The Effect Of Anuloma Viloma Pranayama And Kapalbhati On Resting Pulse Rate And Stress Of School Going Children In Bhubaneswar

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Abstract: To determine the effect of Anuloma-Viloma Pranayama and Kpalabhati on resting pulse rate and stress, one hundred fifty (N=150) randomly selected male student aged 15-17 years to participated in the study of DAV Public School, Bhubaneswar, Odisha, India. They were randomly assigned into three groups: A- Pranayama, B- Kpalabhati and C- Control. The subjects were subjected to the twelve weeks Pranayama and Kpalabhati training program. The between group differences was assessed using the post-hoc test. The level of $p \leq 0.05$ was considered significant. The pulse rate and stress significant decrease in group A and B compared with the control group-c.
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Key Words: Anuloma-Viloma Pranayama, Kpalabhati, Pulse Rate and Stress

Introduction

In this contemporary fast growing world of science and technology, the human elements are treated as ever before. Its goals are distant and dissatisfying[1]. The mechanism of modern living, the force restriction of physical activity leading to a century life, an increased amount of leisure, time, all these factors have resulted in a tremendous increase of professional and public interest in physical activity and health[2]. People seem to be "*turning on*" to the idea that one looks and feels better and stays healthier by being physically more active. Today yoga, being a matter of varied interests, has gained worldwide popularity[3]. Recent research trends have shown that it can serve as an applied science in a number of fields such as physical education and sports, (Health and family welfare, psychology and medicine and one of the valuable means for the development of human resources for better performance and productivity). However, it has generally been believed that yoga is a spiritual science having emancipation as its goals and hence cannot be treated only as a therapy[4]. It is now being achieved in all parts of the globe that yoga is not only for better development of mind, socio-control (spiritual or moral) but a therapy. Yoga focuses on harmony between mind and body. Yoga derives its philosophy from Indian metaphysical beliefs[5]. The word yoga comes from the Sanskrit language and means union or merger. The ultimate aim of this philosophy is identical to strike a balance between bodies, mind and attain self-enlightenment. To achieve this, yoga uses movement, breath, relaxation, posture and meditation in order to create a lively, healthy and balanced approach to life[6].

Objective of the Study

1. To find out the effect of Kpalabhati on resting pulse rate of school going children of Bhubaneswar.
2. To find out the effect of Anuloma-Viloma Pranayama on resting pulse rate of school going children of Bhubaneswar.
3. To find out the effect of Kpalabhati on stress of school going children of Bhubaneswar.
4. To find out the effect of Anuloma-Viloma Pranayama on stress of school going children of Bhubaneswar.

Methodology

A. Method:

The researcher was followed the experimental research method in the study. There were three groups, one act as a Kpalabhati group and second act as a Pranayama group and no act control group.

- Group "A" - Kpalabhati
- Group "B" - Anuloma-Viloma Pranayama
- Group "C" - Control

The duration of experimental period was twelve weeks. The pre-test conduct before the practice. The post-test conduct after the practice.

B. Size of Sample:

- The size of the sample was 150 school boys.
- 75 students were selected from DAV Public School, Bhubaneswar, Odisha, India to Class 11 and 12 those who are interested in yoga.
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Variables

- Resting Pulse Rate
- Stress

Resting Pulse Rate

Resting Pulse Rate was recorded as the number of Pulse per minute during the state of rest.

Table 1 indicates the values of descriptive statistics of the experimental Groups Kpalabhati Group, Anuloma-Viloma Pranayama Group & Control Group for physiological variable of pulse rate, which shows that the mean and S.D. values of Pranayama Group, Kpalabhati Group and the Control Group were found to be 68.44±6.73, 71.38±5.72 and 74.20±5.13 respectively. Total the same was 71.34±6.31.

Table 1: Descriptive statistics of the data measured in the post testing pulse rate

Groups	Practices	N	Mean	Std. Deviation
Group - A	Kpalabhati	50	68.44	6.73
Group – B	Anuloma-Viloma Pranayama	50	71.38	5.72
Group -C	Control	50	74.20	5.13
Total		150	71.34	6.31

a Covariates appearing in the model were evaluated at the following values: pre pulse rate = 72.67. The mean and standard error of different post-testing Groups after adjustment have been shown in Table 2. Which were for Kpalabhati Group 69.263, Pranayama Group 71.646 & 0.312 & 0.313 and Control Group 73.111 & 0.314.

