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Effect of 8-weeks yoga and aerobic exercise on muscular strength and flexibility of school students

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Abstract

Life will not be life without physical activities. Through physical activities alone people were able to survive in this world. The story of evolution throws some light on the nature and types of activities which are an essential part of modern physical activities which are to be fit for day-to-day existence and to meet the occasional emergencies that arise. Yoga may be an important tool for every individual to maintaining health and improving quality of life. Aerobic exercise can be viewed as an intricate system of bodily supply and demand. That is the body needs energy for any kind of activity and the need is filled by burning off the foods that eat. The purpose of the study was to Effect of 8-Weeks Yoga and Aerobic Exercise on Muscular Strength and Flexibility in school students. For the purpose of the study Sixty (20 in Yoga group, 20 in Aerobic exercise group, 20 in control group) Pre- Adolescence boys student from Delhi Public School, Srinagar, Jammu and Kashmir were selected as the subjects for this study. The age of the subjects was between 12-14 Years. In order to investigative the existence of significant difference among Yoga group, Aerobic group and Control group on Muscular Strength and Flexibility of pre-adolescence Boys in pre-test, Post-test and Adjusted post test result, the analysis of Co- variance (ANCOVA) was used at 0.05 level of Significant. In case of existence of significant differences, the post hoc test (L.S.D test) was used in order to investigate the significant difference between paired group means. The result showed that there was significance difference on Muscular Strength among Yoga group, Aerobic group and Control group. The result also showed that there was significance difference on Flexibility among Yoga group, Aerobic group and Control group.

Keywords: Muscular strength, flexibility, yoga group, aerobic group and control group

Introduction

Yoga may be an important tool for every individual to maintaining health and improving quality of life. Yoga asana are simple actions for keeping the internal and external parts of the body in good health. Yogic exercise affects by and large all the organs and system of the body. It specially affects the muscles and sinews. Yoga has gained popularity as a way to achieve relaxation and meditative states. When stepped its mystical elements, yoga emerges as a safe, enjoyable and relaxing flexible programme.

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.

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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)

Aerobic can be viewed as an intricate system of bodily supply and demand. That is the body needs energy for any kind of activity and the need is filled by burning off the foods that eat. The majority medical opinion is that aerobic programs strengthen heart muscle, increase the efficiency of lungs and offer other wonderful benefits. Aerobic exercise refers to exercise that involves or improves oxygen consumption by the body. Aerobic means "with oxygen", and refers to the use of oxygen in the body's metabolic or energy-generating process. (Concise Oxford English Dictionary). The muscles generate energy by converting glucose into lactic acid. But because of the strenuous nature of the activity and the fact that oxygen is not needed, this sort of exercise can only be maintained for short periods of time. Oxygen only comes into play after the exercise, when it is needed for recovery and metabolism of glucose to supply more energy.

Aerobic exercise and physical activities provide the individual with a number of lasting benefits as not only do they help to reduce depression and anxiety, but they also improve both physiological and psychological well-being, enhance work and recreation, and improve health. Aerobic exercise is almost universally accepted as a major component of most successful cardiac rehabilitation programs in addition the potential value of aerobic exercise in the primary prevention of coronary heart disease is also receiving increased attention as a result of

recent epidemiologic data demonstrating a significant inverse relationship between increased levels of habitual activity and reduced risk of CHD events. The review highlights various aspects of psychological functioning reported to be affected by exercise, including personality, mood, cognitive functioning, and behavioural adaptation.

Statement of the problem

The purpose of the study was to Effect of 8-Weeks Yoga and Aerobic Exercise on Muscular Strength and Flexibility in school students.

Methodology

For the purpose of the study 60 (Sixty) (20 in Yoga group, 20 in Aerobic exercise group, 20 in control group) Pre-Adolescence boys student from Delhi Public School, Srinagar, Jammu and Kashmir were selected purposively as the subjects for this study. The age of the subjects was between 12-14 Years.

To compare the variables

1. Muscular Strength was measured through Bend knee sit up test for one minute and the number of legal sit up was considered as a result.
2. Flexibility was measure through Modified Sit-and Reach Test and the results were recorded in inches.

