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Effect of Core Strength Training and Yogasana Practices on Selected Health Related Physical Fitness Components among Female Athletes

R. Meera

Research Scholar

SRM University, Chennai, Tamil Nadu

meera.ktt@gmail.com

Dr. R. Mohanakrishnan

Assistant Professor

SRM University, Chennai, Tamil Nadu

mohanakrishnansrm@gmail.com

Abstract: The purpose of the study was to examine the effect of core strength training and yogasana practices on selected physical fitness components among female athletes. To achieve the purpose of the study forty-five ($N = 45$) female athletes, they were selected randomly in Chennai, Tamil Nadu, India as subjects. The age of the subjects ranged from 14 to 19 years. They are divided into three equal groups consists of fifteen subjects each ($n = 15$) were named experimental group I underwent core strength training and experimental group II underwent yogasana practices and group – III as a control. The period of experimentations is limited to 15 weeks, 4 days a week and 45 to 60 minutes per day with proper warming-up and cooling down regimen. The selected health related physical fitness components such as muscular strength and muscular endurance were selected as criterion variables and tested. The core strength training and the yogic practices were selected as training protocol. The core strength training will be given based on individuals 1 RM to set the load and the intensity will be set between 75% to 90%. The pre-test and post-test means of experimental groups I, II and control group will test for significance by applying the analysis of covariance (ANCOVA). The level of confidence is fixed at 0.05, for significance. In addition to this, Scheffe's post-hoc test will be employed, when the F-ratio of the adjusted post-test means is significant, to find out the paired mean difference if any among the groups for each variable, separately. Based on the result of the study there was a significant change on health related physical fitness performance due to core strength training and yogic practice.

Keywords: Core Strength, Yogasana, Physical Fitness, Women Athletes.

I. INTRODUCTION

The “core” is comprised of several groups of muscles including the transverses abdominus, multifidus, diaphragm and pelvic floor muscles. These muscles work together to produce maximum stability in the abdominal and lumbar (lower) back region, as well as coordinate the movement of the arms, legs, and spine. Engaging these muscles is not something that most people do consciously, therefore, it is important to learn how to effectively co-contract these muscles while performing these rehabilitation exercises (Behm DG, 2005). The deep muscles of your stomach and low back are the core muscles of your body. They support and protect your low back and help your leg and arm muscles work well (Cholewicki J, McGill SM, 1996).

Researchers have identified the importance of a strong core in relation to back pain and rehabilitation and developed tools used to measure core strength and stability While the importance of the core and methods of training and assessing it has been largely publicized, few studies have been completed which quantitatively demonstrate core strength's role in strength and performance (Cissik JM, 2002). Running performance and economy, and core strength in high school aged touch football and basketball athletes. Groups from each study completed core training and groups that underwent training experienced improvements in core strength (Duncan RA, McNair PJ, 2000). Core strength of a number of sport performance variables in divisional football players and found weak to moderate correlations. Explanations for the lack of significant relationships in these studies include inconsistent methods used to measure core strength with the performance variables, the population tested, or there is no relationship (Liemohn WP, Baumgartner TA, 2005).

Yoga is essentially a spiritual discipline based on an extremely subtle Science, which focuses on bringing harmony between mind and body. It is an art and science for a healthy living. The word "Yoga" is derived from the Sanskrit root *yuj* meaning "to join", "to yoke" or "to unite".

According to Yogic scriptures, the practice of Yoga leads to the union of individual consciousness with universal consciousness. According to modern scientists, everything in the universe is just a manifestation of the same quantum firmament. One who experiences this oneness of existence is said to be "in Yoga" and is termed as a yogi who has attained a state of freedom, referred to as Mukti, nirvāna, kaivalya or moksha.

Yoga is a means of balancing and harmonizing the body, mind, and emotions. This is done through the practice of Asana, Pranayama, Mudra, Bandha, Shatkarma, and Meditation, and must be achieved before the union can take place with the higher reality (Kristal AR, 2005).

