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Research Paper

Determination of Physical Fitness Index (PFI) With Modified Harvard Step Test (HST) in Male and Female Medical Students of Age 17-19 Yrs

Medical Science

KEYWORDS : Male Medical students, female medical students, height, weight, Harvard index.

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ABSTRACT

Background & Objectives: Harvard step test has been given much attention to select highly physically active persons who will be capable of doing hard work so that they may be recruited in various sports & games or appropriate industrial occupations.

The present study was carried out in medical students to determine the Harvard Step Test (HST). There is significant difference in Harvard Index (HI) or Physical Fitness Index (PFI) in male and female students because males are generally more aggressive and accepts challenges more than females, also there is significant difference in Height (Ht) and Weight (Wt) in males and females. So, PFI affected by body size as evidenced in the co-relation PFI with height and weight.

Methods: The study was conducted in department of physiology, MNR Medical College, Sangareddy. A total of 133 subjects were selected, of whom 73 were male and 60 were female medical students whose age varied from 17 to 19 years. The subjects selected for this study were medical students admitted for First MBBS Course. The PFI or HI of the subjects was calculated by asking the subject to perform Harvard Step test. Prior to the test, age (Yrs), height (cm) and weight (kg) were recorded.

Results: In the present study, the mean Harvard Index or PFI was 83.0101 in males and 60.2425 in females. Mean values of height and weight were 170.5603cms & 56.3219kgs in males and 156.14cms & 49.2Kgs in females respectively.

Interpretation & Conclusion: Low mean value of PFI in female subjects compared to male subjects can thus be attributable to their lower body weight and height; also, males are generally more aggressive and accept challenges more than females. This present study is an attempt to modify Harvard step test with classification of score. But for Indians it is necessary to modify the step test because of short stature.

1. Introduction:

Application of Harvard step test in the physical performance capacity of an individual has aroused interest because of simplicity veracity of test. To make our boys and girls come up to the standard of top performance in the world of sports today. We provide them training facilities to increase their physical performance and will power. To motivate them we have to raise the standards of basis physical fitness levels first and then to later to specialized training schedules.

The Harvard step test (HST) was introduced by Brouha et al (Brouha et al,. 1943). From Harvard fatigue laboratory in USA to select army personnel during World War II. HST has become well known to study cardiovascular fitness by American Alliance for Health physical education research and Dance (AAHPERD) who recommended this level to study health related physical fitness programme in youth (Elbel ER et al,. 1958).

Application of original Harvard step test in Indian population has been found to be unsatisfactory because of the step height of 20" which adversely affects Indian men who are relatively shorter (Sunil K R et al,. 1993 & P K Banerjee et al,. 1983) hence modification of the test has been proposed with respect of the stepping model height and frequency, number of modified HST's had been recommended by a number of workers either by lowering step height or frequency of up-down per min or by altering duration of exercise instead of maximum period of 5 min similarly present study makes an attempt to modify HST with Lowering both step height and frequency keeping same duration for college students with classification of score to categorize the physical fitness index (PFI).

The aim of present study is therefore planned to study PFI in both male and female medical students with modified HST along with a statistical subdivision to classify the score relatively on a moderate number of subjects.

2. Methods and Materials:

A total of 133 subjects of which 73 were male and 60 were female whose age varied from 17 to 19 years. The subjects selected for this study were medical students admitted for MBBS Course after obtaining Instituitional Ethical Clearance. They were not practicing any athletic event. Informed consent was obtained from all participants. The study was conducted in the department of physiology, MNR Medical College, Sangareddy.

All the subjects were familiarized with Hardward step test. The procedure of this method is that subject took rest for 5 minutes prior to test and initial pulse was noted Ask the subject to perform the exercise of ascending and descending Harvard step of 16" (40cm) height 20 times per min for 5 min (Brouha et al,. 1943). It he gets exhausted earlier then note the time for which he was able to perform the test. Time is noted with the help of stopwatch. At the end of test ask the subject to sit immediately on chair count the pulse and record it during 1 to 1-$^{1}/_{2}$ min to 2 to 2/-$^{1}/_{2}$, 3 to 3/-$^{1}/_{2}$ min interval. Total of these three reading is called recovery pulse. Convert the duration of exercise in seconds and fatigue index or Harvard index is calculated as follows,

$$HI = \frac{\text{Duration of exercise in seconds}}{2 \times \text{recovery}} \times 100$$

Prior to the test age, height and weight were recorded. Student's 't' test were applied for statistical analysis for finding mean and standard deviation.

3. Results:

The physical characteristics like age, height, weight and PFI of subject are given in table I. The classifications of fitness according to index are given in table II.

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4. Discussion:

This modified HST is found to be height suitable for Indian men and women. It may be mentioned that all the subjects continued the exercise step test for 5 min. when step height was 16" with step frequency 20/min respectively. The finding in the present study suggests that there is significant difference in physical fitness Index or Harvard index in male and female medical students because male is generally more aggressive and accepts challenge more than female (Ian Gregg et al,. 1973). Also there is significant difference in height and weight in males than female so PFI affects by body size as evidenced in positive co-relation between PFI with height and weight (P K Banerjee et al,. 1983). A similar observation was earlier made by Elbel et al,. 1958 (Debnath P K et al,. 1978) on male college students.

The lower men values of PFI in the female students compared with male students can thus be attributable to their lower body weight and height. This present study is an attempt to modify test with classification of score. It would be valid for untrained men and women. It may be mentioned that no physical explanation is given to modify the HST in any country (Brouha L et al,. 1843). But for Indians with short stature, it is felt necessary to modify HST and its physiological and anthropometric relations are yet to be explored (Sunil K R et al,. 1993).

Table – 1: Shows physical characteristics and PFI in male and female medical students (Mean ± SD)

Sex	No.	Height (cms) Mean	Weight (Kg) Mean	PFI (HI) Mean	Statistical Signature	'p' Value
Male	73	170.5603	56.3219	83.0101	HS	<0.0001
Female	60	156.1400	49.2000	60.2425	HS	<0.0001

Table – 2: Classification of fitness according to Harvard index.

Category	Harvard Index
Poor	<55
Average	65-69
Good	80-89
Excellent	90 & above

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