

Effects of Hatha Yoga Training on the Health-Related Physical Fitness

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Abstract. The aim of the study is to determine the effects of hatha yoga training on health related physical fitness variables including muscular Strength, Agility, Power, Speed and Cardiovascular Endurance. Thirty randomly selected male students of department of physical education (T) Guru Nanak Dev University, Amritsar (Punjab, India) aged 18 –24 years, volunteered to participate in the study. Subjects were assigned into two groups: A (experimental: N-15) and B (control: N-15). The subjects from Group A were subjected to an 8-week hatha yoga training programme. Each yoga session consisted of 10 minutes of pranayamas, 15 minutes of dynamic warm-up exercises, 40 minutes of asanas and 5 minutes of supine relaxation in savasana. The subjects were evaluated pre and post the 8-week training program. Student's t-test was used to assess the between-group differences for dependent data to assess the Post-Pre differences. Results indicated that the health related physical fitness variables including muscular Strength, Agility, Power ($p < 0.01$) and Speed ($p < 0.05$) significantly improved in group A compared with the control one. There was non-significant improvement found in experimental group for cardiovascular endurance. These findings indicate that regular hatha yoga practice can elicit improvements in the health-related aspects of physical fitness and may contribute to enhance health status and wellness.

Keywords: Hatha yoga, Agility, Power, Speed, cardiovascular endurance.

1. Introduction

Yoga is the oldest system of personal development encompassing body, mind, and spirit. The word yoga is derived from the Sanskrit root *Yuj*, which means to join or to yoke. In philosophical terms, yoga refers to the union of the individual self with the universal self (Hadi 2007). Yoga is an ancient Indian practice, first described in Vedic scriptures around 2500 B.C., which utilizes mental and physical exercises to attain *samadhi*, or the union of the individual self with the infinite (Lidell ;1983). Hatha Yoga has become increasingly popular in western countries as a method for coping with stress and as a means of exercise and fitness training (Schell et al; 1994). Hatha yoga is an ancient practice that was developed to promote physical health as well as an awareness of one's true nature. It consists of a series of postures, called asanas, and various breathing exercises, called pranayama, which encourage balance between the physical, mental/emotional, and spiritual aspects of a human being. In short, hatha yoga promotes health. Like other forms of yoga, hatha yoga is purported to quiet the mind and focus the concentration; however, of all the yoga traditions, the importance of physical fitness is emphasized most in hatha yoga (Worthington;1982, Zorn;1968). Yoga has been practiced for thousands of years. It is based on ancient theories, observations and principles of the mind-body connections. Substantial research has been conducted to look at the health benefits of yoga – yoga postures (*asanas*), yoga breathing (*pranayama*) and meditation. These yoga practices might be interacting with various somatic and neuro-endocrine mechanisms bringing about therapeutic effects (Malhotra and Singh ;2002). Yoga is traditionally believed to have beneficial effects on physical and emotional health (Gilbert C. ;1999). The overall performance is known to be improved by practicing yoga techniques (Upadhyay et al ;2008) and their effects on physical functions were reported (Hadi 2007). Yoga practices can also be used as psycho-physiological stimuli to increase the secretion of melatonin which, in turn, might be responsible for perceived well-being (Harinath et al;2004). Yoga may be as effective as or better than exercise at improving a variety of health-related outcome measures (Ross and Thomas; 2010) and as a result this study was undertaken to find out the effects hatha

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yoga training on health related physical fitness variables.

2. Material and Methods

2.1. Subjects:

Thirty randomly selected male students of department of physical education (T) Guru Nanak Dev University, Amritsar (Punjab, India) aged 18 – 24 years, volunteered to participate in the study. A written consent was obtained from the subjects. The study was approved by the local ethical committee. All were doing Bachelor degree in physical education. They were highly motivated to participate in this study and allowed to quit any time. They were randomly assigned into two groups: A (experimental N=15) and B (control N=15). All subjects, after having been informed about the objective and protocol of the study, gave their written consents.

2.2. Selection of Variables and Tests:

The Subjects were tested on the following physical fitness variables.

