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Effect of yoga nidra and pranayama on selected physiological variables of tribal youths

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Abstract

The purpose of this study is to determine the Effect of Yoga Nidra and Pranayama on selected physiological variables of tribal Youths. Ninety Students, with age ranging between 17 to 22 years and studying in Seva Bharati Mahavidyalaya, Kapargari were randomly selected as subjects from B.A/B. Sc students of Vidyasagar University, West Bengal. All subjects were randomly assigned to three groups (A, B and C) where A & B serving as experimental group and C as control group, each consisted of 30 subjects. Two experimental groups participated in the training programme for a period of twelve weeks. Among the experimental groups (A&B) were administered two types of practice i.e., A group was assigned pranayama training (Bhastrika Pranayama, Ujjai Pranayama & Anulom Viloma Pranayama), B group was assigned yoga nidra training. Group C control group did not participate in any kind of training programme. The respective yogic training programme was conducted for twelve weeks for both the experimental groups. The quantitative measurement of each subject was taken with the help of standard equipment, before and after twelve weeks of training. In order to study the comparative Effect of Yoga Nidra and Pranayama on selected physiological variables, Analysis of covariance (ANCOVA) was applied at 0.05 level of significance. The finding of the study shows that yoga nidra and pranayama effect the physiological variables (Resting heart rate, Respiratory Rate and Vital Capacity) of tribal youths.

Keywords: Yoga Nidra, pranayama, resting heart rate, respiratory rate and vital capacity

Introduction

During the last hundred years or so, the way of life has changed greatly throughout the world. The social system and other systems are no longer the same as they used to be in ancient times. Man today needs movement to survive in a different sense. Man's work is divorced from strenuous muscle effort. This way of life is taken its toll, because man is still a biological being who needs to be physically active in order to function actively. There is no substitute for exercise. Today yogic practices have become popular throughout the world. But there are many misconceptions about these practices which are generally looked in exercise physiology. The physiology of yogic practices differs greatly from that of exercise physiology. Yoga, the wealth of India, is one of the greatest gifts of India to the world. Part of daily routine for the Indians for the years. Today yoga is popular not so much as a system of philosophy as a system of practical discipline. the application is yogic techniques is considered beneficial for health and cure of certain disease for improving general efficiency of individual in different fields, yoga is being utilized from the most fundamentally personal to the social and educational implication of the society as a whole. No matter how times and life styles change the judgment of the ancient sages in matters relating to life and conduct is still relevant. Even though our attitude to the nature of yoga itself may be different from those who were installment. in its evolution, its wisdom applies. It is also a spiritual pursuit for many seekers of truth. In the modern world.

Objectives of the Study

- To study the effect of yoga nidra and pranayama on resting heart rate of tribal youths.
- To study the effect of yoga nidra and pranayama on respiratory rate of tribal youths.
- To study the effect of yoga nidra and pranayama on Vital Capacity of tribal youths.

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Design of the Study

The random group design was adopted for this study. Three groups were formed each comprising of 30 subjects. The subjects participated voluntarily in the study. Thirty subjects (N=30) were selected for experimental group –A, Thirty subjects (N=30) were selected for experimental group –B, and Thirty (N=30) acted as control group.

Sample

Sample of 90 tribal youths studying in B.A/B. Sc in Seva Bharati Mahavidyalaya, Kapgari, Vidyasagar University, West Bengal, India were selected randomly for the present study. This was further categorized randomly in to three groups as two experimental and one control group which consist of 30 students each.

Tool Used

1. Resting heart rate was measured by stopwatch.
2. Resting respiratory rate was measured by stopwatch.
3. Vital Capacity was measured by Dry spirometer.

Yogic Interventions Used

- Yoga Nidra
- Pranayama (Bhastrika Pranayama, Ujjai Pranayama & Anulom Viloma Pranayama)

Results

Result of the study has been presented in tabular and graphical form for the components of Resting heart rate, Resting respiratory rate Vital Capacity where ** shows to be significant at 0.05 level.

