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A comparative study of cardiovascular fitness among female students of yoga and physical education

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Abstract
This study was carried out with an objective to compare the cardiovascular fitness of female students of Department of Physical Education, Panjab University, Chandigarh and female students of Government College of Yoga, Sector-23 Chandigarh within the age group of 20 to 25years. The parameter include Physical Fitness Index, Modified Harvard-Step test on sample of 50 female students. To compare the main difference t-test was employed with 0.05 level of significance. The result of the study depicts that the students of Department of Physical Education, Panjab University Chandigarh are found superior than students of Government College of Yoga, Sector-23 Chandigarh on Cardio-vascular fitness. The calculated 't' value 4.138 was found significant at 0.05 level against the tabulated value 2.02 in favor of female students of Department of Physical Education, Panjab University Chandigarh.

Keywords: cardiovascular fitness, harvard-step test, physical activity, yoga

Introduction

Cardiovascular fitness is the most essential because the heart and blood vessels supply blood to the important organs and muscles of the body. Moreover, blood contains oxygen and oxygen is most important for us to stay alive. So, maintaining cardiovascular fitness helps to increase the capacity of the heart and blood vessels to transport oxygen-rich blood to the organs and muscles of the body. Even it improves the ability of the muscles to utilize oxygen to produce energy for functioning. Cardiovascular fitness is essential for both a healthy heart and mind.

The cardiovascular fitness belongs to the physiological aspects of fitness and is particularly related to the fitness of the heart and circulatory and its adjustment to stress conditions. It is the ability to perform large muscle or vital body activities continuously for a sustained period. A number of factors contribute to efficient cardiovascular functioning, including the ability of the heart to pump blood, the ability of the veins and arteries to carry blood, the ability of the muscles to utilize the oxygen delivered by the blood. Cardiovascular workouts the body relies on fats and sugars stored in muscle cells for energy.

Cardiovascular test have been generally considered useful in the field of physical education and sports for the purpose of evaluating physical fitness for the participants. Muscular efficiency is known to be modified by circulation, nutrition and fatigue, likewise, it has been established that the normal cardiovascular system gradually adjusts itself to increase amount of strenuous muscular activity. Physical fitness has been classified in two categories a) Health related physical fitness, b) motor skill related physical fitness. Cardiovascular fitness comes under the health-related physical fitness. It is the ability of an individual to carry work load for relatively prolonged period. It has every significant value in various sports and games especially in long distance running, basketball, football, hockey and other vigorous and long duration activities. Therefore adequate emphasis is laid on the development of this important component of physical fitness depending upon the degree of involvement and nature of task.

Although the cardiovascular fitness has been the subject of intensive investigation for many years, but recently the functioning of the cardiovascular system during exercise has been partially clarified. Variability in the cardiovascular response to exercise is associated with variety of factors including: age, sex, conditioning and training, duration of exercise, obesity, diet, drugs, environment etc. the effects of these factors have been studied time to time. A reliable cardiovascular fitness programme must have been tested for effectiveness by measuring recovery pulse rates, maximum pulse rates, resting pulse rates and blood pressure.

For test purposes, these cardiac responses can be duplicated by Harvard step Test and the Crompton Blood Ptosis Test. The purpose of this study was to compare the cardiovascular fitness of female students of Department of Physical Education, Panjab University, Chandigarh and female students of Government College of Yoga, Sector-23 Chandigarh.

Procedure/Methodology

For the purpose of the study 50 female students, 25 each from Department of Physical Education, Panjab University, Chandigarh and Government College of Yoga, Sector-23 Chandigarh were selected as the subjects. Modified Harvard-step Test for measuring cardiovascular fitness was selected as a variable for the study. 18 inch bench was used to perform the stepping exercise, the rhythm of 24 steps per minute was given for 30 minutes i.e. 72 steps. After 1 min.

rest the pulse rate is counted for 30 sec. Physical Fitness Index (P.F.I) of modified Harvard step test was calculated by the following formula:

$$P.F.I = \frac{duration\ of\ exercise\ in\ seconds \times 100}{5.6 \times pulse\ count\ from\ 1\ to\ 1\frac{1}{2}min.after\ exercise.}$$

The subjects were placed in the following test norms

Table 1

Below 28	Very poor
28-38	Poor
39-48	Fair
49-59	Good
60-70	Very good
71-100	Excellent

To compare the mean difference between the subjects in cardiovascular fitness t-test was applied with the help of SPSS software (version 11.5) with 0.05 level of significance.

