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EFFECT OF ANULOMA- VILOMA PRANAYAMA AND KAPALBHATI ON RESPIRATORY RATE AND ANXIETY LEVEL OF HIGH SCHOOL STUDENTS AT JAIPUR

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Abstract:
Background: Today yoga, being a subject of varied interests, has gained worldwide popularity. Pranayama is a technique of controlling and modulating breath and meditation. It is a process through which one attains a state of deep rest and active state of mind. Recent studies which are based on long-term yogic practices have shown improvements in respiratory rate and anxiety. Breathing techniques during yoga are very important for removing relaxation. Many cultures have stamped the thought that the process of breathing is the essence of being. To relax quickly and to improve the respiratory efficiency is the ultimate goal of it. For children to practice yogic breathing techniques on a daily basis is salubrious. Breathing techniques help to change energies within the body for health and well being.
Method: This study is designed to evaluate the effects of a 12 weeks (except Sunday) daily practice of Anuloma-viloma Pranayama and Kapalbhati on respiratory rate (RR) and anxiety in male students. Students aged 15-18 years are taken from 150 schools situated in Jaipur. Healthy students not suffering from any illness were selected for this study. Participants were trained to perform Anuloma –viloma Pranayama and Kapalbhati and the study was scheduled for 12 weeks. The respiratory rate and anxiety were measured before and after the practice of Anuloma –viloma Pranayama and kapalbhati.
Results: The analysis of data reveals the following: Pranayama group pre respiratory rate mean shows that 27.26/min and post respiratory rate exemplifies that 26.22/min and as far as the pre mean of anxiety level is concerned that is 12.72 and post mean is 8.52. So that researcher finds the significant of both variables and gets a positive result. In Kapalbhati group pre respiratory rate mean demonstrates that 28.30/min and post respiratory rate shows that 27.04/min. But on the other hand as far as pre mean and post mean of anxiety level is concerned that is 13.26 and 10.76 .So that researcher has found the significant of both variables and got the positive result.
Conclusion: It is concluded that the effect of anuloma- viloma pranayama and kapalbhati on RR and Anxiety level among the high school students as shown the significant good performance from pre to post test.
Key Words: Anuloma-Viloma Pranayama, Kapalbhati, Respiratory Rate (RR) & Anxiety

Introduction:

"Breath is life and life is breath. Breath is the key to the mystery of life", says Lama Angarika Govinda. A human lifetime is calculated from the first to the last breath. The process of life itself depends on how we take breaths. Breathing is not only an instinctive reflex to satisfy the need of the body for oxygen but also it has been considered that consciously controlled breathing can be used as a technique for enhancing psychological and physiological powers (Bijlani, 2004). Specific breathing technique called pranayama has been evolved in yoga to transcend the limits of our physical and mental abilities experienced in our daily life. Awareness regarding health and natural remedies, yogic techniques including Pranayama are gaining importance and becoming increasingly acceptable to the scientific community. Pranayama' is a Sanskrit word - Prana and Ayama. 'Prana' means life or life force and Ayama' means development or control. Therefore Pranayama is the development and control of life force (Nagarathna et al., 2006). In yoga Prayamanam is one of the best forms of breathing exercise. 21st century people are the victim of stress and nowadays yoga is widely used among the adult population to alleviate stress but lastly concentrated in children in spite of its vast effects (Sivapriya et al., 2010)

Aim: Design

Current study was proposed to create awareness of health benefits by pranayama and to inculcate to do yoga in school students so that they can get a healthy life in future. The essence of the pranayama practice is slow and deep breathing which is economical as it reduces dead space ventilation. During the process of inhale and exhale it also refreshes air throughout the lungs; in contrast in shallow breathing it refreshes air only at the

base of the lungs. Thus, a yoga practitioner, through pranayama, can at some stage control other physiological functions and finally control manifestations of prana even outside the body (Kinabalu, 2005). Anulom pranayama is a type of pranayama. Anulom in sanskrit means "alternate". It is one of the easiest types of pranayama, and can be practiced without expert guidance (Joshi, 1982). Anulom pranayama is breathing through alternate nostrils of the nose. It is otherwise known as nadi shuddhi pranayama or nadi shodhona pranayama. It is practiced by sitting in any asana, such as sukhasana, vajrasana or padmasana. Alternate nostrils are closed, generally by using the right hand's thumb, ring finger, and little finger. The thumb is used for closing the right nostril and the ring and little fingers are used to close the left nostril. The mouth is closed, and is not used for breathing. No sound should be produced while inhaling or exhaling. The cycle of practice is: The right nostril is closed with the thumb. Air is exhaled through the left nostril, and inhaled back through the same nostril. The left nostril is closed with the ring finger. Air is exhaled through the right nostril, and inhaled back through the same nostril (Khanam et al., 1996). Breath is a dynamic bridge between the body and mind. Pranayama is the art of prolongation and control of breath helps in bringing conscious awareness about breathe and reshape breathing habits and patterns. Meditation is a yogic process to provide deep rest to the system by allowing the mind to calm down to its basal states. It is famous as a relaxation technique to be used for treating stress and stress- related illnesses.

