

Correlation of BMI with Physical Activity and Fatigue in College Going Students

Dr. Ayushi Ghanshyam Patel¹, Dr. Gira Thakrar²

¹First Year MPT Student, ²Senior Lecturer;
JG College of Physiotherapy, Gujarat University, Ahmedabad, India

Corresponding author: Dr. Ayushi Ghanshyam Patel

DOI: <https://doi.org/10.52403/ijhsr.20230505>

ABSTRACT

Introduction: young adults are not susceptible to having healthy weight. Now a days modern lifestyle along with increased consumption of a junk and sedentary behavior it has been observed that fatigue and physical fitness of most people is being compromised and due to that there is also seen difference in their BMI which further affects their entire body. So the objective of study is to find the correlation of BMI with physical activity and fatigue in college going students.

Materials & methods: An observational study was conducted in the Ahmedabad city colleges. Fatigue severity scale and international physical activity questionnaire were filled from 106 students of both the gender between age group of 18 to 25 through online Google forms. Ethical clearance has been taken.

Result: SPSS version 29 software was used for data analysis. There is significant negative correlation found between BMI and physical activity. ($r=-0.3$, $p<0.001$). There is Positive significant correlation found between BMI and fatigue. ($r=0.13$, $p<0.001$)

Conclusion: The result of this study suggests that the physical activity and fatigue of the subjects differed significantly from the BMI. Physical activity decreases as their BMI increases. And as BMI increases, fatigue levels also increase.

Keywords: physical activity, fatigue, BMI

INTRODUCTION

Physical exercise is a healthy habit that shows potential in combining feelings of fatigue and poor energy levels. ⁽¹⁾ One in five people globally reports having persistent fatigue, which is a serious public health issue. ⁽²⁾ The number of people in India has significantly grown over the past few decades as a consequence of sedentary lives and greater intake of a modern, hyper caloric diet.

One aspect of physical exercise that is linked to health is body composition. It details the proportions of bone, fluid, muscle, and fat in the human frame. ⁽³⁾ Extra calories are transformed into fat and kept in our bodies as fat. On the other hand, the

expected weight of muscle in the body is known as muscle mass. Skeletal muscles, smooth muscles, and heart muscles, which function as motors in utilising energy, are all included in muscle mass. Increased calorie consumption due to increased muscular mass results in a decrease in extra body fat. Physical exercise is one thing that has an impact on body fat. ⁽⁴⁾ The moving of the body caused by the use of the skeletal muscles is referred to as physical exercise.

Physical activities include things like walking, gardening, jogging, ascending stairs, and playing football. Inactive, minimally active, and HEPA active are the three categories. According to the International Physical Activities

Questionnaire (IPAQ), which was launched in Geneva in 1998, ⁽⁵⁾ Physical exercise should be at least moderately active or HEPA for health advantages. ⁽⁶⁾ Participating in physical activity can also help keep bodies attractive and encourage physical health. ⁽⁷⁾ People who lead inactive lifestyles are much more likely to have higher BMI and body fat percentages than those who lead busy lifestyles. ⁽⁸⁾

BMI affects physical activity and fatigue. In fit people also, fatigue is a common complaint. ⁽⁹⁾ A subjective sign of exhaustion, weariness, or a lack of energy is fatigue. The seventh most typical sign is it. There is no precise meaning for tiredness or fatigue. It is a subjective experience. From a clinical point of view, fatigue is characterised by symptoms like lack of energy and physical and mental exhaustion ⁽¹⁰⁾ and is described as trouble initiating or maintaining spontaneous activities. ⁽¹¹⁾

Measuring fatigue severity (FSS) One of the most widely used scales for exhaustion surveys is the FSS. The FSS is a brief survey created by Krupp et al. ⁽¹²⁾ that has nine questions measuring how fatigue impacts motivation, exercise, bodily performance, carrying out tasks, interfering with job, family, or social life,

Among other things a healthy weight is not something that young people are prone to. Today's Morden lifestyle, which includes increased junk food intake and inactive behaviour, has been observed to impair most people's energy levels and physical fitness. As a result, there is also a difference in their BMI, which further impacts their entire body. Therefore, the goal of the research is to determine the relationship between BMI and physical exercise and fatigue in college-going students.

