ABSTRACT

INTRODUCTION

Emerging society has considered physical fitness as one of the important indicators of health. Being physically fit has been defined as "the ability to carry out daily tasks with vigor and alertness, without undue fatigue and with ample energy to enjoy leisure-time pursuits and to meet unforeseen emergencies". Physical fitness refers to the maximum capacity that people have or achieve while they perform physical activity that can be measured as the level of strength and flexibility of the muscular groups in different body parts.

LITERARY REVIEW

In this chapter of literary research, attempts were made to understand concept of vyayama, and asanas, from ancient Indian scriptures. Relevant slokas are presented text-wise, and a coherent discussion is provided for the same. Relevant slokas were selected from the Shastrani (Shastrani, 2004) and the multilingual E-Samhita with search option prepared by CCRAS, Department of AYUSH, Ministry of Health and Family Welfare, Government of India. Finally, a theoretical model which depicts the evolution of vyayama to asana has also been attempted.

REVIEW OF SCIENTIFIC LITERATURE

Review of scientific literature enumerates contributions and findings from various studies done in the domains of yoga, physical fitness, and its relevance to the psychological well-being of children. A growing number of studies present the need for stable physical fitness for adolescents. Further, the findings show a positive relationship between physical fitness during adolescence and its contribution to the emotional, physical and academic performance later in life. Finally, a summary of
the effects of yoga on physical fitness in adolescents and the scope of yoga as mind-body training for adolescents is provided.

AIMS

The aim was to explore the effect of yoga on physical fitness among adolescents.

MATERIALS AND METHODS

Subjects

In this thesis, five different studies are reported. The source of subjects for all these studies was the Yoga based Personality Development Program (YPDC) held at SVYASA Yoga University.

Methods

Study 1 - For the study that evaluated the minimum muscular fitness using the Kraus-Weber test (K-W Test) and ventilatory functions by Peak expiratory flow rate (PEFR), 352 healthy school children of both genders in age range of 10-16 years were recruited. Sample consisted of 203 boys and 149 females with a mean age of 12.90 years (SD=1.55).

Study 2 - For this study designed to validate the acceptability of bhramari time (BHT) by checking its correlation with PEFR. 386 healthy school children were recruited. Sample consisted of 229 males and 157 females with a mean age of 12.78 years (SD=1.69).

Study 3 - This study compared 110 competitive yoga children with equal number of age, gender and weight-matched healthy yoga motivated children who were naïve on PEFR, Sit and Reach (SAR) and Handgrip Strength. Sample consisted of 50 boys and 60 girls in each group.
Study 4- This study evaluated the effect of 10 days of intense yoga on physical fitness (PEFR, BHT, SAR & KW- Test) on 103 children.

Study 5- This study on 83 children looked at the immediate effect of Yogic Squat on selective attention in which 48 boys and 35 girls were included.

DESIGN

The research design was innovative in incorporating different research methods such as Cross sectional, Cohort, Pre-Post and Self as Control design, for the five components of this research that aimed at looking at the role of yoga in physical fitness.

INTERVENTION

Study4:

Yoga based Personality Development Camp (YPDC)

YPDC consisted of training in different yoga based techniques for approximately eight hours a day, for 10 days. It included specialized yoga module for overall personality development such as Yogāsanas, breathing practices, eye-cleansing techniques, meditation, emotional culturing sessions, Vedic chanting, and yogic games. Further, the training also included guided relaxation and Cyclic Meditation (CM).

Study5:

Experimental session-- Yogic Squat

Participants practiced 10 minutes of yogic squat with specific hand position. The procedure for squatting yogic salutation is a modified form of the Mayo Clinic’s practice of squats. Instructions are as follows: Stand with your feet slightly apart,
greater than shoulder width and toes pointing ahead. The hands crossed over each other (left over right), maintaining a gentle pressure holding the earlobes throughout with thumb in front and the finger to the back. Slowly descend, bending through hips, knees, and ankles, and stopping when knees reach a 90° angle. Then return to the starting position. Keep the back in a neutral position and abdominal muscles tight. Do not flatten the curve of the lower back or arch back. Keep knees centered over feet while going down. Do not let knees roll inward or outward. Keep movements smooth and controlled with normal breathing. The subjects were told that they could rest if they were too exhausted to continue the practice.

