



## Original Article

## Assessment of Cardio-Respiratory Fitness of Doctor of Physical Therapy Students: A Cross-Sectional Study

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## ABSTRACT

Cardiorespiratory fitness (CRF) shows the overall cardiovascular, pulmonary fitness capacity and the ability to carry out prolonged exercises. **Objective:** To assess the Physical Fitness Index (PFI) in female undergraduate Doctor of Physical Therapy students. **Method:** Cross-sectional study was conducted; 200 physical therapy students were enrolled. Participants were selected through the Non-Probability Convenient sampling technique. Height (m) and Weight (kg) were measured to calculate BMI. The Modified Harvard Step test was used to calculate the PFI. SPSS 21 was used for statistical analysis. **Results:** The current study shows that the Mean age of the participants was 21.53 ± 1.83 years with a minimum age of 17 years and maximum age of 26 years. About 4.5 % (n=9) students had excellent PFI, 13 % (n=26) students had Good PFI, 15 % (n=31) students had Fair PFI and 67 % (n=134) students had poor PFI. **Conclusion:** The physical fitness of physical therapy students at Riphah College of Rehabilitation Sciences is inadequate, and overweight students have lower physical fitness than students with normal BMI.

## INTRODUCTION

In our modern society, the foundation of all the physical activities of individuals is physical fitness [1]. Fitness has two components that are health-related and skill-related. The health-related component includes cardio-respiratory endurance, muscular endurance, muscular strength, and flexibility [2]. Cardiorespiratory fitness (CRF) refers to the ability of the circulatory and respiratory systems to supply oxygen to skeletal muscle mitochondria for energy production during physical activity. Over the previous six decades [3], CRF has dropped. However, the reasons for this drop are unknown, obesity, rising idle time, reduced levels of moderate to intense physical activity, and sociological and economic changes may have all played a role. [4] Physical fitness has been defined in various ways.

However, the most often recognized definition is the ability to perform everyday work with enthusiasm and alertness, without undue exhaustion, and enough energy to enjoy leisure activities and respond to unexpected situations [5]. The profession of physical therapy is established day by day due to increased demand and specialty in medical treatment services and rehabilitation programs to establish a healthy, Active life style [6]. Unaccustomed physical effort is required to deal with emergencies and based on the physical wellbeing of the individual and its capacity [7]. The job description of physiotherapist includes multiple exercise programs recommendation to the patient, clinical rotations in OPD, in the cardiopulmonary unit after CABG, mobilizing patients in

ICU, in Rehabilitation programs after hip and knee arthroplasty and transferring of the patient require a good amount of strength, endurance and flexibility[8-9] Physical therapy students face different kinds of stressors, especially the pressure and burdening curriculum of physical therapy education leads to physically unfit and unhealthy. The Physical Fitness Index (PFI) is one of the essential variables in determining a person's cardiorespiratory fitness. Harvard's step test is used to assess it. Checking the recovery is also valuable to evaluate fitness and a person's ability to recover after a challenging workout[10].

## METHODS

The ethical committee of Riphah College of rehabilitation and Allied Health Sciences granted ethical approval to this study. A cross-Sectional Study design was used. The study was conducted at Riphah International University, Lahore. The study was completed in 4 months after the approval of the synopsis. A non-Probability Convenient sampling technique was used. A sample size of 200 was calculated with Rao software. Female Physical Therapy students were the target population. Inclusion criteria were female DPT students with Ages between 17 to 25 years and BMI 18-28 kg/m<sup>2</sup>. Exclusion criteria were Students with any physical or medical anomalies including cardiac illnesses, chronic diseases that influence physical fitness, and lower limb fractures. Modified Harvard Step of 51cm height, Stopwatch, Metronome, Weight, and Height measuring instruments were used. The subjects signed informed consent forms in writing. To avoid the specific dynamic action of food, all of the participants were told to eat their last meal at least one hour prior to the test. At room temperature, tests and measurements were conducted. To obtain accurate results, all subjects were given adequate rest before each procedure. The following tests were used to determine each participant's fitness level: The BMI formula was used to calculate it = Weight (Kg)/ Height (m<sup>2</sup>). Assessment of PFI: After performing the Harvard Step Test, PFI was determined by getting a heart rate reading. It is based on the recovery of heart rate following a 5-minute exercise. The participants were instructed to step up and down for 5 minutes or until they were fatigued on a 51cm high bench. A step-up and a step-down were included in each cycle. Participants were instructed to take a seat at the end of this procedure. After 1 to 1.5 minutes, 2 to 2.5 minutes, and 3 to 3.5 minutes, the pulse was monitored and readings were noted. The Faculty of Physiotherapy's

Departmental Research Committee approved the study's protocol[11]. Physical fitness index was measured by using this formula [12]:  $PFI = \frac{\text{duration of exercise in seconds} \times 100}{2(\text{pulse}1+2+3)}$ .