Physical fitness variables /Test

- Muscular Strength / Sit-ups Test
- Agility /Shuttle Run Test
- Power /Standing Broad jump Test
- Speed /50 yard dash Test
- Cardiovascular Endurance /600 yard run and walk Test

2.3. Study protocol:

The subjects from Group A were subjected to a 8-week yogic exercises training programme. This lasted 8- weeks and consisted of daily sessions. Each yoga session consisted of 10 minutes of *pranayamas*, 15 minutes of warm-up exercises, 40 minutes of *asanas*, (yoga postures), and 5 minutes of relaxation in *savasana*.. The Five days in a week was observed in training and Saturday-Sunday was considered as a rest days. The *pranayamas* consisted of alternate nostril breathing while maintaining the *vajrasana ardha padmasana* position. Nostril-regulated breathing was practiced throughout the warm-up and *asana* position of the exercise program. The warm-up program focused on slow, dynamic muscular movements, which consisted of dynamic lunges, shoulder and arm circles, neck rolls, standing forward bend and two to three cycles of the *surya namaskar*.¹ The *asanas* introduced in this study included the following poses:

- *Vakrasana*
- *Vidalasana*¹⁷
- *Pascimottanasana*
- *Maha mudra*
- *Vrksasana*¹⁸
- *Virabhadrasana*
- *Trikonasana*

The *asanas* focused on the quality and ease of breath, isometric muscular contractions, flexibility, balance, and concentration. Each yoga session ended with 10 minutes of *savasana* to relax and cool down.

2.4. Physical fitness Testing:

The Sit-ups test was used to assess the muscular strength. The score of the test is the number of correctly executed sit-ups performed by the subjects in 60 seconds. Shuttle Run test was used to monitor the agility of the subjects. The time taken by the subjects between the audible signal ‘start’ and the finishing of the run was recorded to be the score. The time was recorded correct in seconds. The standing broad jump was used to assess explosive power of the legs. A 50 yard dash test was used to estimate Speed. The time was recorded correct unto tenth of seconds. The time taken by the subjects to complete the test in seconds was the net score of the subjects.600 yards. Run or Walk test was used to measure cardiovascular endurance. The time taken to run 600 yards recorded in minutes.

2.5. Data Analysis:

Values are presented as mean values and SD. The Student paired t' test was used to compare parameters within groups. Data was analyzed using SPSS Version 16.0 (Statistical Package for the Social Sciences, version 16.0, SSPS Inc, Chicago, IL, USA).

3. Results

Table- 1: Mean, SD and t–test values of muscular Strength and agility of experimental group and control group during Pre Test and Post Test.

Variables	Experimental (A) N: 15		t-test	Control Group (B) N: 15		t-test
	Pre	Post		Pre	Post	
Muscular Strength	19.8±0.54	21.73±1.9	9.37**	20.53±1.95	20.33±1.98	0.54
Agility	12.78±0.28	12.38±0.97	4.77**	13.85±0.38	13.79±0.38	0.65

**Significant at 0.01 level

Table No.1 showed the mean \pm S.D. and 't' values of physical fitness variables of experimental group and control group. The mean \pm S.D of muscular strength of pretest of experimental group and posttest of experimental group was 19.8±0.54 and 21.73±1.9 respectively, whereas the mean \pm S.D of muscular strength of pretest of control and posttest of control group was 20.53±1.95 and 20.33±1.98. The "t" value in case of experimental group was 9.37 and for control group it was 0.54. The mean \pm S.D of agility of pretest of experimental group and posttest of experimental group was 12.78±0.28 and 12.38±0.97 respectively, whereas the mean \pm S.D of agility of pretest of control and posttest of control group was 13.85±0.38 and 13.79±0.38. The "t" value in case of experimental group was 4.77 and for control group it was 0.65. Thus it may be concluded that 8-week of hatha yoga training programme showed significant improvement in muscular strength and agility at ($p < 0.01$) level. There was non-significant deference found in control group in both variables.

Table- 2: Mean SD and t–test values of power, speed and cardiovascular endurance of experimental group and control group during Pre Test and Post Test.

