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Impact of Pranayama and Meditation on Resting Respiratory and Pulse Rates in Visually Impaired Students

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Abstract: ***Objectives: To determine the effect of Pramayama and Mindfulness Meditation practice on the Resting Respiratory Rate and Pulse Rate among visually impaired school students. Methodology: Thirty (30) visually impaired school students were selected for this study. Shree Hanuman Prasad Poddar Andha Vidyalaya, Varanasi, Uttar Pradesh, India, Subjects were selected using a purposive sampling technique. First, the subjects were equally divided into two groups (Group 'A' n=15, Group 'B' n=15) with 30 samples. 'A' represents the experimental group, and 'B' represents the control group. Prior to administering the test, pre - test scores for Resting Respiratory Rate and Pulse Rate were collected. After thirteen (13) weeks of training, post - test scores were collected on Resting Respiratory Rate and Pulse Rate. The experimental group perform the Pranayama (20 minutes) and Meditation (20 minutes) the total duration of practice was 40 minutes, conducted four days per week. No training was involved in the control group. Significance level was set at.05 levels. Results and Conclusions: The study concludes that Pranayama and mindfulness meditation significantly improve resting respiratory and pulse rates among visually impaired students. These findings underscore the potential of these practices to enhance the physiological wellbeing of this population, advocating for their inclusion in health and educational programs.***

Keywords: Pranayama, Mindfulness Meditation, Resting Respiratory Rate (RRR) and Pulse Rate (PR), Visually Impaired Students

1. Introduction

Yoga is the ancient science of India, it is a conscious process for gaining mastery over the mind and body and thereby growing faster from the animal level to become normal human beings and reach the height of greatness (**Singh et al., 2017).** It is a traditional science, and is becoming very popular all over the world day by day due to its scientific research. Yoga exercises with their varied types help to stabilize and balance the internal system of the body, thereby bringing about general physical fitness and physiological homeostasis. Yoga is mostly aerobic and anaerobic types of activities Yoga include both aerobic and anaerobic activities, impact on various physiological systems in the human body (**Singh et al., 2016).** The ancient Indian science of Yoga makes use of voluntary regulation of the breathing to make respiration rhythmic, and to calm the mind. This practice is called Pranayama. Pranayama is a Sanskrit word meaning "restraint of the prana or breath". The word is composed of two Sanskrit words, Prana, life force, or vital energy, particularly, the breath, and "ayama", to suspend or restrain. It is often translated as control of the life force (prana). Pranayama means control of breath and it involves three main phases which is crucial for maintaining the strength of the respiratory system and overall body health. These are best practiced in the early hours of the morning or after sunset (**Kanniyan, 2014).** Breathing is a vital process that starts at the time of birth and stops when a person dies. During breathing, the life sustaining oxygen is provided to all the parts, organs and cells of the body. One can control the rhythm of panic energy with pranayama and attain a healthy body and mind. The ancient yogic developed many breathing techniques to maximize the benefits of Pranayama. It is also used in preparation and meditation of postures, to help maximize the benefit of the practice focus and mind (**Xavier, 2006).** Reductions in resting blood pressure compared with those obtained by whole body exercise are also seen with the practice of yoga and meditation [5, 6] and a common feature of these techniques is slow and regular breathing. Furthermore, a number of randomized controlled studies have shown slow breathing to be effective in reducing blood pressure. It has been proven that pranayama is an important component of active relaxation that can effectively reduce blood pressure and fatigue. Pranayama, one of the yogic breathing techniques can produce different physiological responses. Yogic techniques are known to improve physical and mental performances. Patanjali, the foremost exponent of yoga, in his Yoga Sutra describes - Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana and Samadhi as eight angas (parts) of yoga (**U. Ganapathy Sankar & Monisha. R, 2020).** Health and holistic health is closely related, which gives importance to physical, mental, social, spiritual and sexual health as whole. Hypertension is directly connected with circulation, respiration and function of vital organs. Complementary therapy like pranayama is directly having effect on mental and physical health. So, Pranayama emphasis on promotion, prevention and curative measures and helps to maintain normal blood pressure. Alternative therapy in Nursing is also very much valuable aspect of health care system. It is mainly based on promotion, maintenance, prevention and rehabilitation of disease (**Brunner and Suddarth 2012; Joshi L. N. Joshi V. D. and Gokhale L. V 2014).**

2. Purpose of the Study

The purpose of this study was to evaluate the effects of Pranayama and mindfulness meditation on resting respiratory and pulse rates in visually impaired students.