Asanas: “Sthiram, Suktham Aasanam” Hathasya prathamaangatvaadaasanam poorvamuchyate. Kuryattadaasanam sthairyamaarogyam chaangalaaghavam. Prior to everything, asana is spoken of as the first part of Yoga. Having done asana, one attains steadiness of body and mind, freedom from disease and lightness of the limbs - Hatha Yoga Pradipika (1:7)

The Hatha Yogis, however, found that certain specific asanas, open energy channels, and psychic centers. They found that developing control of the body through these practices enabled them to control the mind and energy. Yogasanas became tools for higher awareness, providing the stable foundation necessary for the exploration of the body, breath, mind and higher states. For this reason, asana practice comes first in texts such as Hatha Yoga Pradipika (Karunakaran .K and V. Ramesh .V, 2009).

In the yogic scriptures, it is said that there were originally 8,400,000 asanas, which represent the 8,400,000 incarnations every individual must pass through before attaining liberation from the cycle of birth and death. These asanas represented a progressive evolution from the simplest form of life to the most complex; that of a fully realized human being. Down through the ages, the great rishis and yogis modified and reduced the number of asanas to the few hundred known today.

II. METHODOLOGY

To achieve the purpose of the study forty-five (N = 45) female athletes, they were selected randomly in Chennai, Tamil Nadu, India as subjects. The age of the subjects ranged from 14 to 19 years. They are divided into three equal groups consists of fifteen subjects each (n = 15) were named experimental group I underwent core strength training and experimental group II underwent yogasana practices and group – III as a control. The period of experimentations is limited to 15 weeks, 4 days a week and 45 to 60 minutes per day with proper warming-up and cooling down regimen. The selected health related physical fitness components such as muscular strength (Squat) and muscular endurance (Sit-Ups) were selected as criterion variables and tested. The core strength training and the yogic practices will be selected as training protocol. The core strength training will be given based on individuals 1 RM to set the load and the intensity will be set between 75% to 90% and the training routine includes Crunches, Decline Crunch, Cable Crunch, Oblique Crunches, Jackknife Sit-Up, Barbell Side Bend, Leg lift, Leg lift - Hang Position, Oblique Leg lift, Suryanamaskar. Tadasana, Trikonasana, Paschimottanasana, Chakrasana, Bhujangasana. The pre-test and post test means of experimental groups I, II and control group will test for significance by applying the analysis of covariance (ANCOVA). All the data will analyse using a computer with SPSS statistical package. The level of confidence is fixed at 0.05, for significance. In addition to this, Scheffe's post-hoc test will be employed, when the F-ratio of the adjusted post-test means is significant, to find out the paired mean difference if any among the groups for each variable, separately.

III. RESULTS

ANCOVA and Post Hoc Test of Selected Physical Fitness Variables among Core Strength Training Group, Yogasana Practice Group, and Control Group

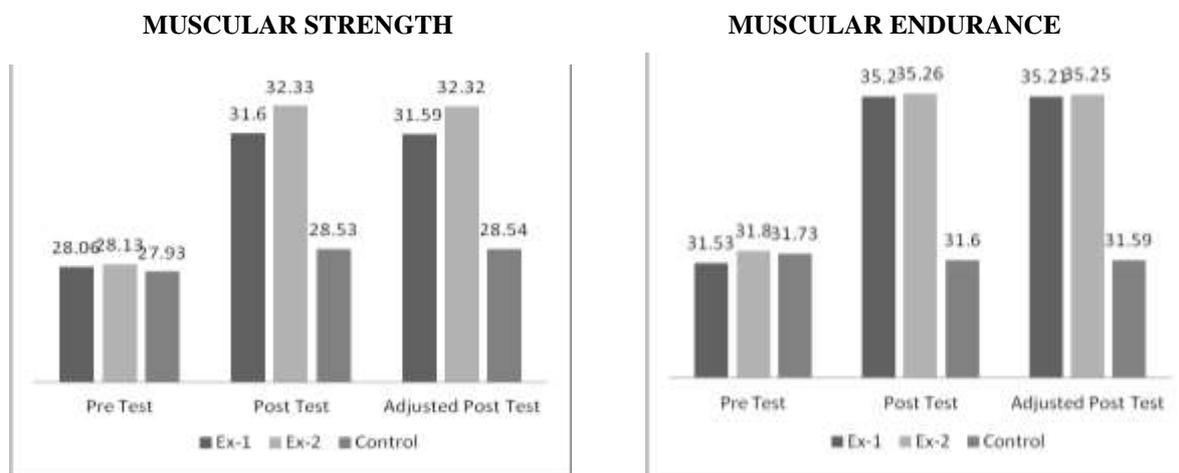
Variables	ANCOVA			Scheffe's Post Hoc Test		
	Groups	Adjusted Post Test Mean	'F'	Pair	MD	'P' Value
Muscular Strength	Ex-1	32.32	91.54*	Ex-I Vs Ex 2	0.728	0.01
	Ex-2	31.59		Ex-1 Vs Con	3.056*	0.00*
	Con	28.54		Ex-2 Vs Con	3.784*	0.00*
Muscular Endurance	Ex-1	35.25	72.01*	Ex-I Vs Ex-2	0.033	0.93
	Ex-2	35.21		Ex-1 Vs Con	3.625*	0.00*
	Con	31.59		Ex-2 Vs Con	3.658*	0.00*

