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A study on the effect of selected yogic practices on resting heart rate and blood pressure

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Abstract

The purposes of the study were (i) to study the effect of Kapalbhathi Practice on Resting Heart Rate and Blood Pressure (ii) to study the effect of Anulom Vilom Practice on Resting Heart Rate and Blood Pressure (iii) to study the effect of Agnisar Practice on Resting Heart Rate and Blood Pressure (iv) to study the effect of Bhramari Practice on Resting Heart Rate and Blood Pressure. The age of the subjects ranged from 35 to 45 yrs sedentary females. There were four experimental groups and four control group. The number of samples at pre test in experimental groups were (anulom vilom n1= 35, kapalbhathi n2=35, bhramari n3=35, agnisar n4=35) consisting of 140 samples. The number of samples at pre test in control groups were (anulom vilom n1= 26, kapalbhathi n2=26, bhramari n3=26, agnisar n4=26) consisting of 104 samples. The number of samples at post test in experimental groups were (anulom vilom n1= 30, kapalbhathi n2=30, bhramari n3=32, agnisar n4=30) consisting of 122 samples. The number of samples at post test in control groups were (anulom vilom n1 = 23, kapalbhathi n2=23, bhramari n3=26, agnisar n4=25) consisting of 97 samples. The experimental groups were treated with selected yogic practices namely Kapalbhathi, Anuloma Viloma, Agnisar, Bhramari, (tailored programme) independently to independent group for 20 minutes, five days a week, for six weeks whereas the control group were not given any treatment. Resting Heart Rate and Blood Pressure were done at pretest and after six weeks of treatment the post test was taken. Simultaneously the control group was tested. It was hypothesized that there will be positive effect of anulom vilom, kapalbhathi, bhramari and agnisar on the autonomic functions of sedentary females age ranging from 35 years to 45 years. Mean, Standard Deviation, and t test were used as statistics and hypothesis was tested at .05 level of significance. The findings exhibited significant differences between pretest and post test scores of experimental groups in regard to the variables namely Resting Heart Rate, systolic Blood Pressure and Diastolic Blood Pressure

Keywords: Kapalbhathi, anuloma viloma, agnisar, bhramari, SBP, DBP, RHR

Introduction

With increased awareness and interest in health and natural remedies, yogic techniques including pranayama are gaining importance and becoming increasingly acceptable to the scientific community (Bijlani, 2004) [2]. In India, yoga is widely claimed to be effective in the prevention, management and cure of many diseases. Yoga modules have, for instance, been found to be effective in the management of hypertension, diabetes and IR. (Telles 1999, Damodaran 2002, Monroe 1992 and Raub 2002) [4, 12, 16]. Baseline heart rate and blood pressure (systolic and diastolic) showed a tendency to decrease and both these autonomic parameters were significantly decreased at breaking point after pranayamic breathing. (Bhargava, Gogate, and Mascarenhas 1988) [15]. Raghuraj and Telles showed following RNYB there was a significant increase in systolic, diastolic and mean pressure. In contrast, the systolic and diastolic pressure decreased after ANYB and the systolic and mean pressure were lower after LNYB. Hence, unilateral nostril yoga breathing practices appear to influence the blood pressure in different ways. These effects suggest possible therapeutic applications. Following nadi-shodhana pranayama of 20 minutes, a significant decline in basal heart rate ($P < 0.0001$) and systolic blood pressure ($P < 0.001$) was observed (Subbalakshmi, Saxena *et al.* 2005) [13]. Dhungel, Malhotra *et al.* (2008) [9] found that with regular practice of ANB (nadisudhi), systolic blood pressure (SBP) was decreased insignificantly, the decreases in pulse rate (PR),

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respiratory rate (RR), diastolic blood pressure (DBP) were significant. Results indicate that regular practice of ANB (nadisudhi) increases parasympathetic activity. A study was done by Pramanik, Sharma *et al.* (2009) [17] on immediate effect of slow pace bhastrika pranayama on blood pressure and heart rate. It was noted that after slow bhastrika pranayamic breathing (respiratory rate six breathes/minute) for five minutes, both the systolic and diastolic blood pressure decreased significantly with a slight fall in heart rate.

In a study by Bhargava *et al.* (1988) [15], 20 healthy young men heart rate, systolic and diastolic blood pressure and G.S.R was recorded before they practiced nadi shodhana pranayama for a period of four weeks. At the end of four weeks, the same parameters were recorded and the results compared. Base line heart rate and blood pressure (systolic and diastolic) showed tendency to decrease and both these autonomic parameters were significantly decreased at breaking point after pranayamic breathing. Although GSR was recorded in all subjects the observations were not conclusive.