MATERIALS & METHODS

An observational study was conducted in Ahmedabad, Gujarat, India, after approval from the institutional ethical committee. The purposive sampling method was used. Data collection was done through an online questionnaire created by Google Forms.

Data were collected for a period of one month, from December 1 to December 31, 2022. A total of 130 responses were recorded, based on inclusion and exclusion criteria total 106 responses for analysis. All participants were aged between 18 and 25 years old, were college students, and both males and females were included in the study. They belonged to different health colleges in Ahmedabad and agreed to participate voluntarily in the study. Students doing sports and gym activities, students with cardiorespiratory disease, and any student with a past 1-week illness were all excluded the questionnaire consisted of three sections: the first section encompasses anthropometric and demographic information, such as age, weight, height, BMI, department, level of study, and additional questions to ensure they are free of chronic disease or not. The second section assessed the student's physical activity level via an international physical activity form. The third section assessed the students fatigue level via a fatigue severity scale.

The FSS has nine lines that can be used to assess the effects of fatigue. Fatigue severity scale has a (Test-retest reliability $r=0.84$)⁽¹³⁾. A numerical measure from 1 (strong disagreement with the statement) to 7 (strong agreement with the statement) was used to ask the individual to evaluate the intensity of the fatigue symptoms they had in the previous week. The total score has been calculated by averaging the scores of each item.

The International Physical Activity Questionnaire is a seven-item self-report tool that evaluates physical activity across four different domains during the past seven days. International physical activity questionnaire has a (intra-class reliability $r=0.80$)⁽¹⁴⁾. The frequency and duration of vigorous activity, moderate activity, and walking are assessed. Participants also report the quantity of time they spend sitting during the course of a week, but this information is not analyzed as part of physical exercise. By combining the stated

frequency and length of each type of activity, the amount of time spent each week on strolling, moderate exercise, and intense activity is calculated. By adding the three categories of above-mentioned tasks, the total amount of physical exercise per week is determined.

RESULT

Out of the 106 participants, 64 were female and 42 were male; the finding shows that 47.7% were of normal weight. Nearly 26.5% of participants were overweight, 5.3% were obese, and nearly 32.86% of respondents fell under the underweight category.

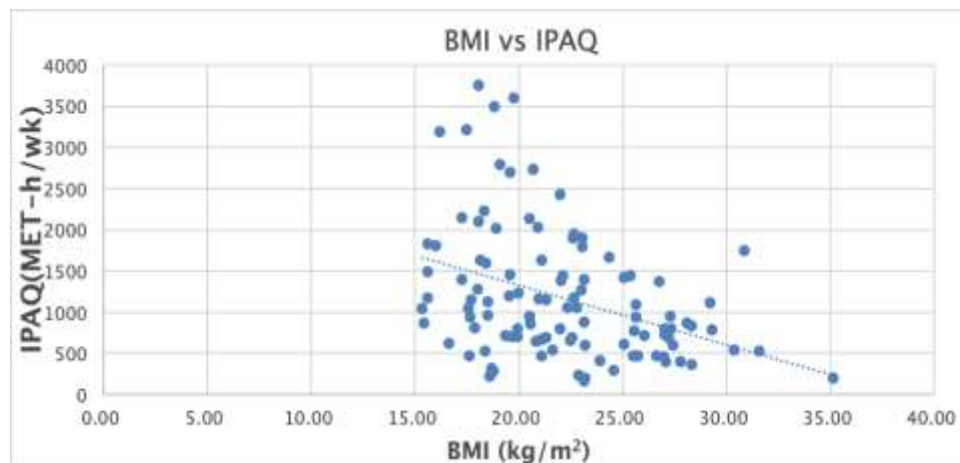
Statistical analysis was performed using SPSS version 29 for data analysis. Data

normality was checked by using the Shapiro-Wilk test because, as per the analysis, the data was not normally distributed and a non-parametric Spearman's correlation test was used and p value <0.05 is considered statistically significant.