Table 2: Descriptive statistics of the data measured in the post-testing after adjustment with the initial difference pulse rate

Groups	Practices	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Group - A	Kpalabhati	69.263[a]	.313	68.643	69.882
Group – B	Anuloma-Viloma Pranayama	71.646[a]	.312	71.029	72.263
Group -C	Control	73.111[a]	.314	72.490	73.732

Table 3 indicates the values test of difference between the subject effects, which shows that there was a significant difference in pre-test values of physiological variable of pulse rate for the three selected Groups, as the value was found to be 903.792, which proves to be the base of Analysis of Co-Variance. Also, a significant difference was found between the post-test values of the experimental and Control Group as the value was found to be 38.018, which was significant at 0.05 level.

Table 3: ANCOVA table for the post-test data on pulse rate

Source	Sum of Squares	df	Mean Square	F Sig.	(p-value)
Pre-Pulse rate	4401.134	1	4401.134	903.792	.000
Treatment Group	370.271	2	185.135	38.018	.000
Error	710.966	146	4.870		
Corrected Total	5482.371	149			

Table 4 indicates the values of post hoc test for the selected Groups for physiological variable of pulse rate, which shows that a significant difference was found between the post-test values of Pranayama Group and the Kpalabhati Group as the value was found to be 2.384 which was significant at 0.05 level, the post-test values of Pranayama Group and the Control Group as the value was found to be 1.465 which was significant at 0.05 level, Kpalabhati Group and the Control Group as the value was found to be 3.848 which was significant at 0.05 level.

Table 4: Post hoc comparison for the group means in post-measurement adjusted with the initial differences pulse rate

(I) Different Groups	(J) Different Groups	Mean Difference (I-J)	SIG. a (p-value)
Pranayama	Kpalabhati	2.384*	.000
	Control	-1.465*	.001
Kpalabhati	Pranayama	-2.384*	.000
	Control	-3.848*	.000

Control	Pranayama	1.465*	.001
	Kpalabhati	3.848*	.000

Based on estimated marginal means:
a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).
* The mean difference is significant at the 0.05 level.

Table 5: Comparison among three groups, pre and post-test mean of pulse rate

Group	Subject	Mean (Pre-Test)	Mean (Post-Test)
Pranayama	50	72.36	71.38
Kpalabhati	50	71.72	68.44
Control	50	73.92	74.20

Table 6 indicates the values of descriptive statistics of the experimental Groups (Pranayama Group, Kpalabhati Group) & Control Group for psychological variable of stress, which shows that the mean and S.D. values of Pranayama Group, Kpalabhati Group and the Control Group were found to be 12.280±3.923, 13.980±3.772, and 17.320±4.488 respectively. Total the same was 14.527±4.558.

Table 6: Descriptive statistics of the data measured in the post testing stress

Different Groups	N	Mean	Std. Deviation
Pranayama	50	12.280	3.923
Kpalabhati	50	13.980	3.772
Control	50	17.320	4.488
Total	150	14.527	4.558

Table 7: Descriptive statistics of the data measured in the post-testing after adjustment with the initial difference stress

Groups	Practices	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Group - A	Kpalabhati	14.425[a]	.228	13.973	14.876
Group – B	Anuloma-Viloma Pranayama	12.835[a]	.229	12.382	13.287
Group -C	Control	16.321[a]	.231	15.865	16.777

a Covariates appearing in the model have evaluated at the following values: pre stress = 15.6867

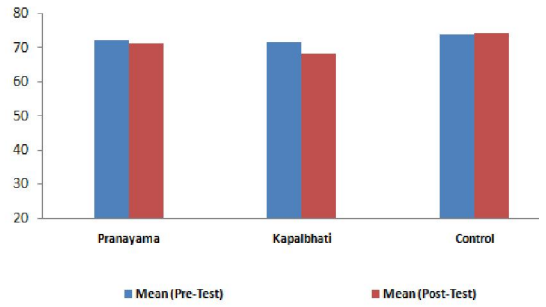

Figure 1: Bar diagram showing the mean value of pulse rate among Pranayama group, Kpalabhati group and Control group

The mean and standard error of different post-testing Groups after adjustment have been shown in table 6. Which are for Kpalabhati Group 14.425, Pranayama Group 12.835 & 0.229 & 0.228 and Control Group 16.321 & 0.231.