Udapa *et al.* (1974) [10] studied six normal young male volunteers who were undergoing training in pranayama. They found out that the pulse rate decreased more and the blood pressure did vary a bit, but there was a definite change in the autonomic functioning of the body. The breath holding time increased and at the same time the pulse rate also decreased.

The review of research suggests that some studies are of combined effect i.e. general yogic treatment (Schmidt 1997, Telles 1999, Damodaran 2002, Monro1992 and Raub 2002) [17, 4, 12, 16] and some studies are of independent treatment Geetha 2008 and Jain 2009 [6, 8] effect. In some studies there was specified treatment (Mandlik 2009) [11] were given where as in some studies there was non-specified treatment. Considering the research gap the researcher was interested to

study the independent effect of selected yogic kriyas and pranayamas namely Kapalbhathi, Anuloma Viloma, Agnisar, Bhramari on Heart Rate, Systolic Blood Pressure and Dystolic Blood Pressure.

Methodology

There were four experimental groups and four control group. The number of samples at pre test in experimental groups were (anulom vilom n1= 35, kapalbhathi n2=35, bhramari n3=35, agnisar n4=35) consisting of 140 samples. The number of samples at pre test in control groups were (anulom vilom n1= 26, kapalbhathi n2=26, bhramari n3=26, agnisar n4=26) consisting of 104 samples. The number of samples at post test in experimental groups were (anulom vilom n1= 30, kapalbhathi n2=30, bhramari n3=32, agnisar n4=30) consisting of 122 samples. The number of samples at post test in control groups were (anulom vilom n1 = 23, kapalbhathi n2=23, bhramari n3=26, agnisar n4=25) consisting of 97 samples. The experimental groups were treated with selected yogic practices namely Kapalbhathi, Anuloma Viloma, Agnisar, Bhramari, (tailored programme) independently to independent group for 20 minutes, five days a week, for six weeks whereas the control group were not given any treatment. Resting Heart Rate and Blood Pressure were done at pretest and after six weeks of treatment the post test was taken. Simultaneously the control group was tested. It was hypothesized that there will be positive effect of anulom vilom, kapalbhathi, bhramari and agnisar on the autonomic functions of sedentary females age ranging from 35 years to 45 years. Mean, Standard Deviation, and t test were used as statistics and hypothesis was tested at .05 level of significance.

Findings

Table 1: Effect of Selected Yogic Kriyas and Pranayamas on Resting Heart Rate

S. No.	Group	Test	Treatment/Training (Pranayama/Kriya)	N	Mean (bpm)	Standard Deviation (bpm)	"t"	Mean Difference (bpm)	Standard Error Difference (bpm)	Probability
1	Exp	Pre	Anulom Vilom	30	75.20	9.208	.547 (N.S)	1.433	2.620	.586
		Post		30	73.77	11.004				
2	Cont	Pre	Nil	23	77.74	8.925	-.170(N.S)	-.391	2.296	.865
		Post		23	78.13	6.448				
3	Exp	Pre	Kapalbhathi	30	73.30	6.193	.770(N.S)	1.400	1.817	.444
		Post		30	71.90	7.792				
4	Cont	Pre	Nil	23	75.74	8.052	-.334(N.S)	-.783	2.341	.740
		Post		23	76.52	7.821				
5	Exp	Pre	Bhramari	32	75.38	7.594	-.201(N.S)	-.406	2.021	.841
		Post		32	75.78	8.549				
6	Cont	Pre	Nil	26	78.88	7.685	.144(N.S)	.308	2.135	.886
		Post		26	78.58	7.711				
7	Exp	Pre	Agnisar	30	73.30	6.193	.770(N.S)	1.400	1.817	.444
		Post		30	71.90	7.792				
8	Cont	Pre	Nil	25	75.74	8.052	-.334(N.S)	-.783	2.341	.740
		Post		25	76.52	7.821				

Note: Exp= Experimental Group

Cont= Control Group

N= Number of Sample

"t"= t test

*= Significant at 0.05 level

N.S= Not Significant at 0.05 level

The analysis in regard to effect of selected yogic kriyas and pranayamas on resting heart rate in the table- 1 reveals that there were insignificant difference at 0.05 level between the pre test and post test of anulom vilom experimental group (t=.547), anulom vilom control group (t=-.170), kapalbhathi

experimental group (t=.770), kapalbhathi control group (t=-.334), bhramari experimental group (t=-.201), bhramari control group (t=.144), agnisar experimental group (t=.770) and agnisar control group (t=-.334).