3. Methodology

Selection of the Subjects

For the purpose of present study Thirty (30) visually impaired school students were selected for this study. Shree Hanuman Prasad Poddar Andha Vidyalaya, Varanasi, Uttar Pradesh, India, Subjects were selected Purposive Sampling technique for the study.

Experimental design

Random group design was used for the purpose of the present study. First, the subjects were equally divided into two groups (Group 'A' n=15, Group 'B' n=15) with Thirty (30) samples. 'A' represents the experimental group, and 'B' represents the control group. Prior to the administration of the test, pre - test scores for Respiratory Rate and Pulse Rate were collected. After thirteen (13) weeks of training, post - test scores were collected on Resting Respiratory Rate and Pulse Rate. The experimental group perform the Pranayama (20 minutes) i. e., Nadi Shodhana Pranayama, Bhramari Pranayama, Ujjayi Pranayama and Kapalbhati Pranayama. Mindfulness Meditation (20 minutes) practice was i. e., Mindfulness Meditation (Breathing Technique) total duration of practice was 40 minutes for four days/week. The control group received no instructions at all.

Training schedule for pranayama and meditation practices

Table 1

S. no	Pranayama	Duration	Repetition
1.	NadiShod. P	5 minutes	5 times
2.	Bhr. P	5 minutes	5 times
3.	Ujjayi. P	5 minutes	5 times
4.	Kapal. P	5 minutes	2 times/100 Strokes
Five Minutes Rest in Savasana			
5.	Mindfulness Meditation (Breathing Technique)	20 minutes continue	1 times

***NadiShod. P,** Nadi Shodhana Pranayama; **Bhr. P,** Bhramari Pranayama; **Ujjayi. P,** Ujjayi Pranayama; **Kapal. P,** Kapalbhati Pranayama.

Selection of variables

Following variables were selected for the purpose of present study, i. e., Resting Respiratory Rate and Pulse Rate.

Selected parameters & measuring tools

Table 2

S. No	Parameters	Test item	Instrument	Scoring /unit
1.	RRR	Manually resting respiratory rate test	Stopwatch	Breaths/ minute (BPM)
2.	PR	Pulse rate test	Digital Blood Pressure apparatus	Breaths/ minute (bpm)

RRR, Resting Respiratory Rate**; PR,** Pulse Rate

Collection of data

In this study, total of two physiological variables was selected, i. e., (1) Resting Respiratory Rate and (2) Pulse Rate. The first Resting Respiratory Rate was measured by Manually Resting Respiratory Rate counted in fully resting position, according to the (McArdle - Katch procedure) in a lying resting position. The second pulse rate was measured by Digital Blood Pressure apparatus, measured in fully resting position in a sitting position in the chair.

Statistical procedure

To the effect of Pranayama and Mindfulness Meditation practice on Resting Respiratory Rate and Pulse Rate Analysis of Covariance, significance level was set at.05 levels. For the purpose of the analysis of data was used SPSS - 24 Software.

4. Results and Findings

Results and findings Data were collected on thirty (30) subjects belonging to two groups i. e. one experimental and one control group to study the effect of Pranayama and Mindfulness Meditation practice on the Resting Respiratory Rate and Pulse Rate among visually impaired school students. The subjects were divided into two equal groups consisting of 15 subjects each belonging to one experimental and one control group. Experimental group 'A' was exposed to Pranayama and Mindfulness Meditation and Control group 'B' was not exposed to any Pranayama and Mindfulness Meditation. The experimental group Pranayama and Mindfulness Meditation practiced for thirteen (13) weeks. Data was analyzed using the significance level for the Analysis of Covariance ANCOVA was set at 0.05. The subjects of both groups were compared on Resting Respiratory Rate and Pulse Rate. The results of analysis of covariance were presented below: Resting Respiratory Rate and Pulse Rate.

