

Effect of Hatha Yoga on Flexibility of College Going Female Students

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Abstract: Being flexible significantly reduces the chance of injury and chronic back pain. The purpose of the study was to see the effect of Hatha Yoga training on the flexibility of female college students. So forty (40) female college students of Radha Krishna Institute Vikaspuri, New Delhi was randomly selected as subjects and further twenty (20) students were randomly selected for Control Group and remaining 20 students were selected for Experimental Group. The age of the subjects ranged from 18 to 20 years. Flexibility was selected as variable and Sit and reach test was used as a criterion measure for flexibility. Pre-test data were collected from both the group before giving 45 days of the Hatha Yoga training programme and also Post-test data were collected from both the group at the end of 45 days of the Hatha Yoga training programme. Mean, Standard Deviation and ANCOVA were used as statistical techniques for the present study. The result revealed that the 45 days of Yoga training had significantly improved the flexibility of female college going students of Radha Krishna Institute Vikaspuri, New Delhi.

Key Words: Flexibility, Hatha Yoga, Asanas, Pranayama, and Yoga Nidra.

INTRODUCTION

We need flexibility to perform everyday activities with relative ease. Flexibility tends to deteriorate with age, and the sedentary life hastens its deterioration. Daily activities become more difficult to perform without adequate flexibility. The way we perform our daily activities over time which form as a habit which may lead to reduced mobility of joints and compromised body positions. In order to ensure our independence as we age, we need to stay active and stretching regularly helps prevent this loss of mobility. Being flexible significantly reduces the chance of injury and chronic back pain. Yoga has been considered to be improving one's flexibility. The various different yoga positions work on all the different joints found in the human body. These also include those joints that are not really targeted in other forms of exercise. Benefits of yoga include increasing one's lubrication of the tendons, joints and ligaments.

It is important to include flexibility training as part of our regular fitness routines. Improved flexibility may enhance performance in aerobic training and muscular conditioning as well as in sport. There is scientific evidence that the incidence of injury decreases when people include flexibility training in their routines due to the enhanced ability to move unimpeded through a wider range of motion. The only exception to this would be when there is an excessive or unstable range of motion, which may increase the likelihood of injury. When used appropriately, flexibility training allows us to become more in tune with our body. It is a form of active relaxation that can improve both mental and physical recovery. So considering the importance of Flexibility I have tried to see the effect of 45 days of Hatha Yoga

training programme on female students of Radha Krishna Institute, Vikaspuri, New Delhi.

METHODOLOGY

For the purpose of the study forty (40) female students of Radha Krishna Institute of Vikaspuri, New Delhi were randomly selected as subjects and further twenty (20) students were randomly selected for Control Group and remaining 20 students were selected for Experimental Group. The age of the subjects ranged from 18 to 20 years. Flexibility was selected as variable and Sit and reach test was used as a criterion measure for flexibility. Pre-test data were collected from both the group before giving 45 days of the Hatha Yoga training programme and also Post-test data were collected from both the group at the end of 45 days of the Hatha Yoga training programme. Mean Standard Deviation and ANCOVA were used as statistical techniques for the present study.

TRAINING PROTOCOL

The training programme was divided into four parts, Suryanamaskar Part, Asanas Part, Pranayamas Part, and Yoga Nidra Part. The training programme lasted for 45 days every day in the evening for 40 minutes from 4:00 pm to 4:40 pm and 5 (five) days a week, Monday to Friday. Saturday and Sunday were observed as rest Day.

1. **Surya Namaskar:** At the beginning of the training Suryanamaskar was made to perform for 8 minutes continuously.
2. **Asanas:** After performing the Suryanamaskar, following asanas were made to perform for 25 minutes.
 - i. Sarvangasana,
 - ii. Halasana,

- iii. Bhujangasana,
 - iv. Shalvasana,
 - v. Dhanurasana
 - vi. Pashimottanana,
 - vii. Ardhamatsyendrasana,
 - viii. Vajrasana,
 - ix. Suptavajrasana
 - x. Tadaasana.
3. **Pranayamas:** After performing Asanas following pranayamas were made to perform for 2 (Two) minutes.
- i. Anulom-Viloma,

4. **Yoga Nidra:** Finally last 5(five) minutes were given for yoga Nidra.

RESULTS

The data pertinent to flexibility of pre-test and post-test of forty (40) female students of Radha Krishna Institute, Vikaspuri, New Delhi were computed with the help of computer Software called IBM SPSS Statistics-21 and presented from table No. 1 to Table No. 4.

