

Effects of Selected Hathayogasanas Pranayama Practices and Stress Reducing Exercises on Health Related Physical Fitness and Selected Psychological Variables of College Students

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Abstract

The Purpose of the study was to investigate the effect of selected hathayogasanas, pranayama practices and stress reducing exercises on health related physical fitness and psychological variables of college students. One hundred and twenty students were selected at random. The average age ranges of the subjects were 18 to 20 years. The subjects were divided into four groups of thirty. Control group, Experimental group I, II and III Hatha yoga group, Pranayama group and Stress Reducing exercises group. Pre and post test scores were collected. The treatment was given for a period of twelve weeks. Differential statistics for post test –pre test difference in individual groups and significance of gain scores effect size statistics used to determine the significance of paired mean difference. The selected variables of Health Related Physical Fitness variables and Psychological variables were significantly improved in the effect of the three treatments.

Key words: Hathayogasanas, Pranayama, Stress reducing exercises, Flexibility, Stress

Introduction

Physical education has long believed that exercise is essential to maintain good health. During the past twenty years a great deal of evidence has been reported by the medical researches supporting the value of vigorous exercise for promoting health (**Ted A. Baumgartner**, 1987). Yoga provides linkage between body, mind and soul. Yoga starts from cleanliness of the body and mental thought process, word and action of a man. Yoga makes the mind to go deep into the subconscious level purified even the accumulated evil thoughts. (**Iyengar. B.K.S**, 2004) It is harmony and is as good as physical education. Asanas have corrective and preventive effect and bring about manifold benefits. It is making a multidimensional development. It is known fact the regular practice of physical exercise and / or yogasana relaxes the mind and considerably brings down the mental and physical strain. (**Kovoor T. Behanan**, 1964) Pranayama means a Break in the moment of Breath; Prana Meaning Breath and Yama meaning Pause.

Psycho-physical health is the greatest concern of modern man. Participation in activities that promote physical fitness also had been shown to reduce depression and anxiety and to increase a person's self image and ability to deal with stress in a positive manner (**Lawther**, 1972). Yoga eliminates psycho – physical tensions. Proposed initially by **Annarino, Cowell** (1980) this view is becoming an accepted way to classify learning domains in Physical Education.

The main purpose of the study was to find out the effect of training in Hathayogasanas, Pranayama practices and stress Reducing Exercises on health related physical fitness and selected psychological variables of college students. It was hypothesised that there would be a significant effects on the selected criterion variables namely health related physical fitness and psychological variables due to Hathayogasana, Pranayama practices and stress reducing exercises; and also there would be significant differences in the effect of these three treatments on the criterion variables.

Methodology

One hundred and twenty students were selected at random from the colleges in Karaikudi for this study. The average age of the subject was 18 to 20 years. The subjects were divided at random into four groups. The number in each group was thirty.

Sit and Reach test was used to estimate flexibility, flexed Arm Hang Test was used to estimate Functional strength, Bent knee sit-ups test was used to estimate Trunk strength, skin folds Test was used to estimate the Body composition, Harvard step test was used to estimate cardio respiratory endurance. The psychological variables were measured by the following units of testing the hypothesis. Letter Cancellation Test was used to estimate Focus of Attention, Recall Test was used to estimate memory, it was used to estimate stress and the scale developed by N.K. Chadha (2001) will be modified and adopted, it was used to estimate Emotional Intelligence. Initial data were collected on the chosen variable. Final data were also collected on the chosen variables after 12 weeks of experimental treatment.

Experimental Treatment Procedure

The Selected Hathayogasanas Practices such as Uttita Trikonasana, Uttanasana, Salabasana, Dhanurasana, Bhujangasana, Paripurana Navasana, Parvatasana, Paschimottanasana, Salabamba Sarvangasana and Halasana are included in the Experimental Treatment –I for the first group.