Resting Respiratory Rate (RRR)

Table1.1: Mean and Standard Deviation of RRR for post testing Control and Experimental Group

Group	Mean	Standard Deviation	N
Control Group	21.93	3.555	15
Experimental Group	17.67	2.257	15
Total	19.80	3.643	30

Mean and Standard Deviation of Control and Experimental group for RRR during post - test are given in the Table 1.1. The post - test mean and standard deviation of RRR in the control group were 21.93 ± 3.555. And the post - test mean and standard deviation of RRR for experimental group are 17.67 ± 2.257. Also the mean and standard deviation for all the students i. e.30 is 19.80 ± 3.643.

Table 1.2: Descriptive Statistics for the post - test data after Adjustment with the initial difference in Relation to RRR: Adjusted post - test mean

Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Control Group	22.076[a]	.369	21.319	22.832
Experimental Group	17.524[a]	.369	16.768	18.281

The following values are used to evaluate covariates that are included in the model: Pre groups = 21.80.

Adjusted post - test mean of RRR shown in the above table are different with Table No 1.1 because here we eliminated the effect of covariant on the basis of initial difference in pre test score.

Table 1.3: Analysis of Co - variance (ANCOVA) table for post - test data in relations to RRR

Source	Sum of Squares	df	Mean Square	F	P value
Corrected Model	329.842[a]	2	164.921	81.023	.000
Intercept	14.353	2	14.353	7.051	.013
Pre	193.309	1	193.309	94.969	.000
Treatment Group	154.875	1	154.875	76.08	.000
Error	54.958	1	2.035		
Total	12146.000	27			
Corrected Total	384.800	30			

a. R Squared =.857 (Adjusted R Squared =.847)

Table 1.3 represented the ANCOVA for RRR which showed the significant difference between the experimental and control group after being adjusted the pre - test covariate. The F - value found in the table is 76.08 which is significant at.05 level of significance since P - value for treatment group is.000 which is less than.05.

Table 1.4: Post Hoc Comparison for the group adjusted paired means in post - test RRR

(I) Group (J) Group	Mean difference (I - J)	Std. Error	P value	95% Confidence Interval for Difference	
				Lower Bound	Upper Bound
Control Experimental	4.551*	.522	.000	3.481	5.622
Experimental Control	- 4.551*	.522	.000	- 5.622	- 3.481

According to estimated marginal means
a. The mean difference is statistically significant at the 0.05 level.
b. Adjusted for multiple comparisons: The least significant difference (equal to no adjustments).

Since the F - ratio in the above mentioned table (Table No 1.3) is significant; a pair wise comparison has been made in Table No 1.4. After reading the Table No 1.4 it may be noted here that p - value is less than 0.05, it is significant at0.5 level. Thus following conclusion can be drowning.
There is a significant difference between the adjusted post - test mean of the experimental group and the control group on the basis of RRR during post - testing.

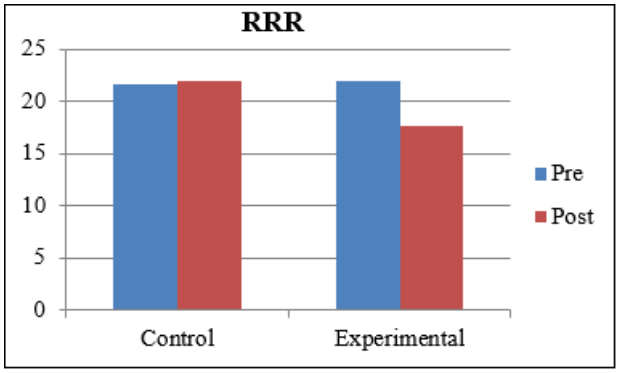

Figure 1: Graphical Representation of RRR of Pre & Post Test Mean of Control and Experimental group

The above figure presents the graphical representation of the pre and post - test mean of RRR for both the experimental and control group.

Pulse Rate (PR)

Table 2.1: Mean and Standard Deviation of PR for post testing Control and Experimental Group

Group	Mean	Standard Deviation	N
Control Group	72.20	3.895	15
Experimental Group	70.67	3.086	15
Total	71.43	3.540	30

Mean and Standard Deviation of Control and Experimental group for PR during post - test are given in the Table 2.1. The post - test mean and standard deviation of PR in the control group were 72.20 3.895. And the post - test mean and standard deviation of PR for experimental group are 70.67 ± 3.086. Also the mean and standard deviation for all the students i. e.30 is 71.43 ± 3.540.