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

Treatment Group	Mean	Std. Deviation	N
Pranayama Resting Heart Rate	66.8000	1.62735	30
Yoga Nidra Resting Heart Rate	67.7333	2.43443	30
Control Group Resting Heart Rate	69.0667	2.61209	30
Total	67.8667	2.42737	90

Table 2: Descriptive Statistics of the Data Measured in the Post-Testing after Adjustment with the Initial Difference Resting Heart Rate

Treatment Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Pranayama Resting Heart Rate	67.279 ^a	.286	66.712	67.847
Yoga Nidra Resting Heart Rate	67.587 ^a	.282	67.027	68.148
Control Group Resting Heart Rate	68.733 ^a	.284	68.169	69.297

a. Covariates appearing in the model are evaluated at the following values: pre resting heart rate = 70.4667.

Table 3: Ancova Table for the Post-Test Data on Resting Heart Rate

Source	Type I Sum of Squares	Df	Mean Square	F	Sig. (P-Value)
Pre Resting Heart Rate	285.514	1	285.514	119.967	.000
Treatment	34.212	2	17.106	7.188	.001
Error	204.674	86	2.380		
Corrected Total	524.400	89			

Table 4: Post Hoc Comparison for the Group Means in Post-Measurement Adjusted with the Initial Differences Resting Heart Rate

(I) Treatment Group	(J) Treatment Group	Mean Difference (I-J)	Sig. ^A (P-Value)
Pranayama Resting Heart Rate	Yoga Nidra Resting Heart Rate	-.308	.447
	Control Group Resting Heart Rate	-1.454*	.001
Yoga Nidra Resting Heart Rate	Pranayama Resting Heart Rate	.308	.447
	Control Group Resting Heart Rate	-1.146*	.005
Control Group Resting Heart Rate	Pranayama Resting Heart Rate	1.454*	.001
	Yoga Nidra Resting Heart Rate	1.146*	.005

Based on estimated marginal means

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

*. The mean difference is significant at the .05 level.

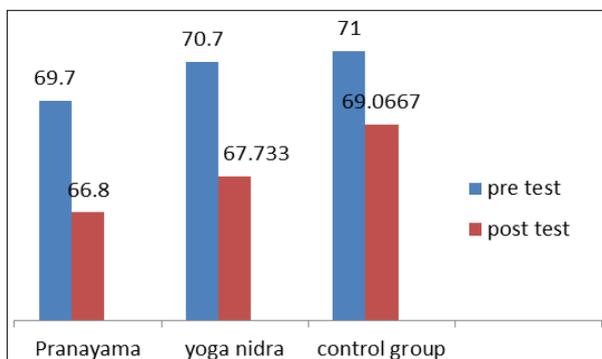


Fig 1: Comparison of the means on resting heart rate of the control group and two experimental groups

Interpretation of findings

The values of the means and standard deviations for the data on resting heart rate in the different groups during the post testing in the table 1.

Further, adjusted means and standard deviation for the data on resting heart rate of different groups during post testing have been shown in table 3. Readers may note that these values are

different from that of the unadjusted values shown in table1.the advantage of using the ANCOVA is that the differences in the post-testing means are compensated for the initial difference in the scores. In other words, it may be said that the effect of covariate is eliminated in comparing the effectiveness of the treatment groups during post-testing.

Table 3 shows the F –value for comparing the adjusted means of the three treatment groups (pranayama, yoga nidra, control) during post-testing. Since p-value for the F- statistic is 0.001which is less than 0.05, it is significant. Thus, the null hypothesis of no difference among the adjusted post-means for the data on resting heart rate in three treatment groups may be rejected at 5%level.

Since F-statistic is significant, post hoc comparison has been made for the adjusted means of the three treatment groups which is shown in table 4. It may be noted here that p-value for the mean difference between pranayama and control is 0.001 and yoga nidra and control is 0.005. Both these p-values are less than 0.05 and hence they are significant at 5% level. Thus, the following conclusions can be drawn:

1. There is a significant difference between the adjusted

means of the pranayama and control groups on the data of resting heart rate during post-testing.

2. There is a significant difference between the adjusted means of the yoga nidra and control groups on the data of resting heart rate during post-testing.
3. There is no significant difference between the adjusted means of pranayama and yoga nidra on the data resting heart rate during post –testing.