The selected Pranayama Practices such as Ujjayi, Sitali, Sitakari, Pratiloma, anuloma, Surya Bhedana, Chandra Bhedana, Nadi sodhana, Savasana are included in the experimental Treatment-II. The selected Stress Reducing exercises such as Palm Press, Undulating Spine Stretch, Prone Half Lotus, Upward Facing Dog, Reclining Side twist, The Crawl, Knee squeeze Stretch, Horizontal Arm Stretch, Back ward Hand Press, Shoulder Lift are included in the Experimental Treatment-III for the third group.

1st and 2nd week Repetition-2, 3rd-6Week Repetition-3, 7-10Week Repetition-4, Week 11&12 Repetition-5, duration-60, no. of sets-1. Savasana will be given at the end of the session of each day. Saturday & Sundays are holidays of every week. Group IV was kept free and away from the above three experimental groups.

Apart from descriptive statistics for the whole and subgroups in the selected variables, the treatment effects were studied using the following statistics. Differential statistics for group difference in post test, Differential statistics for post test – pre test difference in individual groups and Significance of gain scores effect size statistics.

Table - I
Showing 'T' Test Results for the Difference between Means of Post and Pre Test Scores of All the Criterion Variables of all the Groups (1 To 4)

| S. No | Criterion Variables | | Experimental group -1 Hathayogasanas N = 30 | | | Experimental group -2 Pranayama N = 30 | | | Experimental group -3 Stress Reducing Exercise N = 30 | | | group 4 Control N = 30 | | |
|---|-----------------------------------|-----------------------|---|----------------|-------------|---|----------------|-------------|---|----------------|-------------|---------------------------|----------------|-----------|
| | | | M | S.D | 'T' Value | M | S.D | 'T' Value | M | S.D | 'T' Value | M | S.D | 'T' Value |
| 1. health related physical fitness variables | | | | | | | | | | | | | | |
| 1. | Flexibility (FL) | Post test Pre test | 12.63 8.30 | 5.26 4.41 | 3.454 | 12.10 9.37 | 5.38 4.89 | 2.06 | 11.80 8.30 | 4.21 3.64 | 3.443 | 9.03 8.57 | 4.00 4.71 | 0.411 |
| 2. | Trunk Strength (TS) | Post test Pre test | 19.53 14.33 | 5.69 4.99 | 3.763 | 17.70 13.73 | 6.14 5.63 | 2.607 | 17.53 12.97 | 4.99 5.16 | 3.485 | 17.53 12.97 | 4.58 4.84 | 0.137 |
| 3. | Functional Strength (FS) | Post test Pre test | 21.67 15.87 | 11.22 10.04 | 2.109 | 21.57 16.53 | 6.90 9.42 | 2.366 | 20.60 14.37 | 9.84 8.82 | 2.586 | 20.60 14.37 | 9.94 10.93 | 0.173 |
| 4. | Body fat % | Post test Pre test | 11.37 14.31 | 0.51 0.66 | - 19.306 | 11.73 14.23 | 0.55 0.73 | 18.18 | 11.44 14.20 | 0.50 0.68 | - 17.910 | 11.44 14.20 | 0.92 0.67 | 0.154 |
| 5. | Cardio respiratory Endurance (RE) | Post test Pre test | 71.35 56.33 | 5.55 4.78 | 11.232 | 66.99 56.81 | 4.66 5.24 | 7.957 | 68.71 56.03 | 5.30 4.66 | 9.843 | 68.71 56.02 | 3.74 3.98 | 0.030 |
| 2. psychological Variables | | | | | | | | | | | | | | |
| 6. | Focus of Attention (FA) | Post test Pre test | 44.70 39.13 | 11.96 10.83 | 2.889 | 44.60 38.77 | 8.63 11.03 | 2.283 | 44.83 38.77 | 8.75 10.63 | 2.42 | 44.83 38.77 | 11.30 11.30 | 0.4374 |
| 7. | Memory (ME) | Post test Pre test | 22.60 18.56 | 3.66 3.51 | 4.357 | 22.30 17.98 | 4.18 4.01 | 4.104 | 20.77 17.17 | 3.66 2.84 | 4.48 | 20.77 17.77 | 3.26 3.60 | 0.4238 |
| 8. | Stress (ST) | Post test Pre test | 28.77 35.70 | 15.03 18.07 | -1.837 | 22.57 29.67 | 12.16 15.31 | - 2.4127 | 30.13 38.47 | 15.14 18.35 | -2.13 | 38.30 37.53 | 17.69 18.78 | 0.4350 |
| 9. | Emotional Intelligence (EI) | Post test Pre | 199.33 145.83 | 6.53 11.23 | 22.557 | 196.17 144.17 | 5.82 11.30 | 22.407 | 191.17 145.00 | 5.36 10.83 | 20.93 | 144.50 144.50 | 11.84 11.55 | 0.5050 |