Variables	Experimental (A) N: 15		t-test	Control Group (B) N: 15		t-test
	Pre	Post		Pre	Post	
Power	1.96±2.4	2.4 ±8.81	11.88**	1.87±9.59	1.9 ±0.11	0.87
Speed	6.93±8.32	6.73±0.34	2.42*	7.04±0.37	7±0.42	1.36
Cardiovascular Endurance	1.58±4.9	1.53±0.14	2.02	1.86±0.27	1.86±0.27	0.33

**Significant at 0.01 level

*Significant at 0.05 level

Table-2 showed the mean \pm S.D. and 't' values of physical fitness variables of experimental group and control group. The mean \pm S.D of power of pretest of experimental group and posttest of experimental group was 1.96±2.4 and 2.4 ±8.81 respectively, whereas the mean \pm S.D of power of pretest of control and posttest of control group was 1.87±9.59 and 1.9 ±0.11. The "t" value in case of experimental group was 11.88 and for control group it was 0.87. The mean \pm S.D of speed and cardiovascular endurance of pretest of experimental group and posttest of experimental group were 6.93±8.32 and 6.73±0.34 and 1.58±4.9 and 1.53±0.14 respectively, whereas the mean \pm S.D of speed and cardiovascular endurance of pretest of control and posttest of control group were 7.04±0.37 and 7±0.42 and 1.86±0.27 and 1.86±0.27. The "t" value in case of experimental group was for speed 2.42*.and for cardiovascular endurance 2.02. For control group it was 1.36 for speed and 0.33 for cardiovascular endurance. Thus it may be concluded that 8-week of hatha yoga training programme showed significant improvement in power ($p < 0.01$) and speed ($p < 0.05$). There was non-significant deference found in experimental group for cardiovascular endurance. For each of the chosen variable, the results pertaining that there were non-significant deference found in control group.

4. Discussion

The study was conducted to find out the effects of hatha yoga training on health-related physical fitness variables. The statistical analysis of data collected on thirty subjects indicated that there were significant improvement in all the variables (except cardiovascular endurance). This study shows that 8 weeks of regular hatha yoga practice, a tradition that has existed for at least 4500 years and is now becoming increasingly popular in the United States, (Hewitt; 1978, Schell et al; 1994) can have significant benefits in improving the health-related aspects of physical fitness. We found significant increases in muscular strength, agility, power and speed. There were no significant changes in cardiovascular endurance. Studies have shown that yoga practice can lead to improvements in hand-grip strength (Madanmohan et al; 1992),⁵ muscular endurance (Ray et al; 1986) and agility (Bal and Kaur; 2009).⁷ Practitioners credit yoga for everything from improving their strength, respiration and fitness levels to “opening energy channels.” Yoga asana are psychophysical practices to culture body and mind. Yoga practices are known to significantly improve health status, and reduce stress and anxiety (Ross and Thomas; 2010). Furthermore, the positive results of this study indicate that hatha yoga is a form of physical activity that would meet the objectives of current recommendations to improve physical fitness and health (Surgeon; 1996). Yogasanas training programme showed significant improvement in agility level. The findings is supported by the study conducted by Galantino et al. (2004) to evaluate a possible design for a 6-week modified hatha yoga protocol to study the effects on Twenty-two participants (M = 4; F = 17), between the ages of 30 and 65 with chronic low back pain showed improved balance and agility. Likewise et al. (2005) conducted a study titled “Effect of a Gentle Iyengar Yoga Program on Gait in the Elderly: An Exploratory Study” on Twenty-three healthy adults (age range, 62–83y) who were naive to yoga were recruited; 19 participants completed the program. An 8- week Iyengar Hatha yoga program specifically tailored to elderly persons and designed to improve lower-body strength and flexibility. Findings of this exploratory study suggest that yoga practice may improve hip extension, increase stride length, and decrease anterior pelvic tilt in healthy elders. The Housam El-din Talhah, et al. (1997) to achieve the benefits of yoga exercises at the vehicle development flexibility through the integration of all of the body, mind and spirit of reason may be due to the nature of the performance of such exercises, which is characterized by slow and work to raise the level of motivation towards the best addition to Hatha Yoga exercises to improve physical fitness and strengthen the muscles of the body of all the various benefits of yoga are not limited to this only, but also to work to improve and develop the various components of the body. The researcher Recommendations with Use Hatha Yoga exercises because of its clear and positive impact on improving the health-related physical fitness variables.

5. Conclusion

In summary, the results of this investigation indicate that 8 weeks of hatha yoga practice can significantly improve multiple health-related aspects of physical fitness in young, healthy, predominantly female subjects. More specifically, yoga training can increase strength, agility, muscular power and speed. However, in the present study, hatha yoga did not have a significant effect on endurance. These data provide more evidence to support the beneficial effect of Hatha Yoga for improving the health-related physical fitness variables.

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