Six week of yoga and aerobic training was imparted on Pre-Adolescence boys student from Delhi Public School, Srinagar, Jammu and Kashmir, to investigative the existence of significant difference among Yoga group, Aerobic group and Control group on Muscular Strength and Flexibility of six week protocol pre- adolescence Boys in pre-test, Post-test and Adjusted post test result, the analysis of Co- variance was used at 0.05 level of Significant. In case of existence of significant differences, the post hoc test (L.S.D test) was used in order to investigate the significant difference between paired group means

Training schedule

Table 1: Yoga training programme for Pre- Adolescence boys student from Delhi Public School, Srinagar, Jammu and Kashmir, days (alternative days) per week for a period of Eight week.

Particular	Training Schedule	Surya Namaskar and Yoga training		
		Tuesday	Thursday	Saturday
Total Duration	8Weekes	Suryanamaskara,	Suryanamaskara,	Suryanamaskara,
		Padusana, Vrikshasana,	Padusana, Vrikshasana,	Padusana, Vrikshasana,
Frequency	3 days per week	Bhujangasana,	Bhujangasana,	Bhujangasana,
		Vajrasana,	Vajrasana,	Vajrasana,
Repeating	2 times	Parvatasana,	Parvatasana,	Parvatasana,
Duration	1 hours	Dhanurasana, Makarasana,	Dhanurasana, Makarasana,	Dhanurasana, Makarasana,
		Naukasana,	Naukasana,	Naukasana,
Time	4pm-5.00pm	Poschimattanasana,	Poschimattanasana,	Poschimattanasana,
		,Matsyasana, Chakrasana,	,Matsyasana, Chakrasana,	,Matsyasana, Chakrasana,
		Sarvangasana, Halasana,	Sarvangasana, Halasana,	Sarvangasana, Halasana,
		Salvasana,	Salvasana,	Salvasana,

- Surya Namaskar was performed 5 minutes on training date.
- 25 second holds in final position of all asana.
- After every asana 1 minute 20Second Savasana or Makarasana was given.

Table 2: Aerobic exercise programme for Pre- Adolescence boys student from Delhi Public School, Srinagar, Jammu and Kashmir, three days (alternative days) per week for a period of Eight week.

Particular	Training Schedule	Aerobic exercise		
		Monday	Wednesday	Friday
Total Duration	8Weekes	Jogging (150miters)	Jogging (150miters)	Jogging (150miters)
Frequency	3 days per week	Running (60miters)	Running(60miters)	Running(60miters)
Repeating	2 times	Aerobics (6minutes)	Aerobics(6minutes)	Aerobics(6minutes)
Duration	1hours	Calisthenics with instrument (6minutes)	Calisthenics with instrument (6minutes)	Calisthenics with instrument (6minutes)
Time	4pm-5.00pm	dancing (6minutes)	dancing (5minutes)	dancing (5minutes)

- After every exercise 3 minutes Walking (2.5 km/h) speed
- In between Jogging and Running 2 minutes Walking (3.00 km/h) speed

Finding

Table 3: Mean on Muscular Strength on pre and post-test among Yoga group, Aerobic group and Control group

Group	Muscular Strength	
	Pre-Test	Post- Test
Yoga group	33.60	36.65
Aerobic group	33.0	38.55
Control group	33.2	34.3