In order to find as to which treatment is best, one can see the adjusted means values of different treatment groups during post-testing given in table 2. Clubbing these adjusted means with the three conclusions mentioned above, one may get the answer. If the difference between any two group means is significant (which can be seen from table 4), nothing is done and if the mean difference is not significant, thus, it may be concluded that the resting heart rate of the pranayama and yoga nidra groups are equal and is significantly less than that of the control group. Hence, it may be inferred that pranayama and yoga nidra are equally effective in reducing the resting heart rate among the subjects in comparison to that of the control group.

Table 7: Ancova table for the post-test data on respiratory rate

Source	Type i sum of Squares	df	Mean Square	f	Sig. (p-value)
pre respiratory rate	1107.754	1	1107.754	903.385	.000
treatment	115.913	2	57.957	47.264	.000
error	105.455	86	1.226		
corrected total	1329.122	89			

Table 8: post hoc comparison for the group means in post-measurement adjusted with the initial differences respiratory rate

(I) Treatment group	(j) Treatment group	Mean difference (i-j)	Sig. ^a (p-value)
Pranayama respiratory rate	Yoga nidra respiratory rate	-.422	.144
	Control group respiratory rate	-2.653*	.000
Yoga nidra respiratory rate	Pranayama respiratory rate	.422	.144
	Control group respiratory rate	-2.231*	.000
Control group respiratory rate	Pranayama respiratory rate	2.653*	.000
	Yoga nidra respiratory rate	2.231*	.000

Based on estimated marginal means

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

*. The mean difference is significant at the .05 level.

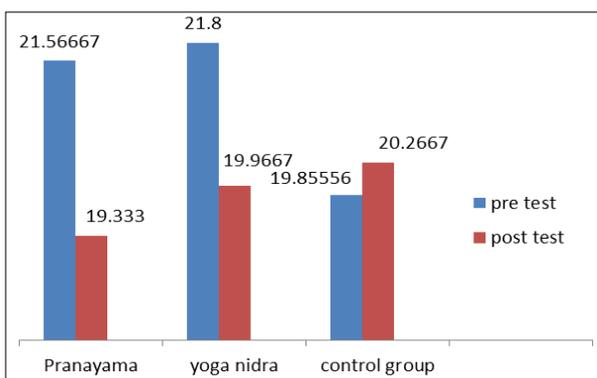


Fig 2: Comparison of the means on respiratory rate of the control group and two experimental group

Interpretation of findings

The values of the means and standard deviations for the data on respiratory rate in the different groups during the post testing in the table 5.

Further, adjusted means and standard deviation for the data on respiratory rate of different groups during post testing have been shown in table 6. Readers may note that these values are different from that of the unadjusted values shown in table 5.

Table 5: Descriptive Statistics of the Data Measured in the Post Testing Respiratory Rate

Treatment group	Mean	Std. Deviation	N
Pranayama Respiratory Rate	19.3333	3.47735	30
Yoga Nidra Respiratory Rate	19.9667	3.47884	30
Control Group Respiratory Rate	20.2667	4.60085	30
Total	19.8556	3.86445	90

Table 6: descriptive statistics of the data measured in the post-testing after adjustment with the initial difference respiratory rate

Treatment group	Mean	Std. Error	95% confidence interval	
			Lower bound	Upper bound
Pranayama Respiratory Rate	18.830 ^a	.203	18.427	19.234
Yoga Nidra Respiratory Rate	19.253 ^a	.203	18.848	19.657
Control Group Respiratory Rate	21.484 ^a	.206	21.074	21.893

a. Covariates appearing in the model are evaluated at the following values: pre respiratory rate = 21.0111

The advantage of using the ANCOVA is that the differences in the post-testing means are compensated for the initial difference in the scores. In other words, it may be said that the effect of covariate is eliminated in comparing the effectiveness of the treatment groups during post-testing.

Table 7 shows the F –value for comparing the adjusted means of the three treatment groups (pranayama, yoga nidra, control) during post-testing. Since p-value for the F- statistic is 0.000 which is less than 0.05, it is significant. Thus, the null hypothesis of no difference among the adjusted post-means for the data on respiratory rate in three treatment groups may be rejected at 5% level.

Since F-statistic is significant, post hoc comparison has been made for the adjusted means of the three treatment groups which is shown in table 8. It may be noted here that p-value for the mean difference between pranayama and control is 0.000 and yoga nidra and control is 0.000. Both these p-values are less than 0.05 and hence they are significant at 5% level. Thus, the following conclusions can be drawn:

1. There is a significant difference between the adjusted means of the pranayama and control groups on the data of respiratory rate during post-testing.
2. There is a significant difference between the adjusted

means of the yoga nidra and control groups on the data of respiratory rate during post-testing.