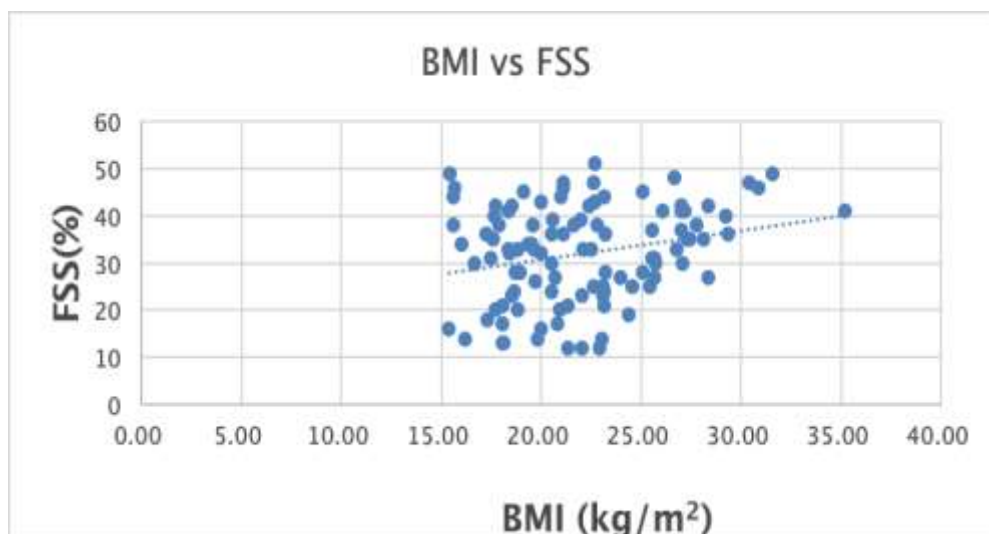
A weak but significant negative correlation was found between BMI and physical activity. (r value = -0.3, p value = 0.001) A very weak but significant positive correlation was found between BMI and fatigue. (r value =0.13, p value = 0.001).

Spearman's correlation	MEAN±SD	r-value	p-value
BMI	22.08±0.40	1.000	.001
IPAQ	1061.60±84.73	-0.326**	.001
FATIGUE	32.15±0.98	0.136	.001

Table: 1 correlation of BMI with physical activity and fatigue



Graph: 1 correlation of BMI with physical activity



Graph: 2. Correlation of BMI with Fatigue

DISCUSSION

Total 106 participants the finding shows that 47.7% were of normal weight. Nearly 26.5% of participants were overweight, 5.3% were obese, and nearly 32.86% of respondents fell under the underweight category. There were some overweight and even obese students who had body types that were affected by lifestyles. The majority of the overweight and obese individuals are categorized as minimally active and a few are inactive. While a small numbers of normal individuals are HEPA active.

Present study found that a negative correlation between physical activity and BMI. This is similar to a study done by Tan PL et al. ⁽¹⁵⁾ they found that the relationship between physical activity and BMI indicates a very weak negative correlation ($r=-0.084$). They concluded that when physical activity increases, BMI and body fat mass would decrease. And Body fat mass is believed to be another factor affected by physical activity. And Ding et al. ⁽¹⁶⁾ As per the findings of this study The Relationship between Body Mass Index and Physical Fitness in the physical ability of university students is impaired as BMI increases. This study shows that low levels of fitness particularly seen in overweight or obese individuals are associated with adverse health effects. In present study found that the value of BMI reduces when physical activity levels rise. Hence, there is insufficient evidence to suggest that a very weak negative correlation also exists in the population. This shows that the value of BMI reduces when physical activity levels rise.

Smisha Mohan et al. ⁽¹⁷⁾ conducted a study in 2016 reported that inactive people experience exhaustion earlier than active people because they receive insufficient amounts of nutrients including oxygen, creatine phosphate, and ATP, as well as neurotransmitter depletion and metabolite buildup in the muscles. Robert Fitts ⁽¹⁸⁾ in 1994 suggested that factors that influence the onset of fatigue are type of muscle

fibres, training, and blood flow. In present study we found positive correlation between fatigue and BMI shows this indicates that when fatigue level increases, the value of BMI increases.

With this background, the present study was carried out to correlate BMI, Physical activity and fatigue

CONCLUSION

In conclusion, BMI, fatigue, and physical activity are important factors affecting student's quality of life, which may also affect their entire lives. Our study findings suggest that, from the 106 respondents, the result of this study suggests that the physical activity and fatigue of the subjects differed significantly from the BMI. Physical activity decreases as their BMI increases. And as BMI increases, fatigue levels also increase. There are some limitations of this present study the daily life activities of the students have not taken into consideration. Future similar study can be done in different health conditions, physical activity and fatigue comparison can be done among different BMI categories.