## RESULTS

For each parameter, the mean, standard deviation, and ranges were determined. SPSS 21 was used to conduct the statistical analysis. Table 1: It represents the demographic characteristics of Participants. The total number of participants N=200 have a minimum age of 17 and maximum age of 26 with a mean of 21.53 ±1.83. The minimum value of BMI was 18kg/m<sup>2</sup> and the maximum value was 28kg/m<sup>2</sup> with a mean ± SD of 26.01 ±5.53. The minimum duration of exercise was 60 seconds and the maximum period was 900 seconds with the mean of 263.92 ± 148.78. The minimum Pulse value was 136 per minute and the maximum pulse value was 572 bpm after 5 minutes with a mean value of 267.44 ±73.75. The minimum value of PFI was 10.56 and the maximum value of PFI was 113.64 with the mean value of 52.26 ±27.74

Parameters	Minimum	Maximum	Mean	SD
Age	17.00	26.00	21.53	1.83
BMI	18	28	26.01	5.53
Duration of exercise	60	900	263.92	148.78
Sum of 3 Pulses	136	572	267.44	73.75
PFI	10.56	113.64	52.26	27.74

**Table 1:** Physical Fitness Parameters of participants

PFI Rating fitnessindex	physical
Excellent	>90
Good 84-91	
Fair 77-83	
Poor<77	

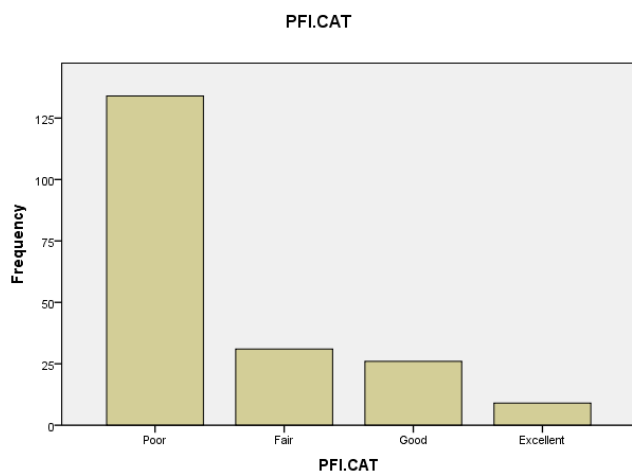


**Table 2:** Physical Fitness Index rating for females

Table 3: It shows the physical fitness index of participants of this present study with percentage. 4.5 % (n=9) students have excellent PFI, 13 % (n=26) students have Good PFI, 15 % (n=31) students have Fair PFI and 67 % (n=134) students have poor PFI. CAT value. This figure shows that 4.5 % (n=9) had excellent PFI, 13 % (n=26) had Good PFI, 15.5 % (n=31) had fair PFI and 67% (n=134) have poor PFI values (Figure 1).

PFI	Frequency	Percent (%)
Excellent	9	4.5
Good	26	13.0
Fair	31	15.0
Poor	134	67.0

**Table 3:** Physical fitness index of participants



**Figure 1:** Physical fitness index results of participants

Many studies have demonstrated that proper physical health is required for anybody to carry out their daily obligations. Because they will be participating in a range of activities during their clinical settings, physical therapy students require high cardiorespiratory fitness [13].

## DISCUSSION

Many studies clarified that physical health is essential to perform out daily task CRF is very important for physical therapy students as they are involved in multiple activities throughout their clinical postings in OPD, clinics and hospitals like transferring, shifting and managing paraplegics patients and quadriplegics patients, mobilizing patients in ICU [13]. The goal of this study was to determine the cardiorespiratory fitness of female physiotherapy students. According to the findings, all of the physiotherapy students' BMIs were within normal limits. The current study assesses DPT students' physical fitness by using the Harvard step test. This step test has four physical fitness grades depending on the scores obtained after the test [14]. It has been reported that a lack of physical activity is linked to a reduced level of aerobic capability in physical therapy graduate students. It's widely acknowledged that leading an active lifestyle can help you stay healthy and avoid disease. Physiotherapists should maintain a high level of fitness as a health-promoting behavior. Thus, it's fascinating to promote physical activity among physical therapy students [15]. It is determined that almost all physical therapy students don't seem to do their routine work due to their busy schedules. current study's results indicate that Riphah DPT female students who perform daily exercise generally have a better cardiorespiratory fitness level than inactive students. In this study, only 9(4.5%) students were with excellent PFI, 26(13%) students were with good PFI, 31(15.5%) students were with fair PFI and maximum students 134(67.0%) were

with poor PFI. Sonia Pawaria et al. did a study on the cardiorespiratory fitness of physiotherapy students. The study's findings revealed that physiotherapist students' cardio-respiratory fitness was average, while low in the current study. The physical fitness index and VO<sub>2</sub> max had a high positive connection. It was also a cross-sectional study including 40 physiotherapy students [16]. Another study by Ajediran et al. evaluated the physical fitness of Ghanaian physiotherapists and the relationship between age and exercise participation. It was a pilot study. The total number of participants in this study was 40, with 23 (58%) females. They performed a three-minute step test. Physical fitness was poor among the physiotherapists as compared to age-adjusted values. The findings of this investigation corroborate our findings [17]. Sunil Kumar's study on cardiorespiratory fitness of medical students in a health institute found that male medical students had a higher CRF than female medical students. Most students' VO<sub>2</sub> max was within acceptable limits, indicating that their fitness level was adequate. The CRF of the minimal students was insufficient, and they must improve their CRF by frequent exercise practice [18]. Pulse rate fluctuation after exercise was lowest among students with good physical activity levels and highest among students with poor physical activity levels. As a result, prospective physical therapy students must understand their fitness level and look for ways to improve it. It is critical to maintaining a good level of fitness. According to the American College of Sports Medicine (ACSM) and the American Heart Association, a healthy adult should engage in moderate-intensity physical activities for at least 30 minutes, five days a week, or vigorous-intensity physical activities for at least 20 minutes, three days a week (AHA) [19].

## CONCLUSION

It is concluded that the cardiopulmonary fitness of the undergraduate DPT students is not satisfactory. This may be due to a lack of physical activities and busy life. Regular physical activity should be added to the daily routine as it is necessary for cardiopulmonary fitness.

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