Results

The Hathayogasanas (Group I), shows significant difference between means of pre and post test scores, at 0.05 level of confidence, since the obtained 't' values for the four criterion variables of Health Related physical fitness, FL 3.45, TS 3.76, BFP -19.31 and CRE -11.23 are higher than the Table value (2.39) and in one of the variables FS, the obtained 't' value is 2.11, significant at 0.05 level. For the hathayogasanas group (1), The obtained 't' values for the psychological variables i.e. FA 2.89, ME 4.36, EI 22.56 are higher than the table value 2.39, which reveals the significant difference at 0.05 level of confidence. In case of ST, the obtained 't' value is (1.84), significant at 0.05 level, since the table value is 1.67.

In Group (2) Pranayama practices, for three criterion variables of Health Related Physical fitness, the mean differences in the pre and post test scores significant different at 0.05 level. Since the obtained 't' values , TS 2.61, BFP 18.18 and CRE 7.96 are higher than the Table value 2.39. The obtained 't' values differ significantly at 0.05 level in flexibility 2.06 and FS 2.37, since the table value is 1.67 for the three psychological variables, the obtained 't' values, in FA 2.28 at 0.05 level and ME 4.10 and EI 22.41 differ significantly at 0.05 level. In stress the 't' value is (-2.41) differs significantly at 0.05 level.

In stress reducing exercise practice group, the five health related physical fitness, criterion variables differ significantly at 0.05 level, at the obtained 't' values FL 3.44 TS 3.49 Fs 2.59 BFP 17.91 CRE 9.84 are higher than the table value 2.39. In psychological variables, three criterion variables FA 2.42, ME 4.48 and EI 20.93 show significant difference at 0.05 level, since the obtained 't' values are higher than the table value 2.39. In the stress variable, the obtained 't' value is -2.13 significant at 0.05 level. The control group did not show any significant difference between the pre and post test means in all the nine variables are the 't' values for all these variables are less than the table value for 0.05 level.

The results of the study showed that experimental groups significantly improved Flexibility, Functional Strength, Trunk Strength, Body Composition, Cardio Respiratory Endurance, Focus of Attentions, Memory, Stress, Emotional Intelligence were essential to perform the motor skills in an efficient manner. On the whole, the total Psychological and Health Related Physical Fitness Performance improved due to all the three groups. when compared with the mean difference of greater than control group .The analyze of data revealed that Asana group, Pranayama Group, and Stress Reducing Exercise Group has proved to be effective in improving the Psychological and Health Related Physical Fitness Performance of the subjects.

Table-II
Gain Score Analysis

The Mean and Standard Deviation of Gain Scores in all the Criterion Variables of Experimental and Control Groups, F- Ratio and Tukey Hsd Test Results and Significance among the Different Pairs of groups