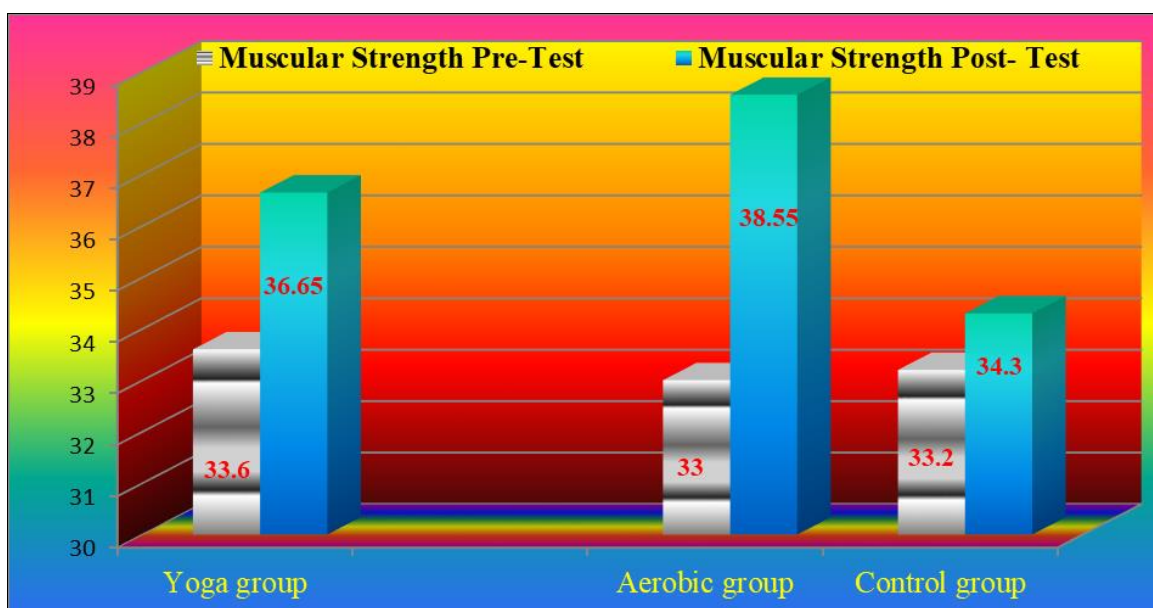


Fig 1: Graphical representation of Mean on Muscular Strength on pre and post-test among Yoga group, Aerobic group and Control group

Table 4: Analysis of Co-Variance of the Means of Muscular Strength Test among Yoga group, Aerobic group and Control group

Mean	Yoga group	Aerobic group	Control group	Source of variance	SS	df	MSS	F-Ratio
Pre-Test	33.60	33.0	33.2	Among	3.73	2	1.865	.07
				Within	1568	57	27.50	
Post-Test	36.65	38.55	34.3	Among	181.3	2	90.65	3.74*
				Within	1379	57	24.19	
Adjusted Post-Test	36.39	38.76	34.35	Among	-7	2	-3.5	-15
				Within	1257	56	22.44	

$F_{yx} = 14.67 > 3.15, F_{0.05} (2, 57) = 3.15, A = \text{among means variance.}$
 $F_{0.05} (2, 56) = 3.15, W = \text{within group variance}$

The table -6 revealed that there was no significance difference on Muscular Strength ($F = 0.07 < 3.15$) at 57 degree of freedom at 0.05 level of confidence) among Yoga group, Aerobic group and Control group in pre-test phase. However the F ratio values of the post was ($3.74 > 3.15$) significant difference in Muscular Strength at 0.05 level of significant among Yoga group, Aerobic group and Control group. The F

value in adjusted post-test was ($-0.015 < 3.15$) also not significant difference in Muscular Strength at 56 degree of freedom at 0.05 level of significant among Yoga group, Aerobic group and Control group. So the table shows that all the treatment was not equally effective in improving the performance of Yoga group, Aerobic group and Control group.

Table 5: Analysis of critical difference among Yoga group, Aerobic group and Control group of Muscular Strength

Group	Muscular Strength		
	Mean	Mean Difference	Critical Difference at 5% Level
Yoga Group and Aerobic Group	36.39	2.37*	1.62
	38.76		
Yoga Group and Control group	36.39	2.04*	1.62
	34.35		
Aerobic Group and Control group	38.76	4.10*	1.62
	34.35		

Table 6: Mean on Flexibility on pre and post-test among Yoga group, Aerobic group and Control group

Group	Flexibility	
	Pre-Test	Post- Test
Yoga group	13.61	15.71
Aerobic group	13.01	14.64
Control group	13.14	13.49

