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## Comparison of cardio respiratory endurance through Harvard step test among boys and girls in Punjabi University, Patiala

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### Abstract

The physical fitness index measures the physical fitness for muscular work and the ability to recover from the work. The purpose of this study to comparison of Cardio Respiratory Endurance through Harvard Step test among boys and girls in Punjabi university, Patiala. The study was carried out on 80 subjects. The subjects were divided into boys and girl's groups from science and arts stream. Each group was comprised of 20 candidates. The study carried out on random sample of Punjabi university students. All subjects were ranging in age 20 to 25years. The statistical analysis was done using descriptive analysis and t-test. statistical analysis shows that physical fitness in students is not satisfactory and there is significant difference in physical fitness index between boys and girls. Physical fitness of science boys and arts girls are not satisfactory and science girls and arts boys are having better physical fitness.

**Keywords:** Physical fitness index, harvard step test, science, and arts students

### Introduction

Cardiovascular endurance is the ability of the heart, lungs, and blood vessels to deliver oxygen to your body tissues. The more efficiently your body delivers oxygen to its tissues, the lower your breathing rate is. Essentially, a stronger, more efficient oxygen delivery system allows you to dive with greater ease in any situation. Cardio-Respiratory Fitness (CRF) is a major component of health-related fitness and depends on many phenotypes associated primarily with cardiac, vascular, and respiratory functions. Measurements of sub-maximal exercise capacity and maximal aerobic power are generally performed to assess cardio-respiratory fitness.

Health as defined by the World Health Organization (WHO), is a "state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.

Health-related fitness has been shown to have a protective effect on the incidence of cardio-metabolic risk factors in children. Health-related fitness consists of five domains including body composition, aerobic fitness, muscular strength and endurance, and flexibility.

Body composition and aerobic fitness are the two domains that tend to have the strongest relationships with health outcomes in the paediatric population. Because of the established relationships between health-related fitness and various health markers, improving health related fitness levels has become imperative to attenuate risk of developing chronic disease. The Harvard step test is a type of cardiac stress test for detecting and diagnosing cardiovascular disease. It also is a good measurement of fitness and a person's ability to recover after a strenuous exercise by checking the recovery rate.

### History of Harvard Step Test

In (1943), Brouha developed a very simple field test for measuring cardiovascular endurance of humans. Due to its relative ease of administration and minimal equipment requirement, this is desirable test. Subjects were given simple instructions to step up and down to a standardized Candence for 5 minutes. Immediately following the stepping, recovery heart rate was determined for a full minute.

An accurate way to assess fitness is to complete a maximal aerobic test which records and measures the heart rate and oxygen consumption using breathing apparatus and oxygen/

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carbon dioxide measurement software. Of course, this scientific approach is outside the reach for many people and is both impractical and improbable for many health clubs and gyms to cater for.

Therefore, the purpose of present study was to Comparison of Cardio Respiratory Endurance through Harvard Step test among Boys and Girls in Punjabi University, Patiala.

### Material and Methods

The study was carried out on 80 subjects. The subjects were divided into boys and girl's groups based on their study stream. Each group was comprised of 20 candidates. The study carried out on random sample of Punjabi university Patiala students. All subjects were ranging in age 20 to 25 years. Equipment's for the measurement of Cardio respiratory Endurance were stop watch, a Bench of 20inches height for boys and for girls 16inches was used for stepping up and down exercise, Metronome. PFI was calculated by using following formula.

Physical fitness Index (%) (Edward Fox Charles *et al.*, 1973)<sup>[4]</sup>

$$\text{PFI} = \text{Duration of exercise in seconds} \times 100 / 2(\text{pulse } 1+2+3)$$

Procedure: The Harvard Step Test consists of 3 or 5 minutes of stepping up and down using a stable box or step measuring 20 inch in boys and 16 inches in girls in height. The rate of stepping is set at 30 steps per minute. The pulse rate is then measured at the 1st, 2nd, and 3rd minutes of recovery after finishing the step test.

- PR1 (Pulse Rate 1) – 1 min after exercise
- PR2 (Pulse Rate 2) – 3 min after exercise
- PR3 (Pulse Rate 3) – 5 min after exercise.

**Table 1:** Physical Fitness Index rating (Edward L. Fox. *et al.*, 1973)<sup>[4]</sup>

PFI Rating	Physical Fitness Index	
	Male	Female
Excellent	>115	>91
Good	103-115	84-91
Fair	91-102	77-83
Poor	<91	<77

The subjects were given rest for 5 min in a chair. Resting pulse rate was measured in that resting position. After explanation subjects were told to do modified Harvard step test in a rhythmic manner & the data were recorded. The detail procedure of exercise test was explained to the subjects & actual demonstration was given before starting test in order to allay apprehension.

### Data analysis

Statistical analysis was done using descriptive analysis and t-test. The t-test was applied to find out the significance difference in the status of science and Arts Students on the selected variables.

### Results

**Table 2:** Distribution of the subjects according to the HST

HST	Science		Arts	
	Males	Females	Males	Females
Score	23.4+4.6	22.7+5.8	26.0+2.1	19.8+4.7

The data in the table 2 shows that the average HST of the

subject was calculated 23.4+4.6 for science boys &26+2.1for Arts boys respectively.

On the other hand, the mean of HST (22.7+2.1) of science girls and (19.8+4.7) of Arts girls. The result was not significant as for t- value was 0.03 in case of boys but in girls t-value was 0.11.

### Discussion

In present study we have examined the cardiovascular test (HST) was applied on the subjects. The subject's score was evaluated with the help of the HST norms. All the subjects were poorest performance. Nobody, were participating any type of planned exercise. Insufficient physical activity is a key risk factor for non-communicable diseases such as cardiovascular diseases, cancer, and diabetes.

It is highly recommended that the planned exercise by specialised persons should be integral part of the curriculum.

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