| S. No | Variables | Exp. group I hathayogas anas N = 30 | | Exp. group II pranayama N = 30 | | Exp. group III Stress Reducing Exercise N = 30 | | Exp. Group IV Control N = 30 | | OF | Tuk ey HS D Tes t | groups differed signific antly at 0.05 level |
|---|--|--|------|--------------------------------------|------|--|------|------------------------------------|------|----------------|----------------------------------|---|
| | | M | S.D | M | S.D | M | S.D | M | S.D | | | |
| 1. Health Related Physical Fitness Variables | | | | | | | | | | | | |
| 1. | Flexibility (FL) | 4.33 | 0.96 | 2.7 3 | 0.74 | 3.50 | 0.78 | 0.4 7 | 1.20 | 94. 66 | 0.6 614 | (1&2) (1&3) (1&4) (2&3) (2&4) (3&4) |
| 2. | Trunk Strength (TS) | 5.20 | 0.81 | 3.9 7 | 0.61 | 4.57 | 2.01 | 0.1 7 | 1.44 | 85. 92 | 0.9 453 | (1&2) (1&4) (2&4) (3&4) |
| 3. | Functional Strength (FS) | 5.80 | 1.37 | 3.0 3 | 0.81 | 4.23 | 1.25 | 0.4 7 | 2.40 | 61. 49 | 1.1 115 | (1&4) (2&4) (3&4) |
| 4. | Body fat % | - 2.93 | 0.73 | - 2.4 5 | 0.61 | - 2.77 | 0.71 | 0.3 9 | 0.52 | 17 6.0 9 | 0.4 573 | (1&2) (1&4) (2&4) (3&4) |
| 5. | Cardio respiratory Endurance (RE) | 15.0 1 | 2.20 | 10. 18 | 2.30 | 12.6 8 | 2.14 | 0.0 3 | 0.54 | 34 8.1 3 | 1.3 699 | (1&2) (1&3) (1&4) (2&4) (2&3) (3&4) |

| 2. Psychological Variables | | | | | | | | | | | | |
|----------------------------|-----------------------------|-------|------|-------|------|-------|------|------|------|--------|------|---|
| 6. | Focus of Attention (FA) | 5.57 | 2.19 | 3.83 | 0.83 | 4.07 | 0.58 | 0.47 | 2.05 | 80.51 | 1197 | (1&2) (1&2) (1&3) (2&4) (3&4) |
| 7. | Memory (ME) | 4.03 | 0.56 | 4.33 | 0.55 | 3.60 | 0.67 | 0.17 | 1.34 | 156.93 | 0581 | (1&4) (2&3) (2&4) (3&4) |
| 8. | Stress (ST) | 6.93 | 3.48 | 7.10 | 3.91 | 8.33 | 4.03 | 0.77 | 2.66 | 40.92 | 2577 | (1&4) (2&4) (3&4) |
| 9. | Emotional Intelligence (EI) | 24.67 | 2.92 | 23.50 | 3.97 | 22.00 | 5.81 | 0.67 | 4.42 | 184.23 | 3148 | (1&4) (2&4) (3&4) |

One tailed test of significance at 0.01 and 0.05 level.

Results of Gain Score Analysis

The four groups namely Hathayogasanas, Pranayama, stress Reducing Exercises practices and control groups were compared on the basis of mean gain scores. The obtained 'F' value is 94.66, 85.92, 61.49, 176.09, 348.13, 80.51, 156.93, 40.92, 184.23 found to be greater than the table value of 3.92 required to be significant at 0.5 level.

Since, 'F' value reveals that there is a significant difference between the four groups, the tukey HSD test was applied and the difference in mean gains required for the means to differ significantly is found. The obtained THSD mean difference required is 0.6614 for FL, 0.9453 for TS, 1.1115 for FS, 0.4573 for BFP, 1.3699 for CRE 1.1197 for FA, 0.5981 for ME, 2.5177 for ST, 3.1148 for EI reveals that the following pairs of groups differ significantly at 0.05 level in the mean gains.

The mean differences in post test scores between experimental and control groups, in all the five criterion variables are significant. The obtained 't' value for flexibility is 3.15, for Trunk strength 4.22, for Body fat percentage -3.10 and for cardio respiratory endurance 14.94, for Functional Strength 2.32.

The experimental and control groups significantly differ in their means in the four psychological variables namely focus of attention memory, stress and emotional intelligence. The gain scores in all the variables for experimental groups are significant at 0.05 level. The treatment has resulted in significant gain for the Hathayoga Asana groups. The pranayama practices groups and the stress reducing exercises groups in all the nine criterion variables, since the obtained 't' value are higher than the table value at 0.05 level. So the hypothesis was accepted.

