

Role of yoga intervention on quality of life and prehypertension

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In developing countries like India, hypertension poses a major problem. Rise in blood pressure for a prolonged period above the normal range is labeled as hypertension and this is usually preceded by prehypertension. Yogic exercises done on regular basis can have beneficial effects on hypertension. The aim of present study was to evaluate the effects of yogic exercises in controlling blood pressure in pre-hypertensive.

Security personnel were screened for hypertension and the subjects with pre-hypertension were selected for study. subjects with pre-hypertension were divided into control and intervention group by using simple random sampling method. Intervention group were trained for yoga and both the groups were followed up to check blood pressure every 3 months.

The study observed a decrease in weight and blood pressure of intervention group as compared to the control group but it was not statistically significant. The intervention group showed significant improvement in self rated quality of life compared to the control group.

Yogasanas and meditation seems to have an antihypertensive effect and a positive effect on self rated quality of life by intervention group as compared to the control group. This proves that simple yogasanas and meditation could be useful to improve the quality of life and control blood pressure in subjects with pre-hypertension.

Keywords: Antihypertensive, Blood pressure, Prehypertension, Quality of life, Security personnel, Yoga

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Hypertension is a major chronic lifestyle disease and an important public health problem worldwide. A recent report states that nearly one billion adults had hypertension in 2000, and it is predicted to rise to 1.56 billion by 2025¹. In recent decades, India is experiencing an epidemiological transition with respect to non-communicable diseases and hypertension has emerged as an important public health problem both in urban and rural India. According to WHO statistics 2014, the prevalence of hypertension in India is 23% (Male 23.1%, Female 22.6%). According to the reports on causes of deaths in India 2001-2003, from the Office of Register General of India, the prevalence of hypertension in urban population is 25% and 10% in rural population. It is estimated that by the year 2025, the prevalence of hypertension in urban India to be 29-45% in men and 25-38% in women. It is one of the major risk factors for cardiovascular mortality and accounts for 20-50% of all deaths. Hypertension is directly responsible for 42% of coronary heart disease deaths and 57% of all stroke deaths in India².

In developing countries hypertension is a major problem and it is more common in people of high socioeconomic status. High intake of salt, fast food, stress, less physical activity and beverages makes a person more prone to the development of hypertension³. Primary hypertension is usually preceded by prehypertension since it is a gradual process. A person with high normal blood pressure is termed as subjects with pre-hypertension. Sympathetic over activity can lead to the development of prehypertension, followed by hypertension stage 1 and 2. The systolic blood pressure (SBP) ranges between 120 and 139 mmHg and diastolic blood pressure (DBP) ranges between 80 and 89 mmHg in prehypertension. If blood pressure exceeds this range, then it is labeled as hypertension. Conversion of prehypertension into hypertension occurs if preventive measures are not applied timely⁴.

Stress has been found as a major culprit for the development of hypertension. Stress management can help in the control of high blood pressure. Techniques like yoga and meditation have been proved beneficial for stress management and therefore, can be

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beneficial in the prevention of developing hypertension from the pre-hypertensive state. These techniques can revert the blood pressure of a person from pre-hypertensive state to normo-tensive state.⁵⁻⁷

Yoga modulates autonomic activities by its action on hypothalamus, limbic system, adrenal gland and other organs of the body. There is an evidence in literature for the relationship between chronic stresses, alterations in hypothalamic-pituitary-adrenal axis activity and hypertension⁸⁻¹⁰.

Yoga is useful to patients of heart diseases and hypertension. It affects hypothalamus and brings about a decrease in the systolic and diastolic BP through its influence on vasomotor center, which leads to reduction in sympathetic tone & peripheral resistance. Yoga reduces anxiety, promotes well-being, and improves the quality of life. Medical science tries to achieve an optimum physical and mental health of the individual through preventive, curative interventions and health promotion. However, for a long time medical professionals have laid much emphasis on the curative aspect, only relatively recently the preventive aspect is also being emphasized. Yogic practice emphasize mainly on the health promotion aspect, although some yogic methods are prescribed for curative purposes as well¹¹.

Hypertension is one of the diseases of occupational origin. It is ranked fifth amongst the ten most important categories of occupational illness. Security people are more prone for stress and physical strain, life style disorders and irregular/unhealthy diet habits. The effect of yoga in modifying these factors may be beneficial to them. If this hypothesis is proved to be correct, the results may be generalised to the general population about the efficacy of yoga intervention on hypertension, subsequently reducing the sequelae of hypertension like cardiovascular and cerebrovascular accidents, and morbidity associated with hypertension.

India is a fast developing country; majority of working population may live in similar situations, like long working hours, increased work related stress, less time for relaxation. There should be some policy in all the Institutes to inculcate the culture of yoga every day for the wellbeing of their working staff.

