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A Case Study

Effects of asana, pranayama and meditation practice on blood pressure

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■ **ABSTRACT**

The purpose of the present study is to find out the effects of asana, pranayama and meditation practice on Blood Pressure (Systolic and Diastolic).To achieve this purpose of the study, forty students studying in Alagappa Model Higher Secondary School, Karaikudi, and Tamil Nadu were randomly selected as subjects. The age of the subjects ranged between 15 to 17 years. The selected subjects were divided into four equal groups of ten subjects each. Group I underwent asana practices, Group II underwent pranayama practice, Group III underwent meditation practice for five days per week, for eight weeks of training period and Group IV acted as control that did not participate in any special training programme apart from their regular activities as per their curriculum. The data was collected at prior to and after the training programme of eight weeks. Blood pressure (Systolic and Diastolic) was chosen as a criterion variable. The analysis of covariance (ANCOVA) was used to analyze the data. The results of the study showed that the Blood pressure (Systolic and Diastolic) was significantly improved due to the asana, pranayama and meditation practice on Blood pressure (Systolic and Diastolic) of schoolchildren.

■ **Key Words :** Asana, Pranayama, Meditation, Blood pressure (Systolic and diastolic), ANCOVA

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Yoga is universally benefiting all people of all ages. The study of Yoga is fascinating to those with a philosophical mind and is defined as the silencing of the mind's activities, which leads to complete realization of the intrinsic nature of the Supreme Being. It is a practical holistic philosophy designed to bring about profound state as well is an integral subject, which takes into consideration man as a whole (Iyengar, 1966). The aim of Yoga is to devise ways and means of helping the better emotional and intellectual concentration. Asana is the main yogic tool for balancing the physical body. It consists of various static postures and physical movements performed to release tension, improve flexibility, maximize the flow of energy and remove fixation (Swamy, 1934). The objective of asana is to create a free flow of energy in order to help to direct our attention within. In this study an attempt was made to find out the effects of asana, pranayama and meditation practice on resting pulse rate (Taimani, 1967). As blood drains form the arteries during ventricular diastolic, the pressure decrease to minimum called diastolic blood pressure. Diastolic blood pressure is the lowest arterial blood pressure of the cardiac cycle occurring during diastolic of the heart. Systolic pressure is the maximum lateral pressure of blood on the wall of the blood vessels during the systole of the heart. Diastolic pressure is the lateral pressure of blood on the wall of the blood vessel during the period of diastolic. In the present study it was found out the effects of asana, pranayama and meditation practice on blood pressure.

The selected subjects were divided into four equal groups of ten subjects each. Group I underwent asana practices, Group II underwent pranayama practice Group III underwent meditation practice for five days per week for eight weeks of training period and Group IV acted as control that did not participate in any special training programme apart from their regular activities. Subjects were required to attend Yoga classes per week five days for a total of 8 weeks. Each Yoga session consisted of 10 minutes of pranayamas (breath-

control exercises), 15 minutes of dynamic warm-up exercises, 50 minutes of asanas (Yoga postures), and 10 minutes of supine relaxation in savasana (corpse pose). The subjects were evaluated before and after the training programme, blood pressure was measured through spigmomanometer .The influence of asana, pranayama and meditation practice on resting pulse rate was analysed separately and presented below. The analysis of covariance on resting pulse rate of the pre and post test scores of experimental group I, II, III control group have been analyzed and presented in Table 1.

Table 1 shows the analysed data on Systolic Blood Pressure. The pre-test means of Systolic Blood Pressure was 124.70 for Experimental Group I, 124.60 for Experimental Group II, 124.40 for Experimental Group III and 124.90 for Control Group. The obtained "F" ratio of 0.46 was lesser than the table F-ratio 4.12. Hence, the pre-test was not significant at 0.05 level of confidence for the degrees of freedom 3 and 36.The post-test means of Systolic Blood Pressure were 120.30 for Experimental Group I, 121.60 for Experimental Group II, 123.40 for Experimental Group III and 124.60 for Control group. The obtained "F" ratio of 44.51 was higher than the table F-ratio 4.12. Hence, the post-test was significant at 0.05 level of confidence for the degrees of freedom 3 and 36.The adjusted post-test means of Systolic Blood Pressure were 120.26 for Experimental Group I, 121.64 for and Experimental Group II, 123.62 for and Experimental Group III and 124.38 for Control group. The obtained "F" ratio of 315.63 was higher than the table F-ratio 4.12. Hence, the adjusted post-test was significant at 0.05 level of confidence for the degrees of freedom 3 and 35.Since, four groups were compared, whenever, the obtained 'F' ratio for adjusted post-test was found to be significant, the Scheffe's test was used find out the paired mean differences and it was presented in Table 1a .

