

Relation of Physical Fitness Index with Body Mass Index: Study Among Female Students of Balwant College Vita, Dist. Sangli, (M.S.), India

Rahul Patil¹, Satyawan Patil², Yogita Patil³, Rajaram Atigre⁴

Department of Zoology, Balwant College, Vita^{1,3}

P.G. Department of Zoology, A.S.C. College, Palus²

Department of Zoology, Shri. Vijaysinha Yadav College, Pethvadgaon⁴

Abstract: *The present study was undertaken to find out the correlation between Physical Fitness Index (PFI) and Body Mass Index (BMI). Physical Fitness Index was measured using the Modified Harvard step test. BMI was calculated by the Quetelet Index. In the present study total 85 female students having the age group between 18 to 25 years were selected from Balwant College, Vita. The present study showed that 64.70 % students were having low average PFI. 28.23 % students were having poor average PFI. 5.88% students were having high average PFI. 1.75 % Students were having good PFI. This study showed that there was no correlation between BMI and Physical Fitness.*

Keywords: PFI, Harvard Step Test, BMI, Quetelet Index, etc.

I. INTRODUCTION

Fitness is a common term used to describe the ability to perform an exercise. Physical fitness has been defined in different ways, but the generally accepted definition is the ability to carry out daily tasks with vigour and alertness, without undue fatigue, and with ample energy to enjoy leisure-time pursuits and meet unforeseen emergencies (Kluwer, 2018). Physical fitness suggests not only absence of a disease or a disabling deformity and capacity to perform a sedentary task efficiently but also a sense of physical well-being and the capacity to deal with sudden and unaccustomed physical efforts (Parmar, 2015). Physical fitness is a set of attributes a person has or achieved (Caspersen *et al.*, 1985), which is linked to the person's capability to do physical activity (Pescatello, 2014). There are many psychological, behavioral and physiological reasons why people do not perform physical activity or perform limitedly (Bulut, 2013). The levels of physical fitness are generally assessed by different measurements such as body weight, height, chest size, etc. and these measurements are useful for entry into various government jobs.

Poor physical fitness will result in increased incidences of various health problems such as cancer, obesity, cardiovascular diseases, and diabetes mellitus. Some of these diseases are the leading cause of death in the world (Powell K.E. and Blair S.N., 1994).

The selected girls for this study were from the village background as well most of them were from farmer families and they do not aware of their physical fitness. Due to this reason the present study was carried out to find the relation between physical fitness index and body mass index of selected girls' students.

II. MATERIALS AND METHODS

For the present investigation, 85 girls' students whose age varied from 19 to 25 years were selected from Balwant College, Vita, district Sangli, India.

Study Design: Observational study.

Study Setting: Balwant College, Vita

Sample Size: 60 subjects.

Sampling: Convenient sampling method,

Inclusive Criteria: Female students age between 18 to 25 years.

Exclusive Criteria: Participants were excluded if they have any health problems such as cardiovascular or respiratory problems, endocrine problems, any lower limb pathology and chronic diseases,

Body Mass Index (Quetelet Index):

All the selected girls were asked for Body mass index assessment by applying standard method Quetelet Indexing. Observations of weight and height of girls were carried out by properly calibrated weighing balance and height in meter respectively. The BMI was calculated by using formula,

$$BMI = \frac{\text{Body Weight in kg}}{\text{Height (Meter)}^2}$$

For the differentiation, as per the data, of BMI was subjected to various categories as underweight, normal, overweight and obese individuals by using the BMI chart provided by WHO.

Table 1: Body Mass Index

Range	Below 18.5	18.5-25	25-30	Above 30
Type	Underweight	Normal	Overweight	Obese

Physical Fitness Index (Mahajan, 2020):

Students were asked to sit quietly for 5 min. Thereafter, they were asked to perform the stepping up and down on 18 inch high step for women [23] for 5 min at the frequency of 30 times per min. The participant performed this exercise as long as she could, but not in excess of 5 min. Time for which the participant can perform the test was noted. The time at which the participant felt that she cannot perform the test any more was taken into consideration. This time is known as the time of exhaustion. After the completion of the test, pulse rate was counted from 1 to 1½ min (pulse rate 1), 2–2½ min (pulse rate 2), and 3–3½ min (pulse rate 3) (Mahajan, 2020).

PFI was then calculated using the formula, **PFI = Duration of exercise (in seconds) × 100/2 (Pulse rate 1 + 2 + 3)**

The fitness of the participant was graded on the basis of the score of PFI as poor, low average, high average, good, and excellent.