Table 2.2: Descriptive Statistics for the post - test data after Adjustment with the initial difference in Relation to PR: Adjusted post - test mean

Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Control Group	72.398[a]	.624	71.117	73.678
Experimental Group	70.469[a]	.624	69.189	71.749

The following values are used to evaluate covariates that are included in the model: Pre groups = 72.43.

Adjusted post - test mean of PR shown in the above table are different with Table No 2.1 because here we eliminated the effect of covariant on the basis of initial difference in pre-test score.

Table 2.3: Analysis of Co - variance (ANCOVA) table for post - test data in relations to PR

Source	Sum of Squares	df	Mean Square	F	P value
Corrected Model	206.165[a]	2	103.083	17.705	.000
Intercept	46.522	1	46.522	7.990	.009
Pre	188.532	1	188.532	32.381	.000
Treatment Group	27.721	1	27.721	4.76	.038
Error	157.201	27	5.822		
Total	153445.000	30			
Corrected Total	363.367	29			

a. R Squared = .567 (Adjusted R Squared =.535)

Table 2.3 represented the ANCOVA for PR which showed the significant difference between the experimental and control group after being adjusted the pre - test covariate. The F - value found in the table is 4.76 which is significant at.05 level of significance since P - value for treatment group is.038 which is less than.05.

Table 2.4: Post Hoc Comparison for the group adjusted paired means in post - test PR

(I) Group (J) Group	Mean difference (I - J)	Std. Error	P value	95% Confidence Interval for Difference	
				Lower Bound	Upper Bound
Control Experimental	1.928*	.884	.038	.115	3.742
Experimental Control	- 1.928*	.884	.038	- 3.742	- .115

According to estimated marginal means
a. The mean difference is statistically significant at the 0.05 level.
b. Adjusted for multiple comparisons: The least significant difference (equal to no adjustments).

Since the F - ratio in the above mentioned table (Table No 2.3) is significant; a pair wise comparison has been made in Table No 2.4. After reading the Table No 2.4 it may be noted here that p - value is less than 0.05, it is significant at 0.5 level. Thus following conclusion can be drowning.

There is a significant difference between the adjusted post - test mean of the experimental group and the control group on the basis of PR during post - testing.

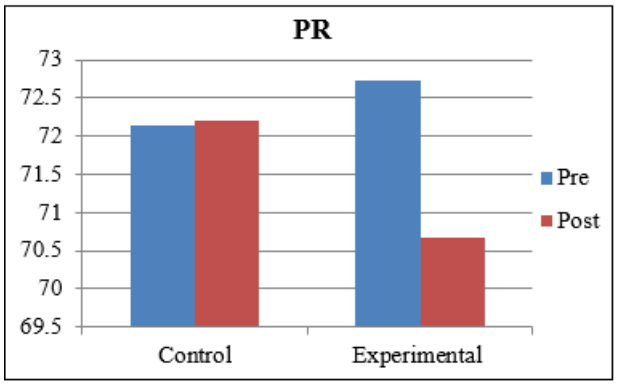

Figure 2: Graphical Representation of PR of Pre & Post Test Mean of Control and Experimental group

The above figure presents the graphical representation of the pre and post - test mean of PR for both the experimental and control group.

Results of the Study:

1) The results of an Analysis of Co - variance (ANCOVA) to find out the Effect of pranayama and mindfulness meditation on Resting respiratory rate (RRR) where F - ratio of 76.08 (P=.000) It was found to be statistically significant at the.05 level.
2) The results of an Analysis of Co - variance (ANCOVA) to find out the Effect of pranayama and mindfulness meditation on Pulse rate (PR) where F - ratio of 4.76 (P=.038) It was found to be statistically significant at the.05 level.

5. Conclusion

The study concludes that Pranayama and mindfulness meditation significantly improve resting respiratory and pulse rates among visually impaired students. These findings underscore the potential of these practices to enhance the physiological wellbeing of this population, advocating for their inclusion in health and educational programs.

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