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ABSTRACT

The aim of the study was to assess the effects of 6-week selected yogic exercises training on blood pressure. 20 purposively selected male blood pressure patients from Amritsar (Punjab, India), aged 30– 50 years, volunteered to participate in this study. Subjects were assigned into two groups: A (experimental: N-10) and B (control: N-10). The subjects from Group A were subjected to a 6-week yogic exercises training programmed which included 5 Asnana and 3 Pranayama. This lasted 8 weeks and consisted of daily sessions, lasting 45 min. Both systolic and diastolic blood pressures were measured with the auscultatory method by using sphygmomanometer and stethoscope. Student's t testwas used to assess the between-group differences for dependent data to assess the Post and Pre differences. The level of $p \leq 0.05$ was considered significant. The systolic and diastolic blood pressures significantly reduced in Group A experimental when compared with the control one. The yogic exercises training may be recommended to control blood pressure and may contribute to enhance health status and wellness.

INTRODUCTION

Yoga is the oldest system of personal development encompassing body, mind, and spirit. The word yoga is derived from the Sanskrit root Yuj, which means to join or to yoke. In philosophical terms, yoga refers to the union of the individual self with the universal self (Hadi, 2007). The word "yoga" has come to describe a means of uniting or a method of discipline: to join the body to the mind and together join to the self (soul), or the union between the individual self and the transcendental self.

Ayurvedic text describes 8 components or arms of Yoga that encompass a philosophy of life:

(a) Yama (self-restraint)
(b) Niyama (routines)
(c) Asana (postures and physical exercises)
(d) Pranayama (use of breathing to achieve focus)
(e) Pratyhara (withdrawal of mind from sense organs)
(f) Dharana (concentration)
(g) Dhyana (meditation) and
(h) Samadhi (emancipation).

Asana and pranayama have been incorporated alongside Ayurvedic medicine as the basis of a system of medical therapy. Hatha Yoga has become increasingly popular in western countries as a method for coping with stress and as a means of exercise and fitness training (Schell *et al*., 1994). Yoga has been practiced for thousands of years. It is based on ancient theories, observations and principles of the mind-body connections. Substantial research has been conducted to look at the health benefits of yoga – yoga postures (asanas), yoga breathing (pranayama) and meditation. These yoga practices might be interacting with various somatic and neuro-endocrine mechanisms bringing about therapeutic effects (Malhotra & Singh, 2002).

The overall performance is known to be improved by practicing yoga techniques (Upadhyay *et al*., 2008) and their effects on physical functions were reported (Hadi, 2007). Yoga practices can also be used as psycho-physiological stimuli to increase the secretion of melatonin which, in turn, might be responsible for perceived well-being (Harinath *et al*., 2004). Yoga may be as effective as or better than exercise at improving a variety of healthrelated outcome measures (Ross & Thomas, 2010) and as a result this study was undertaken to find out the effects of selected yogic exercises on blood pressure.

MATERIAL AND METHODS

Subjects

Twenty purposively selected male blood pressure patients from Raichur (Karnataka, India), aged 30– 50 years, volunteered to participate in this study.

Subjects were assigned into two groups: A (experimental: N-10) and B (control: N-10). All subjects, after having been informed about the objective and protocol of the study, gave

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their written consents. The subjects from Group A were subjected to a 6-week yogic exercises training programme. This lasted 6- weeks and consisted of daily sessions, lasting 45 min each, which included 5-Asanas: Padmasana, Siddhasana, Sukhasana, Vajrasana and Ushtrasana and 3- Pranayama: Nadi-shodana, Kapalbhati and Ujjayi. The six days in a week was observed in training and Sunday was considered as a rest day. Both systolic and diastolic blood pressures were measured with the auscultatory method by using sphygmomanometer and stethoscope. Three readings were taken and their average was recorded.

Data analysis the between-group differences were assessed using the Student's t-test for dependent data. The level of $p \leq 0.05$ was considered significant

RESULTS

Table1 shows the mean, S.D. and't' values of systolic blood pressure of females of experimental groupand control group. Pre-Test mean and S.D. value of experimental group has been calculated as 173 mm Hg ± 22.62 whereas mean and S.D. value of post test were found to be 144 mm Hg ± 12.65 when t-test was applied it has shown the 2.75 value which in significant at 0.05 level. Pre-Test mean and S.D. value of control group has been calculated as 172 mm Hg ± 17.12 whereas mean and S.D. value of post test were found to be 168 mm Hg ± 14.29 when t-test was applied it has shown the 0.052 value which in Non-significant at 5% level.

Table 1 Mean, SD and t –test values of systolic blood pressure of males of experimental group and control group during Pre Test and Post Test

group	Test	N	Mean (mm Hg)	SD	t-Value
Experimental	Pre –Test	10	173	22.62	2.75*
Group	Post-test	10	144	12.65	
Control	Pre –Test	10	172	17.12	0.052
Group	Post-test	10	168	14.29	

***Significant at 0.05 level**

Table 2 shows the mean S.D. and t-test values of diastolic blood pressure of males of experimental group and control group. Pre-Test mean and S.D. value of experimental group has been calculated as 100 mm Hg ± 6.67 whereas mean and S.D. value of post test were found to be 86.5 mm Hg ± 4.15 when t-test was applied it has shown the 2.32 value which in significant at 0.05 level. Pre-Test mean and S.D. value of control group has been calculated as 99.5 mm Hg ± 6.95 whereas mean and S.D. value of post test were found to be 97.5 mm Hg ± 4.96. T-test has also shown non-significant differences in this group.

Table 2 Mean, SD and t–test values of diastolic blood pressure of males of experimental group and control group during Pre Test and Post Test

group	Test	N	Mean (mm Hg)	SD	t-Value
Experimental	Pre –Test	10	100	6,67	2.32*
Group	Post-test	10	86.5	4.15	
Control	Pre –Test	10	99.5	6.95	0.083
Group	Post-test	10	97.5	4.96	

***Significant at 0.05 level**

DISCUSSION

Yoga asanas are psychophysical practices to culture body and mind. Yoga practices are known to significantly improve health status, and reduce stress and anxiety (Ross & Thomas, 2010). Since yoga aims at perfection of the body and mind, it is natural to ask whether the progress towards perfection is reflected in objective reproducible changes in physiological variables. In general, yogic practices have been proposed to reduce blood pressure (Bhargava *et al*., 1988). A significant decline in systolic blood pressure in the present study is in accordance with the findings of Bhargava *et al*. (1988) Diastolic blood pressure mainly varies with the degree of peripheral resistance (Guyton, 1996) and heart rate.

The significant change in diastolic blood pressure observed inthe present study suggests that Yogic exercises might have any immediate effect on peripheral vascular resistance and to reduce heart rate (Results of this study also supported by (Joshi *et al*., 1992) who suggest that Yogic asanas and pranayama have been shown to reduce the physiological parameters such as resting respiratory rate and increase vital capacity, timed vital capacity, maximum voluntary ventilation, breath holding time and maximal inspiratory and expiratory pressures.

CONCLUSION

Significant difference was observed on the variable blood pressure as a result of yogic exercise treatment. Insignificant difference between pre and post test of control group was observed. In conclusion, the present study suggests that a 8-week of yogic exercise training had significant effect on blood Pressure through a variety of effects including relaxation, stretching, and balancing of muscles, mobilization of joints, improvement of posture and breathing, action on pressure points, calming the nervous system and improving homeostasis (Monro, 1997). These data provide more evidence to support the beneficial effect of yoga asana training on reducing blood pressure.

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