Table No. 1
Descriptive Statistics of Flexibility
on Pre-test and Post-test Data

Group	N	Pre-test		Post-test	
		Mean	SD	Mean	SD
Control	20	-2.970	5.9203	-3.020	5.9336
Experimental	20	-1.595	2.7790	3.400	2.3261

The Table No. 1 shows the Mean, Standard Deviation Score of Pre-test and Post-test data of Control and Experimental Group. For the Pre-test data, the mean of Experimental Group is greater than the mean of Control Group as the mean score is -1.595 and -2.970 respectively. Again the variability score of Experimental Group was also better than the Control Group as the Standard Deviation is 2.7790 and 5.9203 respectively.

Further for the Post-test data, the mean of Experimental Group is greater than the mean of Control Group, as the mean score is 3.400 and -3.020 respectively. Again the variability score of Experimental Group was also better than the Control Group as the Standard Deviation is 2.3261 and 5.9336.

Table No. 2
Adjusted Mean of Post-test Data

Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Control	-2.375 ^a	.279	-2.941	-1.810
Experimental	2.755 ^a	.279	2.190	3.321

a. Covariates appearing in the model are evaluated at the following values: Pre = -2.283.

The Table No. 2 shows the adjusted mean of Post-test data of Control and Experimental Group. The Adjusted mean of Post-test data of Control and Experimental Group after covariate of Pre-test data are -2.375 and 2.755 respectively.

ANCOVA was computed in the Table No. 3 to see the effect of 45 days of Hatha Yoga training on Control Group and Experimental Group of Pre-test data and Post-test data.

Table No. 3
ANCOVA (Tests of Between-Subjects Effects on Post-test Data)

Source	Type I Sum of Squares	df	Mean Square	F	Sig.
Pre-test	869.663	1	869.663	564.355	.000
Group	257.237	1	257.237	166.930	.000
Error	57.016	37	1.541		
Total	1185.360	40			
Corrected Total	1183.916	39			

a. R Squared = .952 (Adjusted R Squared = .949)

In the above Table No. 3 when tested between Pre-test data of Control Group and Experimental Group, the Significant difference was found as the p-value is 0.000 which is less than 0.05, the level of confidence.

Further, when tested between the Groups (i.e. Control and Experimental) of Post-test data after covariate of Pre-test data and Adjusted Mean of Post-test Data significant difference was found as the p-value is 0.000 which is less than 0.05, the level of confidence.

Table No. 4
Pair Wise Comparison of Post Adjusted Means on Flexibility

(I) Group	(J) Group	Mean Difference (I-J)	Sig. ^b
Control	Experimental	-5.131*	0.000
Experimental	Control	5.131*	0.000

Based on estimated marginal means

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

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

PairWise Multiple comparisons Post Adjusted Means of Flexibility were done between Control Group and Experimental Group on Table No.4. The Post Adjusted mean difference between Control Group and Experimental Group is -5.131 and the Post Adjusted mean difference between Experimental Group and Control Group is 5.131. Thus, from the above Table No. 2 of Adjusted Mean of Post-test Data, it is evident that Experimental Group on Post-test data had greater flexibility.

DISCUSSION OF FINDINGS

In the present study, we have given 45 days of Hatha Yoga training to forty (40) female COLLEGE students of Radha Krishna Institute of Vikaspuri, New Delhi, to see whether it can improve flexibility or not. The result of the ANCOVA revealed that the 45 days of Hatha Yoga training had improved the flexibility of female COLLEGE students of Radha Krishna Institute of Vikaspuri, New Delhi. Thus, our findings of the present study supported the previous findings of Armstrong, W. Jeffrey & Smedley, June M. Scott (2003); Bal, B.S. & Kaur, P.J (2009); Kawade, R. C. (2011) and Kumar, Surender (2013).

Armstrong, W. Jeffrey & Smedley, June

M. Scott (2003) studied on "Effects of a home-based yoga exercise programme on flexibility in older women" and their result also revealed significant improvement of flexibility for older women. Again Bal, B.S. & Kaur, P.J (2009) studied on "Effects of selected asanas in hatha yoga on agility and flexibility level" and subjects were taken from D.A.V. Institute of Engineering and Technology, Jalandhar (Punjab), INDIA. Their result also revealed significant improvement in Flexibility and Agility as well. Kawade, R. C. (2011) studied on "Yoga Improves Flexibility" and her subjects were school girls of Navi Mumbai. Her result was also effective in improving Flexibility of the school girls of Navi Mumbai. Kumar Surender (2013) also studied on "effect of Hatha Yoga training programme on the physical fitness of boys of rural high school in district Kaithal" and the result of the study revealed that Hatha Yoga training programmed to have positive effect on physical fitness components of rural high school boys i.e. speed, strength, agility, endurance and flexibility. Thus, it is evident that from the above studies regular training of Yoga can improve flexibility and it is recommended to all ages of people to regularly participate in the yoga activities to keep themselves fit and flexible so that one can do his/her task efficiently.

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