Table-III

| S. No | Variables | Exp. group I hathayogasanas N = 30 | Exp. group II pranayama N = 30 | Exp. group III stress reducing exercise N = 30 |
|---|-----------------------------------|--|--------------------------------------|--|
| | | Effect size | Effect size | Effect size |
| 1. Health related physical fitness variables | | | | |
| 1. | Flexibility (FL) | 0.90 | 0.77 | 0.69 |
| 2. | Trunk Strength (TS) | 1.22 | 0.82 | 0.79 |
| 3. | Functional Strength (FS) | 0.48 | 0.47 | 0.37 |
| 4. | Body fat % | -3.53 | -3.14 | -3.46 |
| 5. | Cardio respiratory Endurance (RE) | 4.18 | 4.66 | 3.48 |
| 2. Psychological variables | | | | |
| 6. | Focus of Attention (FA) | 0.48 | 0.47 | 0.49 |
| 7. | Memory (ME) | 1.46 | 1.37 | 0.90 |
| 8. | Stress (ST) | -0.54 | -0.72 | -0.46 |
| 9. | Emotional Intelligence (EI) | 4.63 | 4.36 | 3.94 |

Discussion and Findings

Training droned more blood to the muscles and also droned more lymph away from the blood loaded with waste materials. It increases the tone of the muscles and led to an increase of their efficiency. The size of the muscle fiber was increased. In Pranayama breathing system is exercised and the lung capacity is improved. Stress reducing exercises aimed at making the mind in tranquility. Asana relaxes the muscles and help in over all development of the body. Yoga asana are natural human movements of stretching with awareness. It stimulates the brain centers. The statistical analysis of data revealed that the Flexibility is improved by Hathayoga, pranayama Practices and stress reducing exercise groups. It was found out that all the training has improved the Flexibility than control group. It may be due to the following reasons. Due to the continuous physical training the contraction and relaxation of the muscle fiber is increased and there by the flexibility of the muscle is increased. Besides that the muscles covering the joints are activated and there by the range of movement (Flexibility) become free and easy.

Many study showed that the Endurance was improved effectively by administering yogic practice program me. The Yogic Exercise Program me improves the strength and flexibility. **Hardayal Singh (1991)**. It also enhances the tolerance of the muscles for an increased strength load Endurance is the ability to resist fatigue. That is the tolerance of the muscles to resist fatigue. The yogic practice training basically improves the tolerance of the muscles.

The cardio vascular efficiency administering hatha yoga and pranayama practices improved the strength, flexibility, body fat percentage, stress and emotional intelligence. It also enhance the tolerance of the muscle for increased strength and cardio vascular efficiency(**Larry C. Shaver,1981**) The physical exercises basically improved the tolerance of the muscles and lowering the resting heart rate. It may be due to the above reasons that cardio vascular efficiency was improved due to the hatha yoga asanas, pranayama practices more than the control group.

It was found that body fat percentage was reduced in general due to hatha yoga and pranayama practices. When the post hoc test was applied to find out the difference between paired means it was revealed that hatha yoga practices training had reduced the fat percentage more than the control group. **Getchell (1979)** stressing the importance of circulo-respiratory endurance, following the works opined that physical fitness means more than building muscles or a trim waistline. During the yoga asana and stress reducing exercise there is an increased ability to utilize fat metabolic as fuel for muscle work and correspondingly increased the metabolic turnover in adipose tissue which results in its decreased proportion. When energy output is suddenly decreased, fat is laid down this may be the reason of the reduction of body fat percentage. The improvement of muscular performance depends on the asana, pranayama, stress reducing exercises which gradually increased the psychological and health related physical fitness performance.

Conclusions

Selected variables namely health related physical fitness and psychological variables were significantly improved due to hathayogasana and pranayama practices and stress reducing exercises.

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