Objective of the Study:

- ✓ To measure the breathtaking effect of anuloma-viloma pranayam and kapalbhati on quiescent respiratory rate of school going children residing in Jaipur.
- ✓ To analyze unavoidable effect of anuloma-viloma pranayam and kapalbhati on anxiety that is spreading among the school going children due to some macro reasons which are avoided by us calling them micro.

Research Methodology:

Methods: 150 male healthy school students of 15 to 18 years were selected for the study. Random sampling method was used for the selection. After getting the permission of parents or guardian students were selected by using random sampling. Before starting the study a health check up was conducted for all the participants before the start of the study.

Included Criteria: Healthy participants aged 15 to 18 years.

Excluded Criteria: Participants with acute respiratory illness, respiratory disorders, respiratory medication, congenital heart disease, epileptic, recent injury or immobilization, physically challenged and spinal deformities were excluded from the study. Experimental research method was applied by the researcher in the study. There were three groups one acted as a kapalbhati group and second acted as a pranayama group and no act control group.

- ✓ Group "A" - Kapalbhati
- ✓ Group "B" - Anuloma-Viloma Pranayama
- ✓ Group "C" - Control

The duration of experimental period was twelve weeks.
The pre tests conducted before the practice.
The post tests conducted after the practice.
Techniques of Anuloma Viloma Pranayama-

- ✓ Sit in a comfortable balanced meditative pose.
- ✓ Use the right hand thumb to close your right nostril.
- ✓ Inhale from the left nostril.
- ✓ Close your left nostril with your right hand's index and middle fingers
- ✓ Exhale from the right nostril.
- ✓ Do the reverse: inhale with the right nostril.
- ✓ Close your right nostril with your right hand thumb.
- ✓ Exhale with the left nostril.

Here one round of anulom-vilom pranayama completes.
Techniques of Kapalbhati:

- ✓ Keep breathing gradually while sitting in Padmasana.
- ✓ Inhale and start doing Kapalbhati as stated above. That means a strong Rechaka (exhalation), natural Pooraka (inhalation) and again strong Rechaka and natural pooraka.
- ✓ Keep on doing this rotation swiftly in rhythmic manner.

Perform as many cycles as possible and then keep breathing gradually. All these processes are incorporated under one cycle of Kapalbhati.

Descriptive Statistics of Resting Respiratory Rate:

Table 1: Descriptive Statistics of the Data Measured in the Post Testing Respiratory Rate

Different Groups	Mean	Std. Deviation	N
Pranayama	19.440	2.565	50

Kapalbhati	20.060	3.322	50
Control	20.720	2.564	50
Total	20.073	2.869	150

Table 1 indicates the values of descriptive statistics of the experimental Groups (Pranayama Group, Kapalbhati Group) & Control Group for physiological variable of respiratory rate, which shows that the mean and S.D. values of Pranayama Group, Kapalbhati Group and the Control Group are found to be 19.440±2.565, 20.060±3.322, and 20.720±2.564 respectively. Total the same is 20.073±2.869

Table 2: Anova Table for the Post-Test Data of Respiratory Rate

Source	Sum of Squares	DF	Mean Square	F	Sig (p-value)
Pre-Respiratory Rate	741.158	1	741.158	243.680	.000
Treatment Group	86.445	2	43.222	14.211	.000
Error	444.062	146	3.042		
Corrected Total	1226.193	149			

Table 2 signifies the values test of difference between the subject effects, which shows that there are a significant difference in pre test values of physiological variable of respiratory rate for the three selected Groups, as the value has founded to be 243.680, 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 founded to be 14.211, which is significant at 0.05 level.