Table 1a shows the Scheffe's Post-hoc test results. The ordered adjusted final mean difference for Systolic Blood Pressure of Experimental groups A, B, C and Control Group were tested for significance at 0.05 level of confidence against confidential interval value. The mean differences was between Experimental Group I and Experimental Group II, Experimental Group I and Experimental Group III, Experimental Group I and Control group, Experimental Group II and Experimental Group III, Experimental Group II and Control group, Experimental Group III and Control Group were 1.39, 3.36, 4.13, 1.97, 2.74 and 0.77, respectively and it was observed to be greater than the confidential interval value of 0.43. Hence, all the comparisons were significant.

Table 1 : Analysis of covariance of pre-test post-test and adjusted post test on systolic blood pressure of three experimental groups and control group (Scores in mm/Hg)

Test	Exp. group I	Exp. group II	Exp. group III	Control group	SV	SS	Df	MS	FV
Pre-test									
Mean	124.70	124.60	124.40	124.90	B	1.30	3	0.43	0.46
S.D.	0.78	0.92	1.20	0.70	W	33.80	36	0.94	
Post -test									
Mean	120.30	121.60	123.40	124.60	B	108.67	3	36.22	44.51*
S.D.	0.46	0.92	1.20	0.66	W	29.30	36	0.81	
Adjusted post-test									
Mean	120.26	121.64	123.62	124.38	B	105.54	3	35.18	315.63*
S.D.					W	3.90	35	0.11	

* Indicate significance of values at P=0.05. (The table values required for significance at .05 level of confidence for 3 and 36 and 3 and 35 are 4.12 and 4.12 respectively).

Table 1a : Scheffe's post hock test mean differences on systolic blood pressure among four groups (Scores in mm/Hg)

Exp. group I	Exp. group II	Exp. group III	Control group	Mean differences	Confidence interval value
120.26	121.64	-	-	1.39*	0.43
120.26	-	123.62	-	3.36*	0.43
120.26	-	-	124.38	4.13*	0.43
-	121.64	123.62	-	1.97*	0.43
-	121.64	-	124.38	2.74*	0.43
-	-	123.62	124.38	0.77*	0.43

* Indicate significance of values at P=0.05.

Results of diastolic blood pressure :

Table 2 shows the analysed data on Diastolic Blood Pressure. The pre-test means of Diastolic Blood Pressure were 84.20 for Experimental Group I, 84.10 for Experimental Group II, 83.90 for Experimental Group III and 84.00 for Control group. The obtained "F" ratio of 0.15 was lesser than the table F-ratio 4.12. Hence, the pre-test was not significant at 0.05 level of confidence for the degrees of freedom 3 and 36.The post-test means of Diastolic Blood Pressure were 79.90 for Experimental Group I, 81.10 for Experimental Group II, 82.90 for Experimental Group III and 83.80 for Control group. The obtained "F" ratio of 34.36 was higher than the table F-ratio 4.12. Hence, the post-test was significant at 0.05 level of confidence for the degrees of freedom 3 and 36. The adjusted post-test means of Diastolic Blood Pressure were 79.78 for Experimental Group I, 81.06 for and Experimental Group II, 83.02 for and Experimental Group III and 83.84 for Control Group. The obtained "F" ratio of 187.34 was higher than the table F-ratio 4.12. Hence, the adjusted post-test was significant at 0.05 level of confidence for the degrees of freedom 3 and 35.Since, four groups were compared, whenever the obtained 'F' ratio for adjusted post test was found to be significant, the Scheffe's test was used find out the paired mean differences and it is presented in Table 2 (a).