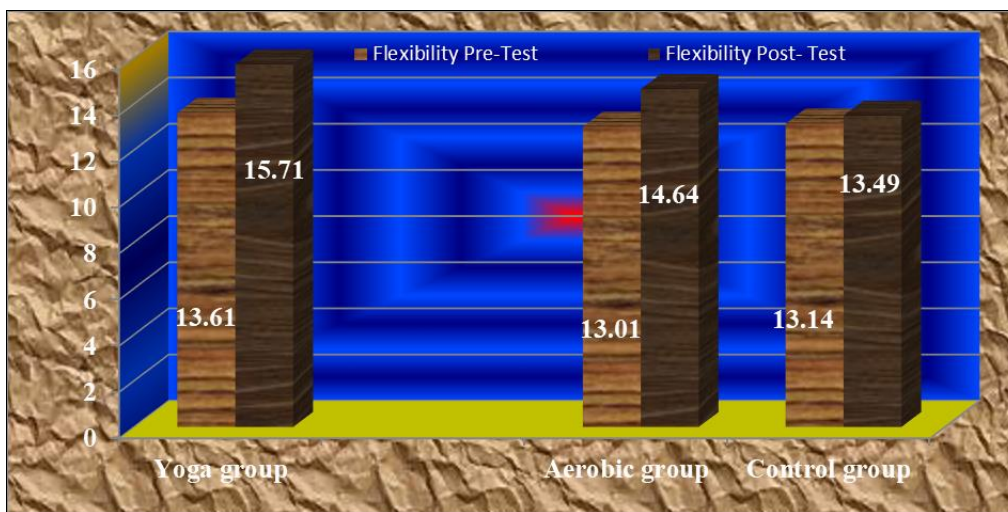


Fig 2: Graphical representation of Mean on Flexibility on pre and post-test among Yoga group, Aerobic group and Control group

Table 7: Analysis of Co-Variance of the Means of Flexibility Test among Yoga group, Aerobic group and Control group

Mean	Yoga group	Aerobic group	Control group	Source of variance	SS	df	MSS	F-Ratio
Pre-Test	13.61	13.01	13.14	Among	3.99	2	1.94	1.08
				Within	101.76	57	1.78	
Post-Test	15.71	14.64	13.49	Among	49.09	2	24.54	15.64*
				Within	86.73	57	1.57	
Adjusted Post-Test	15.64	14.78	13.57	Among	10.20	2	5.10	3.95*
				Within	72.43	56	1.29	

$F_{yx} = 29.08 > 3.15, F_{0.05}(2, 57) = 3.15$, A=among means variance.
 $F_{0.05}(2, 56) = 3.15$, W=within group variance

The table -11 revealed that there was no significance difference on Flexibility ($F=1.08 < 3.15$) at 57 degree of freedom at 0.05 level of confidence) among Yoga group, Aerobic group and Control group in pre-test phase. However the F ratio values of the post was ($15.64 > 3.15$) significant difference in Flexibility at 0.05 level of significant among Yoga group, Aerobic group and Control group. The F value in

adjusted post-test was ($3.95 < 3.15$) also significant difference in Flexibility at 56 degree of freedom at 0.05 level of significant among Yoga group, Aerobic group and Control group. So the table shows that all the treatment was not equally effective in improving the performance of Yoga group, Aerobic group and Control group.

Table 8: Analysis of critical difference among Yoga group, Aerobic group and Control group of Flexibility

Group	Flexibility		
	Mean	Mean Difference	Critical Difference at 5% Level
Yoga Group and Aerobic Group	15.46	.68*	.49
	14.78		
Yoga Group and Control group	15.46	1.89*	.49
	13.57		
Aerobic Group and Control group	14.78	1.21*	.49
	13.57		

Discussion

As per the finding of table are concerned to investigate the effect of Yoga and Aerobic Exercise were found significantly difference than the control group.

The effect of yoga asana and aerobics had shown significant effect when compared to the control group. The result of the study is in consonance with the findings of the following studies by Czamara & Joli Michele, (February 2003), Ray, et. al., (January 2001). Tran *et al.*, (April, 2001), K. Bharatha Priya & R. Gopinath, (August, 2011), K.M. Manimakali and S. Chitra, (August, 2011). The result of the present study indicates that both the experimental groups have significantly increased in the muscular strength when compared to the control group (table-5). The result of the study is in consonance with Madanmohan *et al.*, (2008), Chen *et al.*, (2009) and. Chen *et al.*, (2009) and Venkatareddy *et al.* (2003). Low-impact aerobic exercises attempt to strengthen the abdomen and improve lower back mobility, strength, and endurance. They also enhance flexibility in the hip and hamstring muscles, and in the tendons at the back of the thigh. There are similar studies on aerobic training on muscular strength are significantly higher for the aerobic group when compared to the yogic group, flexibility is significantly higher for the yogic group when compared to the aerobic group during training periods The result of the study is in consonance with Licl *et al.*, (2006), Toy (2008), Agro (1988), Shenbagavalli and Mary Recthammal (2008).

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