Table 3: Post Hoc Comparison for the Group Means in Post-Measurement Adjusted With the Initial Differences Respiratory Rate

(I) Different Groups	(J) Different Groups	Mean Difference (I-J)	Sig. a (p-value
Pranyama	Kapalbhati	.796*	.029
	Control	-1.095*	.002
Kapalbhati	Pranayama	-.796*	.029
	Control	-1.891*	.000
Control	Pranayama	1.095*	.002
	Kapalbhati	1.891*	.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 3 indicates the values of post hoc test for the selected Groups for physiological variable of respiratory rate, which shows that a significant difference has founded between the post test values of Pranayama Group and the Kapalbhati Group as the value has founded to be .796* which is significant at 0.05 level, the post test values of Pranayama Group and the Control Group as the value has founded to be 1.095* which is significant at 0.05 level, kapalbhati Group and the Control Group as the value has founded to be 1.891* which is significant at 0.05 level.

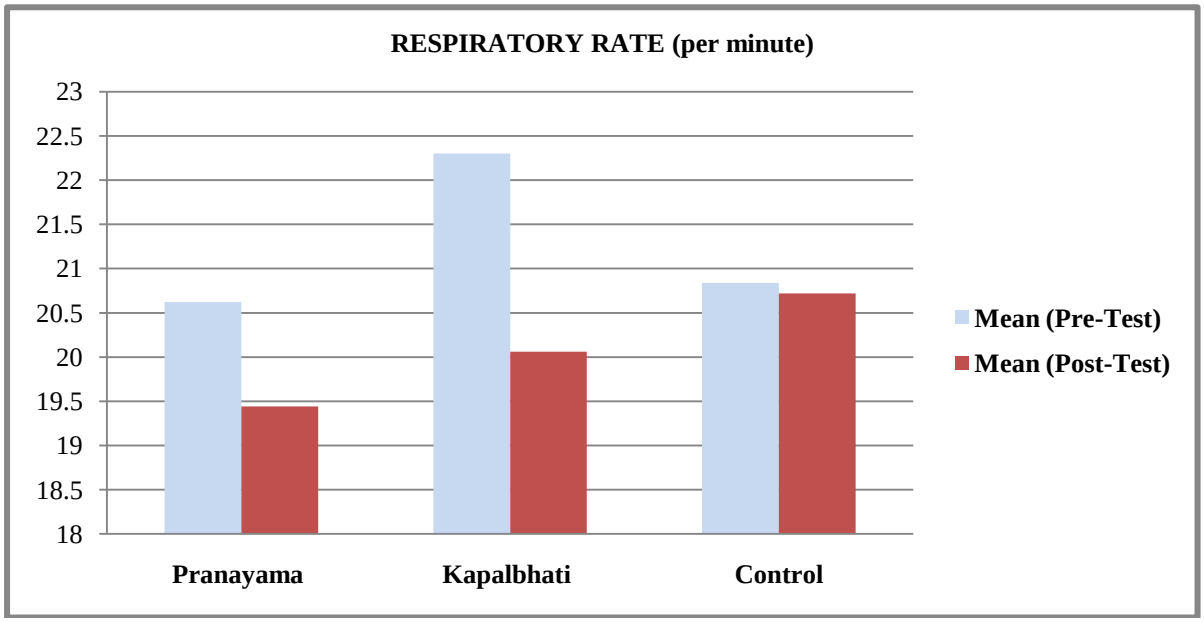

Figure 1: Bar Diagram Showing the mean Value of Respiratory Rate among Pranayama Group, Kapalbhati Group and Control Group

Table 4: Descriptive Statistics of the Data Measured in the Post Testing Anxiety

Different Groups	Mean	Std. Deviation	N
Pranayama	8.520	2.215	50
Kapalbhati	10.760	3.634	50
Control	12.060	3.027	50
Total	10.447	3.335	150

Table 4 indicates the values of descriptive statistics of the experimental Groups (Pranayama Group, Kapalbhati Group) & Control Group for psychological variable of anxiety, which shows that the mean and S.D. values of Pranayama Group, Kapalbhati Group and the Control Group are found to be 8.520±2.215, 10.760±3.634, and 12.060±3.027 respectively. Total the same is 10.447±3.335.

Table 5: Ancova Table for the Post-Test Data of Anxiety

Source	Sum of Squares	DF	Mean Square	F	Sig. (p-value)
Pre-Anxiety	762.648	1	762.648	194.061	.000
Treatment Group	304.968	2	152.484	38.801	.000
Error	573.772	146	3.930		
Corrected Total	1657.073	149			

Table 5 shows the values test of difference between the subject effects, which shows that there are a significant difference in pre test values of psychological variable of anxiety for the three selected Groups, as the value has founded to be 194.061, 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 founded to be 38.801, which is significant at 0.05 level.