Table 8 indicates the values test of difference between the subject effects, which shows that there were a significant difference in pre-test values of psychological variable of stress for the three selected Groups, as the value has found to be 792.406, which proves to be the base of Analysis of Co-Variance. Also, a significant difference is found between the post-test values of the experimental and Control Group as the value has found to be 56.883, which was significant at 0.05 level.

Table 8: ANCOVA table for the post-test data of stress

Source	Sum of Squares	df	Mean Square	F Sig.	(p-value)
Pre-Stress	2058.638	1	2058.638	792.406	.000
Treatment Group	295.559	2	147.779	56.883	.000
Error	379.302	146	2.598		
Corrected Total	3095.393	149			

Table 9: Post hoc comparison for the group means in post-measurement adjusted with the initial differences stress

(I) Different Groups	(J) Different Groups	Mean Difference (I-J)	SIG. a (p-value)
Pranayama	Kpalabhati	-1.590*	.000
	Control	-3.486*	.000
Kpalabhati	Pranayama	1.590*	.000
	Control	-1.896*	.000
Control	Pranayama	3.486*	.000
	Kpalabhati	1.896*	.000

Based on estimated marginal means

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

* The mean difference is significant at the 0.05 level.

Table 9 indicates the values of post hoc test for the selected Groups for psychological variable of stress, which shows that a significant difference has found between the posttest values of Pranayama Group and the Kpalabhati Group as the value has found to be 1.590* which was significant at 0.05 level, the post-test values of Pranayama Group and the Control Group as the value has found to be 3.486* which was significant at 0.05 level, Kpalabhati Group and the Control Group as the value has found to be 1.896* which was significant at 0.05 level.

Table 10 Comparison among three groups, pre and post-test mean of Stress

Group	Subject	Mean (Pre-Test)	Mean (Post-Test)
Pranayama	50	15.65	12.20
Kapalbhati	50	15.70	14.01
Control	50	16.30	16.70

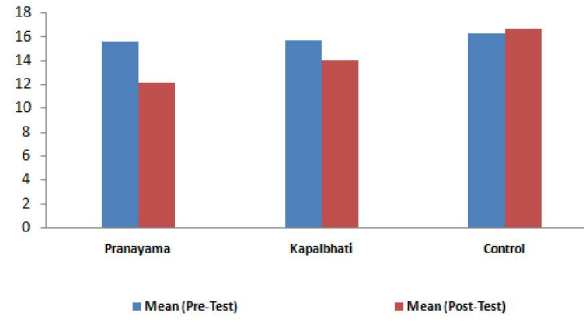

Figure 2: Bar diagram showing the mean value of stress among Pranayama group, Kpalabhati group and Control group

Discussion and Findings

We observed no significant difference in the baseline parameters of the three groups and therefore, they can be examined comparable for the study. After 12 weeks of the study period, researcher observed a significant decrease in resting pulse rate in both (Anuloma-viloma Pranayama and Kpalabhati) groups with no change in control group (Group C). But the Kpalabhati group is more effective then comparison of Anuloma-Viloma Pranayama group.

The researcher observed a significant decrease in stress in both (Anuloma-Viloma Pranayama and Kpalabhati) groups with no change in control group (Group C). But the Anuloma-Viloma Pranayama group is more effective than comparison of Kpalabhati group.

To summarize, our study demonstrates that Anuloma-Viloma Pranayama and Kpalabhati were effective in reducing perceived resting pulse rate and stress. Kpalabhati was more suitable for subjects with stable resting pulse rate and Pranayama was more suitable for subjects with stable stress. On post-test analysis, sample size (150 students) was found adequate for the present study.

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