- There is no significant difference between the adjusted means of pranayama and yoga nidra on the data of respiratory rate during post –testing.

In order to find as to which treatment is best, one can see the adjusted means values of different treatment groups during post-testing given in table 6. Clubbing these adjusted means with the three conclusions mentioned above, one may get the answer. If the difference between any two group means is significant (which can be seen from table 8), nothing is done and if the mean difference is not significant, thus, it may be concluded that the respiratory rate of the pranayama and yoga nidra groups are equal and is significantly less than that of the control group. Hence, it may be inferred that pranayama and yoga nidra are equally effective in reducing the respiratory rate among the subjects in comparison to that of the control group.

Table 9: descriptive statistics of the data measured in the post testing vital capacity

Treatment Group	Mean	Std. Deviation	N
Pranayama Group Vital Capacity	4.3033	.37530	30
Yoga Nidra Group Vital Capacity	3.9367	.28221	30
Control Group Vital Capacity	3.6167	.31523	30
Total	3.9522	.42874	90

Table 10: descriptive statistics of the data measured in the post-testing after adjustment with the initial difference vital capacity

Treatment group	Mean	Std. Error	95% confidence interval	
			Lower bound	Upper bound
Pranayama group vital capacity	4.007 ^a	.022	3.964	4.050
Yoga nidra group vital capacity	3.995 ^a	.019	3.957	4.033
Control group vital capacity	3.855 ^a	.021	3.813	3.896

a. Covariates appearing in the model are evaluated at the following values: pre vital capacity = 3.8683.

Table 11: ANCOVA table for the post-test data on vital capacity

Source	Type III sum of squares	Df	Mean square	F	Sig. (p-value)
Pre vital capacity	15.099	1	15.099	1.402	.000
Treatment	.333	2	.167	15.459	.000
Error	.927	86	.011		
Corrected Total	16.360	89			

Table 12: Post hoc comparison for the group means in post-measurement adjusted with the initial differences vital capacity

(I) treatment group	(j) treatment group	Mean difference (i-j)	Sig. ^a (p-value)
Pranayama Group Vital Capacity	Yoga Nidra Group Vital Capacity	.012	.695
	Control Group Vital Capacity	.152*	.000
Yoga Nidra Group Vital Capacity	Pranayama Group Vital Capacity	-.012	.695
	Control Group Vital Capacity	.140*	.000
Control Group Vital Capacity	Pranayama Group Vital Capacity	-.152*	.000
	Yoga Nidra Group Vital Capacity	-.140*	.000

Based on estimated marginal means

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

*. The mean difference is significant at the .05 level.

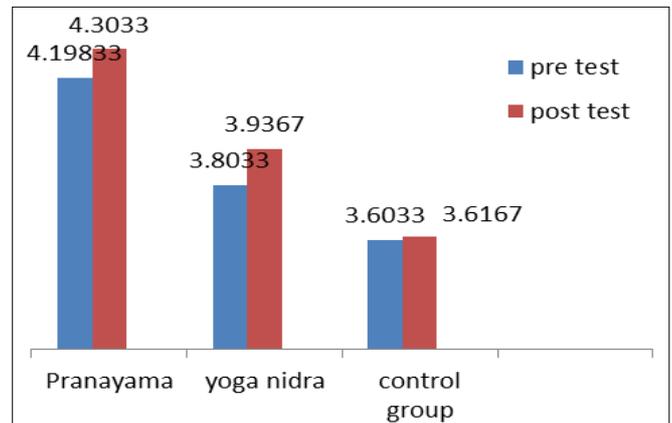


Fig 3: Comparison of the means on vital capacity of the control group and two experimental groups

Interpretation of Findings

The values of the means and standard deviations for the data on vital capacity in the different groups during the post testing in the table 9.

Further, adjusted means and standard deviation for the data on vital capacity of different groups during post testing have been shown in table 10. Readers may note that these values are different from that of the unadjusted values shown in table 9. The advantage of using the ANCOVA is that the differences in the post-testing means are compensated for the initial difference in the scores. In other words, it may be said that the effect of covariate is eliminated in comparing the effectiveness of the treatment groups during post-testing.