Table 6: Post Hoc Comparison for the Group Means in Post-Measurement Adjusted With the Initial Differences Anxiety

(I) Different Groups	(J) Different Groups	Mean Difference (I-J)	Sig. (p-value
Pranyama	Kapalbhati	-1.894*	.000
	Control	-3.489*	.000
Kapalbhati	Pranyama	1.894*	.000
	Control	-1.595*	.000
Control	Pranyama	3.489*	.000
	Kapalbhati	1.595*	.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 no. 6 indicates the values of post hoc test for the selected Groups for psychological variable of anxiety, which shows that a significant difference has founded between the post test values of Pranayama Group and the Kapalbhati Group as the value has founded to be 1.894* which is significant at 0.05 level, the post test values of Pranayama Group and the Control Group as the value has founded to be 3.489* which is significant at 0.05 level, kapalbhati Group and the Control Group as the value has founded to be 1.595* which is significant at 0.05 level.

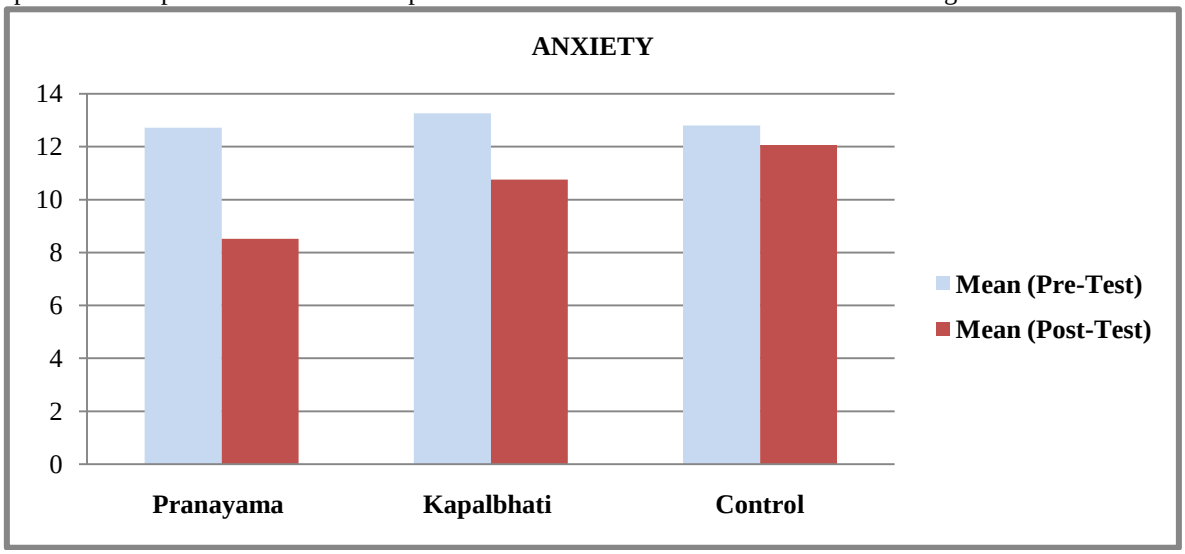

Figure 2: Bar Diagram Showing the mean Value of Anxiety among Pranayama Group, Kapalbhati Group and Control Group

Discussion:

In the present study a significant effect was appeared on respiratory rate and anxiety after conducting 12 weeks regular practice of anuloma–viloma pranayama and kapalbhati. The output of other studies shows a noticeable declination in RR but in contrast of this the present study has shown positive effects on human physiology. Kapalbhati practice is more effective as compare to anuloma-viloma pramayama practice in case of respiratory rate and on the other hand anuloma-viloma practice is more important rather than to kapalbhati practice in case of anxiety. This present study has given stated outcome. In order to improve respiratory rate and anxiety in students both the practices can be applied. Thus in a nutshell in this study it is proved beyond doubt that the regular practice of anuloma-viloma and kapalbhati for 12 weeks is beneficial in improving the respiratory rate and anxiety and to overcome other heart diseases .The results of this study and their explanations justifies the incorporation of yoga as part of our lifestyle in enhancing health and also help in preventing age related respiratory diseases.

Conclusion:

This research paper has achieved the expected and fruitful result which has been assumed by the researcher that is a positive effect of anuloma- viloma pranayama and kapalbhati kriyas on respiratory rate and anxiety level. So, if such yogas start in school would be helpful to increase the health graph of school students.

Recommendation:

The positive result has found in the present study that can be applied to all schools to improve the respiratory functions and decrease the anxiety level of the students. A few minutes practice daily may help to increase the focus level of mind which is required for better works and studies. Through daily practice one can maintain better physical and mental health to have a better future.

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