Findings

Table 1 representing the comparison of cardiovascular fitness (Harvard step test) between female students Department of Physical Education (FPES) and female students of Government College of Yoga (FYS).

Table 2

Variable	Group	N	Mean	S. D	M.D	S. E	t-ratio
Cardiovascular fitness	FPES	25	58.92	5.123	9.00	2.174	4.138
	FYS	25	49.92	9.591			

Significant at 0.05 level 't' 0.05(48) =2.02

It is depicted from the table that the mean scores of female students of Department of Physical Education, Panjab University, Chandigarh and female students of Government College of Yoga, Sector-23 Chandigarh on Cardiovascular were 58.92 and 49.92 respectively. And, calculated t-value was found to be statistically significant as the value obtained was 4.138 whereas, the tabulated value was 2.02 with degree of freedom at 0.05 level of significance. So, it has been observed that there is significant difference in cardiovascular fitness between both the groups. The results shows that Physical education female students were found to be superior to female students of Yoga in cardiovascular fitness.

Discussion

The current study found to be statistically significant on cardiovascular fitness of Physical education female students and female students of Yoga. Physical education female students were found to be superior to female students of Yoga in cardiovascular fitness. Research also suggests that hatha yoga is an acceptable form of physical activity for enhancing muscular fitness and flexibility, but some studies demonstrate that hatha yoga may have little, if any, cardiovascular benefit (Clay 2005) [14]. Bhattacharya & Krishnaswami (1960) [10] also concluded that yoga training does not produce any marked effect on the physiological parameters. Studies have shown that yoga practice can lead to improvements in hand-grip strength (Madanmohan, et.al 1992) [18] muscular endurance (Ray US, 1986) [24] flexibility (Gharote ML 1979) and maximal oxygen uptake (VO_2max) (Balasubramanian B, 1991) [8] In addition, decreases in percent body fat (Bera TK, 1993, Madhavi S, 1985) [9, 19] and increases in forced vital capacity (FVC) and forced expiratory volume in 1 second ($FEV_{1.0}$) (Bhole MV 1970, Joshi LN 1992, Makwana K 1988) [12, 17, 20] have also been observed. Regular hatha yoga practice can elicit improvements in the health-related aspects of physical fitness (Tran MD 2001) [25].

Yoga training results in significant improvement in cardiovascular endurance, anaerobic threshold (Bera & Rajapurkar 1993) [9] and improves physical efficiency (Muralidhara & Ranganathan 1982) [21]. There is lesser increase in BP, HR and RPP after yoga training and yoga training increases muscular endurance, delays onset of fatigue and enables one to perform work at lesser VO2 max (Ray *et al* 1986, 2002) [24] (Bhavanani 2004) [11]

In our study Physical education female students were found to be more fit as compared to female students of Yoga in cardiovascular fitness. It might be attributed to the fact that the students of physical education are more actively involved in physical activities like conditioning, physical fitness classes, athletic training, and game- specialization practical classes, etc. as compared to students of College of Yoga. Practice incorporating sun salutation postures exceeding the minimum bout of 10 minutes may contribute some portion of sufficiently intense physical activity to improve cardio-respiratory fitness in unfit or sedentary individuals. The measurement of energy expenditure across yoga sessions is highly reliable. Metabolic costs of yoga averaged across the entire session represent low levels of physical activity, are similar to walking on a treadmill at 3.2 kph, and do not meet recommendations for levels of physical activity for improving or maintaining health or cardiovascular fitness. Yoga practice incorporating sun salutation postures exceeding the minimum bout of 10 minutes may contribute some portion of sufficiently intense physical activity to improve cardio-respiratory fitness in unfit or sedentary individuals. The measurement of energy expenditure across yoga sessions is highly reliable

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