Table 11 shows the F –value for comparing the adjusted means of the three treatment groups (pranayama, yoga nidra, control) during post-testing. Since p-value for the F- statistic is 0.000 which is less than 0.05, it is significant. Thus, the null hypothesis of no difference among the adjusted post-means for the data on vital capacity in three treatment groups may be rejected at 5% level.

Since F-statistic is significant, post hoc comparison has been made for the adjusted means of the three treatment groups which is shown in table 12. It may be noted here that p-value for the mean difference between pranayama and control is 0.000 and yoga nidra and control is 0.000. Both these p-values are less than 0.05 and hence they are significant at 5% level. Thus, the following conclusions can be drawn:

- There is a significant difference between the adjusted means of the pranayama and control groups on the data of vital capacity during post-testing.
- There is a significant difference between the adjusted means of the yoga nidra and control groups on the data of vital capacity during post-testing.
- There is no significant difference between the adjusted means of pranayama and yoga nidra on the data of vital capacity during post –testing.

In order to find as to which treatment is best, one can see the adjusted means values of different treatment groups during post-testing given in table 10. Clubbing these adjusted means with the three conclusions mentioned above, one may get the answer. If the difference between any two group means is significant (which can be seen from table 12), nothing is done and if the mean difference is not significant, thus, it may be concluded that the vital capacity of the pranayama and yoga nidra groups are equal and is significantly higher than that of the control group. Hence, it may be inferred that pranayama and yoga nidra are equally effective in increasing the vital

capacity among the subjects in comparison to that of the control group.

Discussion of findings

The uprising popularity of yoga nidra and pranayama has been the reason for arousal of this study. The purpose of the study is to determine the effect of yoga nidra and pranayama on the selected physiological variables i.e. Resting heart rate, respiratory rate and vital capacity. It is quite known fact that various forms of yogic training effect number of system of our body in general but cardio-vascular system in particular. After going through the result obtained as evident from various tables given earlier. It is found that there is a significant change in two experimental groups after a span of twelve weeks training, Resting heart rate, respiratory rate and vital capacity were significant difference among the three groups.

Resting heart rate and respiratory rate

The resting heart rate or pulse rate or heart frequency is defined as frequency of heart beats in one minute of the resting condition.

Resting heart rate generally represent the true picture or condition of the function of heart at resting stage. Most probably the impact of Pranayama and yoga nidra were potent enough to change the vago-symphatic tone after twelve weeks of practice of Pranayama and yoga nidra i.e. decreased sympathetic (excitatory) nervous activity and increased parasympathetic (Relaxatory) function. As a result of that there was significant decreased heart rate in both the experimental groups.

Vital Capacity

The term Vital Capacity indicates of an individual maximum ability to exhale air followed by a forceful maximum inspiration. In fact there is the basic difference between yoga nidra and Pranayama. Yoga nidra is a static form of exercise where breathing result is due to constriction and enlargement of nasopharynx structure which is located immediately after the nasal passage may bring possible change in the vital capacity of yoga nidra group where as in Pranayama a forcefully dynamic movement is involved, as a quick expansion and contraction of rib cage is done during Pranayama must have influence the dimension of thoracic cavity and hence for that reason a significant increase in vital capacity was observed after the experimental period of twelve weeks.

Conclusions

- Significant improvement was found in resting heart rate as a result of the experimental treatments in both the experimental groups.
- Significant improvement was found in breath respiratory rate as a result of the experimental treatments in both the experimental groups.
- Significant improvement was found in vital capacity as a result of the experimental treatments in both the experimental groups.

Recommendations

In light of finding of the study, the following recommendations are made for the sports scientists, sports administrators, and teachers of physical education, yoga educators, yoga scientists, research scholars and coaches and yoga instructor.

1. A similar study may be concluded on variables, other than those selected in the study.
2. A similar study may be concluded on female subjects.
3. A similar study may be concluded on different age group with large number of samples.
4. A study may be repeated with the subjects participating at higher levels of competition.
5. Similar study may be under taken in other sports.
6. The knowledge of pranayama and yoga nidra are to be incorporate in the area of games and sports.

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