Table 2: Physical Fitness Index Rating

Male	>90	80-89	65-79	55-64	<55
Female	>86	76-86	61-75	50-60	<50
Grade	Excellent	Good	High average	Low average	Poor

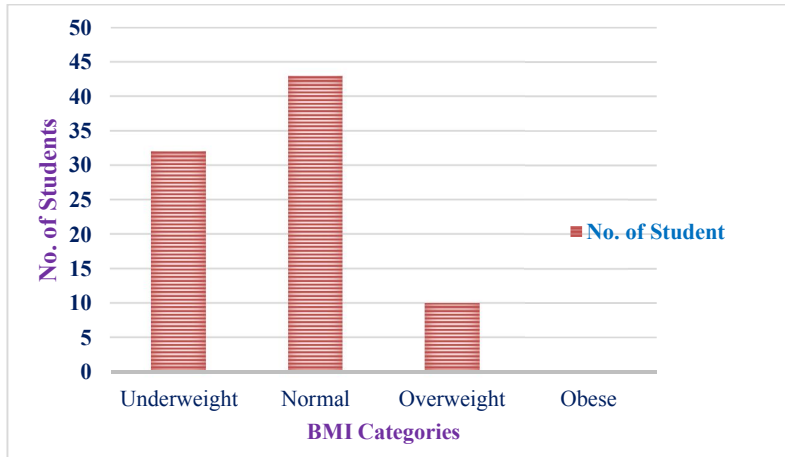
Data Analysis:

Data were analysed on Microsoft Excel version 2016 for making tables and bar graphs. Pearson's correlation (*R*) was used to test the hypothesis to determine the relation between PFI and BMI. *P* < 0.05 was considered statistically significant.

III. RESULT AND DISCUSSION

Table 3: The Values of Body Mass Index

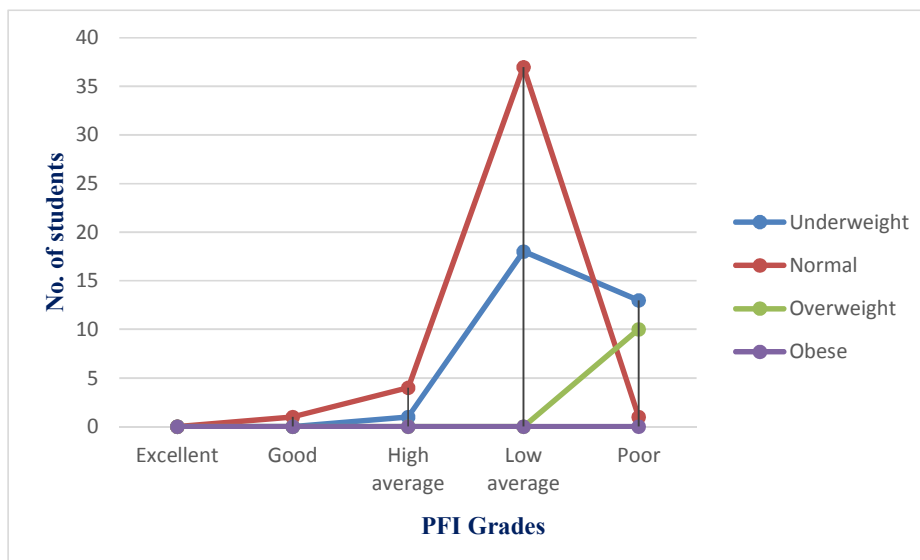
BMI Categories	Underweight	Normal	Overweight	Obese
No. of Student	32	43	10	00
Percentage	37.64	50.28	11.76	00



Graph 1: Number of Students in Different BMI Categories.

Table 4: The Values of Physical Fitness Index of the Students

PFI Grades BMI Categories	Excellent	Good	High average	Low average	Poor
Underweight	00	00	1	18	13
Normal	00	01	4	37	1
Overweight	00	00	00	00	10
Obese	00	00	00	00	00
Total	00	1	5	55	24
Percentage	00	1.17	5.88	64.70	28.23



Graph 2: Relation of Number of Students of Different BMI Categories with Different PFI Grades

A total 85 girl students from college campus were tested for the determination of PFI and its correlation with BMI for the age group of 18–25 years. The results of the present study showed percentage of girl students having the following BMI: underweight 32 (37.64 %), normal weight 43 (50.28%), overweight 10 (11.76 %), None of the participant found as obese [Table 3 and Graph 1]. Results also showed that 28.23% of the girl students had poor physical fitness, 64.70 % of the girls' students had low average PFI, 5.88% of the girl students had high average PFI, 1.17 of the girl students had good PFI and none of the participants had excellent fitness [Table 4 and Graph 2].

The Pearson's correlation (R) was used to test the hypothesis to determine the relation between PFI and BMI. It was found that there was no correlation between PFI and BMI ($r = -0.058$).

Our results are in good agreement with the findings of Munagekar (2021), Puskas *et al.* (2020), Mahajan (2020), Khodnapur *et al.* (2012), Shrivastav *et al.* (2013), Saeed *et al.* (2013) Apart from these, the differences was observed (Parmar (2015) may be because of sampling size.

IV. CONCLUSION

The present study was clearly revealed that there is no correlation between Physical Fitness Index and Body Mass Index. The present study was carried out in Covid- 19 Lockdown period. So, there may be chances of adverse effect of covid-19 pandemic situation on the health of the participant girl students.

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