



A CROSS-SECTIONAL STUDY TO ASSESS THE PHYSICAL FITNESS INDEX IN MEDICAL STUDENTS

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ABSTRACT:

BACKGROUND: The physical fitness index assesses both physical fitness for muscular work and capacity to recover from it. The Harvard Step Test (HST) examines an individual's physical fitness. The present study was conducted to find the physical fitness Index of MBBS students using the Harvard step test and to compare the physical fitness between male and female medical students

MATERIALS AND METHODS: The present cross-sectional Study was conducted in the Department of Physiology, Viswabharathi Medical College, Kurnool. The subjects selected for this study were first year medical students admitted for first MBBS course and physical fitness index was measured using Modified Harvard Step test and physical fitness was compared between male and female medical students. Data was analysed using SPSS version 21.

RESULTS: For 100 students, interpretation of the PFI scores was found to be poor for 57%, low average for 4%, average for 6%, good for 22%, and excellent for 11% of students. Among male participants, distribution of poor, low average, average, good, and excellent PFI was 46%, 4%, 8%, 26% & 17% respectively. Among female participants, distribution of poor, low average, high average, good, and excellent PFI was 68%, 4%, 4%, 18%, and 6% respectively.

CONCLUSION: This study concluded that medical students lacked adequate levels of physical fitness, whereas male students were more physically fit than female students. Academic curriculum should include and aggressively concentrate on students' physical exercise, encouraging them to incorporate a healthy lifestyle into their everyday routines. If adopted, it might dramatically reduce the burden of noncommunicable illnesses in the future.

KEYWORDS: physical fitness index, Harvard step test, Medical Students

INTRODUCTION:

The capacity to do everyday chores with energy and alertness, without experiencing excessive exhaustion, and to confront unanticipated crises and unique circumstances is known as physical fitness

[1]. One of the key factors used to evaluate a subject's cardiopulmonary efficiency is the physical fitness index.

Brouha et al. introduced the Harvard step test (HST) [2]. During World War II, several army soldiers were sent from Harvard's fatigue laboratory in the United States. The American Alliance for Health Physical Education Research and Dance (AAHPERD), which suggested this level to investigate health-related physical fitness programs in adolescents, has made HST well-known for its ability to evaluate cardiovascular fitness [3].

Because of its simplicity and validity, the Harvard Step Test (HST) has generated attention in assessing an individual's physical performance potential; nonetheless, it is thought that the HST has to be modified for Indians who are short in height [4]. In the modified HST used in India, the step height, which was 20" (50.8 cm) in the Harvard step test, is reduced to 16.5" (41 cm) [5].

Exercise and other forms of physical activity help teenagers become more physically fit by building muscle and improving their cardiorespiratory strength and endurance. Students who are physically active may do better in all areas of their lives and adjust to difficult situations more readily [6].

The health of our population is the responsibility of medical students as future healthcare professionals. Therefore, they must maintain their own health and fitness in order to provide superior healthcare. The present study was conducted to find the physical fitness Index of MBBS students using the Harvard step test and to compare the physical fitness between male and female medical students

MATERIALS AND METHODS:

This cross-sectional study was conducted in the department of Physiology at Viswabharathi Medical College, Kurnool for a period of 3 months after taking approval from the Institutional ethics committee. A total of 100 first MBSS students of which 50 were male and 50 were female whose age varied from 17 to 19 years were included in the study. They were not practicing any athletic event. Informed consent was obtained from all participants.

Descriptive data for age, gender, Height, Weight & BMI were obtained

Recording of Physical Anthropometry:

1. Height (In cms): This was measured with the subject in standing position without footwear to nearest to 0.1 cms.
2. Weight (In kgs): The subject was weighed with a standard machine with minimum clothing to nearest to 0.1 kgs.
3. Body mass index (kilogram/meter²): This was calculated for each subject from his height and weight by using formula.

$$\text{BMI} = \text{Weight in kilogram} / \text{Height in meter}^2$$

After familiarizing the participants with the Harvard Step Test, resting pulse rate was noted. The participants were then asked to step up and down the step. A metronome was used to maintain the rhythm. On the count of one, the participants would keep one foot on the heavy wooden step followed by the other; on the count of two he/she would put the first foot off the bench followed by the other. The participants were asked to step up and down 30 times per minute according to the metronome for five minutes, with total steps of 150 steps or until exhaustion [7]. Exhaustion is defined as the point when the participant can no longer maintain the stepping rate for 15 seconds. The time was noted with the help of a stopwatch. Rest was given to the subject for 5 minutes after the step test. At the end of the test, the participants were asked to sit on a chair and the pulse was measured. Pulse rate was counted from 1 to 1½ min (pulse rate 1 – PR1), 2–2½ min (pulse rate 2-PR2), and 3–3½ min (pulse rate 3-PR3) after finishing the test. PFI was then calculated using the formula:

$$\text{PFI} = \frac{100 \times \text{Total duration of exercise in seconds}}{2 (\text{PR1} + \text{PR2} + \text{PR3})}$$

Physical fitness Index Rating [9]:

PFI Rating	Fitness index
excellent	>96
Good	83-96
Average	68-82
low average	54-67
Poor	<54

Statistical analysis: Data analysis was done by SPSS version. The data is presented in the form of frequency & tables. Chi-square test was used to compare the fitness index among the male and female students. P value < 0.05 was considered statistically significant.

