5.1 mmHg after 6 weeks (average 83.25 mmHg) and a further decrease of 3.5 mmHg after 12 weeks (average 79 mmHg).The decrease at every step of follow-up is statistically significant at all phases (Table III). A larger decrease has been noticed in both systolic blood pressure (SBP) and diastolic blood pressure (DBP) during the first 6 weeks compared to the following 6 weeks throughout the follow-up period.

Table 1: Number of participants based on compliance at follow up

Subjects	At Enrollment (n=50)	6 Weeks (n=35	DO/NC	12weeks(n=25)	DO/NC
Male	29	24	5	15	9
Female	21	11	10	10	1

DO=drop out, NC = non-compliant

Table 2: Descriptive statistics of study population (n=33)

	Baseline (Mean± SD)	6 weeks (Mean± SD)	12 weeks (Mean± SD)
SBP in (mmHg)	138.95± 8.58	122.49±7.730	135.72±9.230
DBP in (mmHg)	84.46±3.945	83.25±6.308	79±3.456

SBP= systolic blood pressure, DBP= diastolic blood pressure

DISCUSSION

The primary result of our research is a reduction in blood pressure (both systolic and diastolic) by the use of SKY in individuals with Stage I hypertension. This decrease in blood pressure was observed during a 12-week period of follow-up, without the use of any anti-hypertensive medication, in a population of middle-aged individuals. The average systolic blood pressure reduced from 138.95 mmHg to 122.49 mmHg after 6 weeks (P<0.001), and subsequently increased to 135.72 mmHg after 12 weeks (P<0.001). The average diastolic blood pressure declined from 84.46mmHg to 83.25mmHg over a period of 6 weeks, with a statistically significant difference (P<0.001). Subsequently, it further decreased to 79 mmHg after 12 weeks, also with a statistically significant difference (P<0.001). The drop is attributed to the daily practice of Sudarshankriya Yoga, as the individuals were not undergoing any other form of treatment. As the reduction continues during the follow-up period, individuals who regularly practise will experience gradual advantages. Our discovery aligns with the findings of Narnolia et al and Somawanshi et al.[9,10]Agte et al. have also observed a comparable decrease in DBP.[11]We have observed a notable decrease in SBP, which could be due to our commitment to following the correct procedures and ensuring compliance for inclusion in the analysis. Additionally, our follow-up duration was relatively longer. The positive benefits of SKY can be related to an increase in parasympathetic activity and a decrease in sympathetic activity.[9,10,12]There have been no instances of increased blood pressure or problems related to hypertension in any of the trial participants. No issues or negative outcomes have been seen during the initial training, practice at home, or follow-up sessions. During our investigation, we have followed rigorous adherence standards. However, the compliance was reported by the organisation itself. However, frequent practice was not rewarded, and we continued to monitor the blood pressure of the less regular subjects in order to motivate them to be honest about their practice. The number of individuals who dropped out or did not comply was higher during the initial phase, primarily because of their busy schedules or the lengthy and challenging procedure. However, over the subsequent follow-up period, the number decreased as people were more accepting of the SKY. Subjects reported that they were experiencing enjoyment at the later stage of the follow-up process. Additionally, we observed a gradual improvement in hypertension during the follow-up period.[13]

CONCLUSION

SudarshanKriya Yoga is generally safe and can be used effectively to treat prehypertension and Stage I hypertension, either alone or in combination with anti-hypertensive medicines, as determined by the treating physician. The use of SKY appears to have positive effects on average blood pressure and metabolic indicators in those who are in good health. Approximately 30 individuals participated in the practice of Sudarshankriya Yoga for a duration of 12 weeks. The study shown that the short-term software development kit (SDK) has a notable positive impact on the cardiorespiratory system while at rest. Sudarshankriya yoga demonstrated a statistically significant reduction in the values of all the mentioned measures after 3 months of practice. The analysis of variance indicates that the rise in SKY population in Hampton Roads has a highly substantial impact on reducing the percentage of CVD high risk population, associated expenses, and the general stress level in the region.

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