Table 2: Effect of Selected Yogic Kriyas and Pranayamas on Systolic Blood Pressure

S. No.	Group	Test	Treatment/Training (Pranayama/Kriya)	N	Mean (mmHg)	Standard Deviation (mmHg)	"t"	Mean Difference (mmHg)	Standard Error Difference (mmHg)	Probability
1	Exp	Pre	Anulom Vilom	30	112.80	8.938	-1.258(N.S)	-2.867	2.279	.213
		Post		30	115.67	8.711				
2	Cont	Pre	Nil	23	110.00	12.045	.272(N.S)	.870	3.198	.787
		Post		23	109.13	9.493				
3	Exp	Pre	Kapalbhati	30	113.67	10.930	-.051(N.S)	-.133	2.613	.959
		Post		30	113.80	9.238				
4	Cont	Pre	Nil	23	113.22	16.709	.352(N.S)	1.391	3.958	.727
		Post		23	111.83	9.003				
5	Exp	Pre	Bhramari	32	116.13	14.032	-.356(N.S)	-1.188	3.334	.723
		Post		32	117.31	12.604				
6	Cont	Pre	Nil	26	115.38	16.997	.272(N.S)	1.077	3.957	.787
		Post		26	114.31	10.877				
7	Exp	Pre	Agnisar	30	114.33	12.694	-1.529(N.S)	-4.400	2.878	.132
		Post		30	118.73	9.344				
8	Cont	Pre	Nil	25	111.68	12.365	-.536(N.S)	-1.760	3.285	.595
		Post		25	113.44	10.809				

Note: Exp= Experimental Group

Cont= Control Group

N= Number of Sample

"t"= t test

*= Significant at 0.05 level

N.S= Not Significant at 0.05 level

The analysis in regard to effect of selected yogic kriyas and pranayamas on systolic blood pressure in table-2 reveals that there were insignificant difference at 0.05 level between the pre test and post test of anulom vilom experimental group (t=-1.258), anulom vilom control group (t=.272), kapalbhati

experimental group (t=-.051), kapalbhati control group (t=.352), bhramari experimental group (t=-.356), bhramari control group (t=.272), agnisar experimental group (t=-1.529) and agnisar control group (t=-.536).

Table 3: Effect of Selected Yogic Kriyas and Pranayamas on Diastolic Blood Pressure

S. No.	Group	Test	Treatment/Training (Pranayama/Kriya)	N	Mean (mmHg)	Standard Deviation (mmHg)	"t"	Mean Difference (mmHg)	Standard Error Difference (mmHg)	Probability
1	Exp	Pre	Anulom Vilom	30	68.80	8.164	-.656(N.S)	-1.133	1.729	.515
		Post		30	69.93	4.799				
2	Cont	Pre	Nil	23	68.35	11.943	-1.340(N.S)	-4.261	3.180	.187
		Post		23	71.30	7.425				
3	Exp	Pre	Kapalbhati	30	69.13	10.261	-2.148*	-5.267	2.452	.036
		Post		30	74.40	8.669				
4	Cont	Pre	Nil	23	70.26	11.091	.370(N.S)	1.304	3.528	.713
		Post		23	68.96	12.776				
5	Exp	Pre	Bhramari	32	71.75	9.768	-1.578(N.S)	-3.938	2.495	.120
		Post		32	75.69	10.187				
6	Cont	Pre	Nil	26	70.23	12.842	-.691(N.S)	-2.231	3.226	.492
		Post		26	72.23	10.281				
7	Exp	Pre	Agnisar	30	72.13	6.235	-2.114*	-3.467	1.640	.039
		Post		30	75.60	6.463				
8	Cont	Pre	Nil	25	71.20	9.274	-.653(N.S)	-1.600	2.449	.517
		Post		25	72.80	8.000				

Note: Exp= Experimental Group

Cont= Control Group

N= Number of Sample

"t"= t test

*= Significant at 0.05 level

N.S= Not Significant at 0.05 level

The analysis in regard to effect of selected yogic kriyas and pranayamas on diastolic blood pressure in table-3 reveals that there were significant difference at 0.05 level between the pre test and post test of kapalbhati experimental group (t=-2.148) and agnisar experimental group (t=-2.114), whereas there were insignificant difference at 0.05 level between the pre test and post test of anulom vilom experimental group (t=-.656), anulom vilom control group (t=-1.340), kapalbhati control group (t=.370), bhramari experimental group (t=-1.578), bhramari control group (t=-.691), and agnisar control group

(t=-.653).

Conclusions

- Resting heart rate (bpm) for all the experimental groups and control groups having insignificant difference between the pre test and post test.
- Systolic blood pressure (mmHg) for all the experimental groups and control groups having insignificant difference between the pre test and post test.
- Diastolic blood pressure (mmHg) registered significant

difference in regard to kapalbhathi experimental group as well as agnisar experimental group, whereas insignificant difference between the pre test and post test were recorded for rest of the comparisons.

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