AIM:

To evaluate the effectiveness of yoga intervention in improving the quality of life and control the raised blood pressure of security guards with prehypertension.

Objectives

To assess the prevalence of prehypertension and hypertension among security people.

To assess the changes in quality of life, blood pressure and body weight parameters after yoga intervention.

Materials and Methods

Security personnel of Manipal Academy of Higher Education, Manipal were screened for hypertension after obtaining permission from Institutional ethical committee. Screening for hypertension was done by well-trained nursing staffs. Participants with prehypertension (AHA criteria) were selected for the study. Subjects with pre-hypertension were divided into control and intervention group by using simple random sampling method. A standard questionnaire was given to the participants to put forth their views regarding exercise and life style and their quality of life. Yoga training was given for intervention group for 15 days, one hour per day. This yoga training included yoga asanas like Swastikasana, Vajrasana, Suptavajrasana, Tadasana, Trikonasana, Parshwa-konasana, Pawanamuktasana, Bhujangasana, Salabhasana, Dhanurasana, Padottanasana, Vakrasana, Shavasana (this was practiced after all asanas and all pranayamas). Pranayamas like Anuloma-Viloma, Suryabhedana, Chandrabhedana, Bhramari and meditation. They were monitored to do yoga 45 minutes daily, 6 days a week except on their duty off days.

The progress was monitored 3rd and 6th month by blood pressure and weight monitoring and quality of life questionnaire in both the intervention and control groups.

Measurement of blood pressure: Blood pressure was measured using a mercury sphygmomanometer. While screening patients for hypertension, multiple measurements were taken on three separate occasions one week apart. Auscultation method using accurately validated mercury sphygmomanometer with cuff length $\geq 80\%$, width $\geq 40\%$ of mid upper arm circumference. A quiet appropriate environment was chosen. Patient is seated, legs not crossed and relaxed for several minutes before measurement. Patient should refrain from caffeine and smoking at least 2 hours before measurement. Selected arm should be free of constricted clothing. Wrap cuff snugly around upper arm with center of cuff bladder positioned over the brachial artery and the lower

border of cuff approximately 2 cm above elbow bend. Place cuff at heart level by supporting arm. Palpate radial pulse while inflating the cuff and note the pressure at which it ceases to be palpable. Inflate the cuff a further 30 mm mercury above this pressure. Deflate cuff at the rate of 2-3 mm mercury per beat or less and note the pressure at which radial pulse appears. Fully deflate the cuff. Wait approximately 30 seconds and then inflate the cuff to at least 30 mm mercury above that at which the radial pulse reappeared. While deflating auscultate over the brachial artery in the antecubital fossa. Record Systolic and Diastolic Blood Pressure to the nearest 2 mm mercury. For the systolic reading record the level at which 2 consecutive beats are heard (phase I Korotkoff), even if they then disappeared transiently with progressive deflation (known as the auscultatory gap). For the diastolic reading use disappearance of sound (phase V Korotkoff). Use muffling of sound (phase IV Korotkoff) only where the sound continues to 0 mm mercury. Wait 30 seconds before repeating on the same arm.

Type of Study: Quasi experimental study

Study period: 6 months

Statistical methods: Repeated measures ANOVA, Pre intervention, after 3 months and 6 months

Results

Out of 102 participants 51 were in intervention group and 51 were in control group. A repeated measures ANOVA with a Greenhouse-Geisser correction determined that mean weight differed between the different time points ($F=15.861$, $p<0.001$) which is statistically significant. Posthoc test with Bonferroni correction revealed that yoga training will reduce the body weight for about .596kg which is statistically significant for the 3rd time point.

As compared to control group, in the Intervention group the decrease in body weight of around 2 kg was observed. The decrease in body weight between intervention and control group is not statistically significant as shown in Table 1.

A repeated measures ANOVA with a Greenhouse-Geisser correction determined that mean SBP did not show statistically significance between the different time points. There is no significant difference between the mean SBP for the three time points and the group. as shown in Table 2.

It is observed that the DBP is not statistically significant in the 3 time points. But Interaction of time point and the group is observed as significant. It is observed that DBP is increasing at each time point for control group but for Intervention group it's decreasing as shown in Table 3.

It is observed that the QOL is not statistically significant in the 2 time points. But Interaction of time point and the group is observed as significant. QOL value is observed to be increasing in the Intervention group but it is decreasing for control group as shown in Table 4.