RESULT:

In our study, out of 100 students, there were 50(50%) males and 50(50%) females. The physical characteristics of the participants were mentioned as shown in Table 1.

Table 1: Physical characteristics in Male & Female students

variable	male	female	P value
number	50 (50%)	50 (50%)	0.09
Age (year)	20.65±0.982	20.46±0.852	0.243
BMI	22.02±3.45	22.68±4.08	0.154

P<0.05 statistically significant

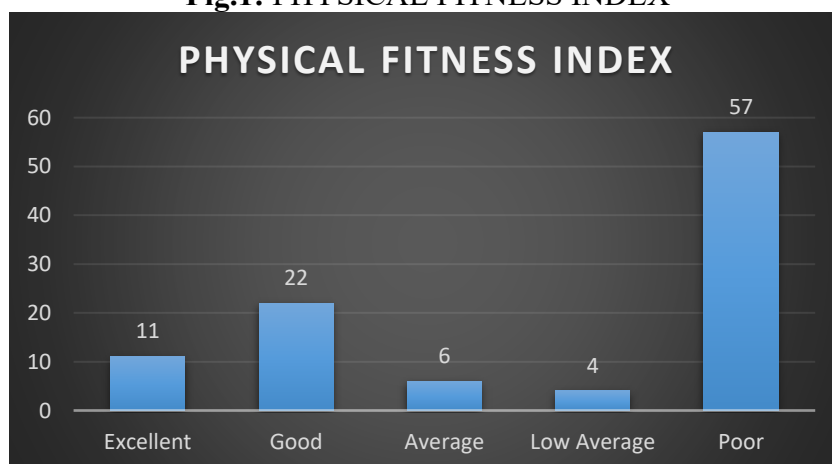
For 100 students, interpretation of the PFI scores was found to be poor for 57%, low average for 4%, average for 6%, good for 22%, and excellent for 11% of students. [Table 2 and fig. 1]. Among male participants, distribution of poor, low average, average, good, and excellent PFI was 46%, 4%, 8%, 26% & 17% respectively. Among female participants, distribution of poor, low average, high average, good, and excellent PFI was 68%, 4%, 4%, 18%, and 6% respectively as shown in Table 2

Table 2: PFI SCORING

	Male (n=50)	Female (n=50)	Total (n=100)	p value
Excellent	8 (16%)	3 (6%)	11	0.001*
Good	13 (26%)	9 (18%)	22	
Average	4 (8%)	2 (4%)	6	
Low Average	2 (4%)	2 (4%)	4	
Poor	23 (46%)	34 (68%)	57	

*P<0.05 statistically significant

Fig.1: PHYSICAL FITNESS INDEX



DISCUSSION:

The current study was conducted to determine the physical fitness index of medical students using the modified Harvard step test and to compare physical fitness between male and female medical students. This study tested the physical fitness of 100 medical students. Future physicians must understand their current level of fitness and strive to improve it. This modified HST was determined to be a good height for Indian men and women. It should be noted that all individuals completed the exercise step test for 5 minutes at a step height of 16 inches and a step frequency of 20 steps per minute. Female students had lower PFI values than male students, which may be attributed to their lower body weight and height. This research is an effort to adapt a test by classifying the scores. It would be valid for both untrained men and women. It should be noted that no physical rationale is provided to adjust the HST in any country. [10] However, for Indians with short height, it is deemed important to adjust HST, and its physiological and anthropometric relationships have yet to be investigated. [11]

The current study's results indicate that there is a considerable difference in physical fitness index, or Harvard index, between male and female medical students because males are typically more aggressive and embrace challenges than females.[12] There is also a considerable variation in height and weight between men and females, implying that PFI is influenced by body size, as indicated by the positive correlation between PFI and height and weight. [13] Elbel et al. [14] and Debnath P K et al. [15] previously reported comparable findings on male college students.

CONCLUSION: This study concluded that medical students lacked adequate levels of physical fitness, whereas male students were more physically fit than female students. Academic curriculum should include and aggressively concentrate on students' physical exercise, encouraging them to incorporate a healthy lifestyle into their everyday routines. If adopted, it might dramatically reduce the burden of noncommunicable illnesses in the future.

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