Control session--Walking

Subjects were asked to walk at their own pace along a 30-meter long yoga hall. Subjects were asked to walk from end to end, covering as much ground as they could during the 10 minutes, without running. Every 60 second, subjects were given feedback on time progression and were encouraged to keep on normal pace of walking along with normal breathing. The subjects were told that they could rest if they were too exhausted to continue the test. They were asked to keep silent and have normal pace of walking along with normal breathing. After the 10 minute duration, they were asked to occupy their respective places for post assessment.

ASSESSMENT TOOLS

Multidimensional assessments of fitness were administered to understand the Physical fitness.

a. Minimum muscular fitness was measured using six tests of minimum muscular fitness for children called Kraus-Weber test (KW).

b. Sit-and-reach test (SAR) used to determine spinal flexibility
c. Handgrip Strength was assessed through the hand grip dynamometer.

d. Ventilatory function was assessed by using the instrument Peak expiratory flow rate

e. Ventilatory function was also measured by Bhramari time.

Further, the Psychological fitness after a specific yoga practice (yogic squat) known to improve cognitive ability was assessed by using Digit letter Substitution tests.

**DATA ANALYSIS**

All statistical analyses were performed using the Statistical Package for Social Sciences, SPSS (version 16.0). Correlation, Independent-sample t-tests and Paired sample t-tests, procedures were used for statistical analyses. Further for categorical variable, McNemar’s test and single sample proportion test were performed.

**RESULTS**

The results of all five studies are summarized below:

1) Study evaluated present status of muscular fitness and ventilatory function using Kraus-Weber Test and mini peak expiratory flow meter on adolescences has shown out of 352 subjects tested 251(71.31%) subjects failed in completing the test successfully. The overall failure rate in boys was 71.9% while in girls it was 70.5% with non-significant difference between the two genders. The observation that the group of students who succeeded on minimum muscular fitness had significantly higher PEFR, points to a positive relationship between muscle fitness and lung functions.
2) As hypothesized, Bhramari time was significantly and positively correlated with PEFR (r=.35, p<0.01), Height (r=.29, p<0.01), Weight(r=.17, p<0.01) and Age (r=.22, p<0.01).

3) Comparison of competitive senior yoga practitioners with yoga naive children - Yoga practitioners scored significantly higher on all domains of Physical fitness except on Left handgrip strength when compared with non practitioners.

4) Ventilatory functions after 10 days Yoga Based Personality Development Camp (YPDC); Peak Flow Rate and bhramari time showed significant increase (p<0.001). Spinal flexibility: significant increase (p<0.001) in Sit and Reach. KW test: Analyzing the total score, number of people who were successful in passing the test (pass in all the six tests) were 19 (29.23%). A single sample proportion test showed that this frequency was statistically significant compared to the post test count 46 (70.77%), p<0.001 (z = 4.195).

5) Cognitive ability after Yogic Squat: In this study, Yogic Squat was compared with Walking session in a within group design. Both the groups showed the same trend of improvement in DLST score (p<0.01 in both groups. Total DLST score improved more in Yogic squat (13.56%) than walking session (9.11%). Though DLST error reduced in both the sessions, they were not statistically significant; the reduction again was found to be better in YS session. Because of this the trend of the results of Net DLST scores remained the same as DSLT total score.

CONCLUSIONS

1. A failure rate of 71% on KW test in urban children (10-16 years) of both genders points to an urgent need of physical fitness training programs for the enhancement of
the strength in areas that shape their physical fitness. The observation that the group of students who succeeded on minimum muscular fitness had significantly higher PEFR, points to a positive relationship between muscle fitness and lung functions.

2. Result suggest that BHT can be recommended for use in mass camps as an acceptable scientifically validated yogic tool in young population to assess the ventilator function and progress of their practices in each class.

3. Children who practice yoga seem to have higher physical fitness than non-practitioners.

4. The results of this study have confirmed the effect of yoga on enhancing physical fitness.

5. Promising results of immediate effects of yogic squat on selective attention is also demonstrated.

Although the current study provides significant insight into the role of yoga in physical fitness and cognitive abilities further research is necessary to explore its various applications.