Table 2 a shows the scheffe's post-hoc test results. The ordered adjusted final mean difference for Diastolic Blood Pressure of Experimental groups I,II,III and Control group were tested for significance at 0.05 level of confidence against confidential interval value. The mean differences between Experimental Group I and Experimental Group II, Experimental Group I and Experimental Group III, Experimental Group I and Control group, Experimental Group II and Experimental Group III, Experimental Group II and Control group, Experimental Group III and Control group were 1.28, 3.24, 4.06, 1.96, 2.78 and 0.82, respectively and it was seen to be greater than the confidential interval value of 0.55. Hence, all the comparisons were significant.

Physiology is the science of functioning of all the organs and systems of an organism. For the physiological system of the body to be fit, they must function well enough to support specific activity that the individual is performing. More over different activity make different demands upon the organism with respect to circulatory, respiratory, metabolic and neurologic process which were specific to the activity (Cooper, 1931). In physiology, one learns how the organs, systems, tissues, cells and molecules within cells work and how their functions are put together to maintain the internal environment. The pressure exerted by the heart and arteries push blood around the body. The magnitude of blood pressure is determined by the amount of blood being pumped out of

Table 2 : Analysis of covariance of pre-test post test and adjusted post test on diastolic blood pressure of three experimental goups and control group (Scores in mm/Hg)

Test	Exp. group I	Exp. group II	Exp. group III	Control group	SV	SS	Df	MS	F value
Pre-test									
Mean	84.20	84.10	83.90	84.00	B	0.50	3	0.17	0.15
S.D.	1.19	1.14	1.11	1.33	W	57.00	36	1.58	
Post-test									
Mean	79.90	81.10	82.90	83.80	B	79.48	3	26.49	34.38*
S.D.	1.00	0.89	1.04	1.47	W	50.50	36	1.40	
Adjusted post-test									
Mean	79.78	81.06	83.02	83.84	B	80.27	3	26.76	187.34*
S.D.					W	8.38	35	0.24	

* Indicate significance of values at P=0.05. (The table values required for significance at .05 level of confidence for 3 and 36 and 3 and 35 are 4.12 and 4.12 respectively).

Table 2a : Scheffe's post hock test mean differences on diastolic blood pressure among four groups (Scores in mm/Hg)

Exp. group I	Exp. group II	Exp. group III	Control group	Mean differences	Confidence interval value
79.78	81.06	-	-	1.28*	0.55
79.78	-	83.02	-	3.24*	0.55
79.78	-	-	83.84	4.06*	0.55
-	81.06	83.02	-	1.96*	0.55
-	81.06	-	83.84	2.78*	0.55
-	-	83.02	83.84	0.82*	0.55

* Indicate significance of values at P=0.05.

the heart per beat (the stroke volume) and the resistance encountered as it passes through the blood vessels (peripheral resistance). Blood pressure is usually expressed as two measurements: Systolic Blood Pressure, indicating the pressure when the heart is actually pumping; and Diastolic Blood Pressure, the pressure when the heart is filled up with blood. Systolic Pressure is always higher and is expressed first. The pressures are measured in millimeters of mercury. Thus, a Blood pressure of 130/80, or 130 over 80, refers to a Systolic Blood Pressure, which will support a column of mercury 130 mm high, and a Diastolic Pressure, which will support a column 80 mm high. Systolic pressure in children is about 100 and in young adults, the value is about 120. It tends to rise with age as arteries thicken. A Systolic Pressure of 180 is not uncommon and it may be as high as 280. The value varies according to a person's position. It tends to drop when you stand up after lying down; this is called postural hypertensive drop. A typical value for Diastolic Pressure is 80 mm of mercury. Although, it is difficult to define precisely what 'normal' blood pressure is, there is general agreement that a desirable blood pressure is less than 140/90.

The results of the present study showed that all the three groups have improved the blood pressure on the sample population. The asana practice influence more than the other two. The pranayama practice is the next best and the meditation practice has the least influence. Bhutkar *et al.* (2008) conducted a study on the effect of asana practice on Cardio-respiratory Fitness Parameters. They concluded that 6 months of asana practice decreases blood pressure. The findings of the present study are in corroboration with the findings of Bhutkarl *et al.* (2008).

Conclusion :

- The asana practice greater influence on blood pressure than the other two.
- The pranayama practice is the next best. And
- The meditation practice has the least influence.

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