*Significant

Ex-1 - Core Strength Training Group, Ex-2 - Yogasana Practice Group, Con – Control Group. MD – Mean Difference

The above table shows that there was a significant difference among Core Strength Training Group, Yogasana Practice Group, and Control Group on selected variables such as muscular strength and muscular endurance. There was a significant difference between Core Strength Training Group and Yogasana Practice Group on muscular strength and muscular endurance. There were no changes on selected physical fitness components on the control group. There were no significant changes among groups due to core strength training and yogasana practices.

The Bar Diagram Shows the Pre, Post and Adjusted Post Test Mean Values of Muscular Strength and Muscular Endurance of Core Strength Training Group, Yogic Practice Group and Control Group



IV. DISCUSSION

Based on the result of the study the core strength training improves physical fitness components such as muscular strength and endurance among women athletes when compared with yogasana practice. Moreover, the yogasana practice has been the positive influence on physical fitness components. In-line with previous results of various fields of scientific studies will conform to the present of the result of the study discussed below. **Sato, K, and Mokha, M. (2009)** examined core strength training influence running kinetics, lower-extremity stability. The study was to determine the effects of 6 weeks of Core strength training on ground reaction forces. Core strength training may be an effective training method for improving performance in runners. **Sekendiz, B, Cuğ, M, and Korkusuz, I, 2010** investigate the effects of Swiss-ball core strength training on trunk extensor. Results of the multivariate analysis revealed a significant difference between pre and post measures of 60 and 90° s-1 trunk flexion. **Tracy, BL, and Hart, CEF, 2013** revised the effects of yoga on general physical fitness, despite the widespread participation in this form of exercise. Yoga subjects exhibited increased dead lift strength, substantially increased lower back/hamstring flexibility, increased shoulder flexibility, and modestly decreased body fat. There were no changes in handgrip strength, cardiovascular measures, or maximal aerobic fitness. In summary, this short-term yoga training protocol produced beneficial changes in musculoskeletal fitness that were specific to the training stimulus. **Clark et al, 2017**, examined the effect of pelvic and core strength training on running performance. Clinically significant findings reveal a 6-week pelvic and core stability strengthening program 3 times a week in addition to coach led team training may help decrease race times. There were no studies combined core strength and yogasana practice on the influence of any fitness variables. Some studies confirmed that the yogasana practice improved fitness variables among young athletes such as the study conferred by **Dhananjai et al. (2010)** and **Saremil et al. (2010)**. **Slawta et al. (2008)** stated that 12-weeks yoga intervention, significant improvements were observed in body composition, fitness.

V. CONCLUSIONS

Based on the result of the study, there was a significant change in physical fitness parameters due to core strength training and yogic practice. There was no change in selected physical fitness components on the control group. The core strength training protocol shows better fitness improvement when compared with yogasana practice among women athletes. There was no significant difference between core strength training group and yogic practice group on selected physical fitness variables. The Yogasana practice also shows positive improvement from the baseline data on selected physical fitness components.

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