Discussion

Hypertension is a multifactorial disease in which arterial pressure is persistently high without an identifiable cause. The pathogenesis of hypertension is

Table 1 — Effect of Yoga on Body Weight

	Group	Mean	Std. Deviation
WT1	Control	67.08	8.586
	Intervention	66.38	8.981
WT2	Control	67.52	8.460
	Intervention	65.53	8.930
WT3	Control	67.84	8.112
	Intervention	64.42	8.703

WT1- Base line weight before yoga training. WT2- After 3 months of yoga practice. WT 3 –After 6 months of yoga practice

Table 2 — Effect of Yoga on Systolic Blood Pressure

	Group	Mean	Std. Deviation
SBP1	Control	133.45	4.762
	Intervention	134.00	4.961
SBP2	Control	133.74	7.763
	Intervention	130.45	6.085
SBP3	Control	134.48	6.635
	Intervention	127.75	6.582

SBP1- Base line systolic blood pressure before yoga training. SBP2- after 3 months of yoga practice. SBP3 –After 6 months of yoga practice

Table 3 — Effect of Yoga on Diastolic Blood Pressure

	Group	Mean	Std. Deviation
DBP1	Control	86.03	5.037
	Intervention	85.95	2.541
DBP2	Control	88.13	5.747
	Intervention	83.10	3.622
DBP3	Control	88.97	5.270
	Intervention	82.05	3.434

DBP1- Base line systolic blood pressure before yoga training. DBP2- after 3 months of yoga practice. DBP3 –After 6 months of yoga practice

Table 4 — Effect of Yoga on Quality of Life

	Group	Mean	Std. Deviation
QOL1	Control	88.02	10.319
	Intervention	91.93	12.799
QOL2	Control	87.39	10.350
	Intervention	92.98	12.120

QOL1- Quality of life before yoga training. QOL2- Quality of life 6 months after yoga training

not fully understood. The possible mechanism is believed to be a sympathetic nervous system over activity and consequent increase in peripheral vascular resistance. Hypertrophy of systemic arterioles may represent an adaptive response to chronically elevated blood pressure and may perpetuate systemic hypertension.

In our present study, we observed a decrease in SBP and DBP. A decrease in SBP and DBP was also reported in mild to moderate hypertensive patients by other authors (Murugesan et al, Patel et al)^{12,13}. In their studies, patients were not given antihypertensive drugs and reduction in BP was found after long time of yogic practices. In a study by Sharma et al and Patel et al, patients were given antihypertensive drugs along with yoga and they showed decrease in BP even after shorter period of yoga practices^{14, 15}. Other studies (Laxmikanthan et al, Vijayalakshmi et al) also reported reduction in BP after yogic practices^{16, 17}.

The present study showed that the practice of asana, meditation, and pranayama for shorter duration is effective in reducing BP in subjects with pre-hypertension patients. The duration of 6 months was sufficient to detect significant desirable physiological effects.

Bera & Rajapurkar (1993) have reported that yoga and meditation results in significant improvement in cardiovascular endurance¹⁸.

Marshall Hagins et al study reported that the within-group analyses, the 24 h diastolic, night diastolic, and mean arterial pressure were all significantly reduced in the yoga group (3.93, 4.7, 4.23 mm Hg, respectively), but in the active control group no significant within-group changes were observed¹⁹.

Vernon A Barnes et al, reported that the differences between groups at baseline did not reach statistical significance. 24-hr systolic BP decreased from 118.8±9.7 to 114.9±8.6 mmHg in the yoga group compared to an increase (115.9±6.2 to 119.4±7.5 mm Hg) in the control group across the 6-month study

($p < .05$). 24-hr diastolic BP decreased in the yoga group from 66.1±6.1 to 64.1±6.5 mm Hg while the controls increased from 65.0±4.2 to 66.0±7.5 mm Hg across the 6-month study ($p < .07$)²⁰.

In our present study the mean systolic BP was 134±4.961, 130.45±6.085 and 127.75±6.582 mm Hg at 0, 3 and 6 months respectively. The mean diastolic BP was 85.95±2.541, 83.10±3.622 and 82.05±3.434 mm Hg at 0, 3 and 6 months respectively. Both the readings decreased over a period of time as compared to the control group. The mean weight was 66.38±8.981, 65.53±8.930 and 64.42±8.703 kg respectively at 0, 3 and 6 months respectively and the readings decreased over a period of time as compared to the control group. The intervention group showed significant improvement in self rated quality of life compared to the control group.

Limitations

The study do not have any mechanism to standardize or quantify the actual magnitude of intervention per individual. Confounding factors like, the participants' food habits, smoking and drinking habits, regular exercises were not considered.

Conclusions

Hypertension is widely prevalent throughout world and is an important risk factor for stroke, coronary heart disease, heart and renal failure. However blood pressure is not well controlled in large number of individuals especially in developing countries. Yoga appears to be a cost effective alternative for controlling blood pressure. Yoga and meditation improves the cardiovascular functions and normalizes the high normal blood pressure of subjects with pre-hypertension. Hence, it can be a useful tool to keep the person healthy throughout the life if it is practiced regularly. This study aims to benefit the pre-hypertensive security personnel to improve their quality of life by adapting healthy life style practices. As these security personnel are an integral and inseparable part of the community, their good health is of utmost concern. Our study therefore is an attempt to improve the same.

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