Declaration by Authors

Ethical Approval: Approved

Acknowledgement: The senior professors who assisted us are all truly appreciated by the authors. And a sincere thanks you to everyone who took part in the research for their immense support and active involvement.

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. O'Connor PJ, Puetz TW. Chronic physical activity and feelings of energy and fatigue. *Med Sci Sports Exerc* 2005; 37 (2): 299-305
2. Wessely S, Hotopf M, Sharpe M. Chronic fatigue and its syndromes. Oxford: Oxford University Press, 1998
3. The Oxford Companion to the Body (2001). Composition of the Body. Available at <http://www.encyclopedia.com/medicine/encyclop>

- edias-almanacs-transcripts-and-maps composition-body. Accessed February 16, 2018.
4. Yoshioka M, Ayabe M, Yahiro T, Higuchi H, Higaki Y, et al. Long-period accelerometer monitoring shows the role of physical activity in overweight and obesity. *International Journal of Obesity* 2005; 29(5), 502–508. <https://doi.org/10.1038/sj.ijo.0802891>
 5. IPAQ Group. Guidelines for Data Processing and Analysis of the International Physical Activity Questionnaire (IPAQ): Short form. [Internet]. The Group; April 2004 [cited 2018 Dec].
 6. Haskell WL, Lee IM, Pate RR, Powell KE, Blair SN, et al. Physical activity and public health: Updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Medicine and Science in Sports and Exercise* 2007; 39(8), 1423- 1434. DOI: 10.1249/mss.0b013e3180616b27
 7. Muñoz-Vera T, Sañudo B, del Pozo-Cruz B, del Pozo-Cruz J, Lopez-Lluch G, Sánchez-Oliver AJ. Influence of the level of physical activity on physical fitness, lipid profile and health outcomes in overweight/obese adults with similar nutritional status. *Science & Sports* 2017; 32(5), 278-285. <https://doi.org/10.1016/j.scispo.2016.05.006>
 8. Hruby A, Hu FB. The Epidemiology of Obesity: A Big Picture. *Pharmacoeconomics* 2015; 33(7), 673-689. Doi: 10.1007/s40273-014-0243-x.
 9. Asp M, Simonsson B, Larm P, Molarius A. Physical mobility, physical activity, and obesity among elderly: findings from a large population -based Swedish survey. *Public Health* 2017; 147, 84–91. <https://doi.org/10.1016/j.puhe.2017.01.032>
 10. Chen MK: The epidemiology of self-perceived fatigue among adults. *Prev Med* 1986, 15(1):74–81.
 11. Chaudhuri A, Behan PO: Fatigue in neurological disorders. *Lancet* 2004, 363(9413):978–988.
 12. Valko PO, Bassetti CL, Bloch KE, Held U, Baumann CR: Validation of the fatigue severity scale in a Swiss cohort. *Sleep* 2008, 31(11):1601–1607.
 13. Neuberger GB. Measures of fatigue: the fatigue questionnaire, fatigue severity scale, multidimensional assessment of fatigue scale, and short form-36 vitality (energy/fatigue) subscale of the short form health survey. *Arthritis Care & Research: Official Journal of the American College of Rheumatology*. 2003 Oct 15;49(S5):S175-83.
 14. Dinger MK, Behrens TK, Han JL. Validity and reliability of the International Physical Activity Questionnaire in college students. *American journal of health education*. 2006 Nov 1;37(6):337-43.
 15. You HW, Tan PL, AF ML. The relationship between physical activity, body mass index and body composition among students at a pre-university centre in Malaysia. *IJUM Medical Journal Malaysia*. 2020 Jul 1;19(2).
 16. Ding C, Jiang Y. The relationship between body mass index and physical fitness among Chinese university students: results of a longitudinal study. In *Healthcare* 2020 Dec 17 (Vol. 8, No. 4, p. 570). MDPI.
 17. Mohan S, Geetha M B, Padmavathi R; Study of muscle function in young adults: *Sch. J. App. Med. Sci.* 2016; 4(7A): 2348-2352.
 18. Fitts RH; Cellular mechanism of muscle fatigue: *Physiol. Rev.* 1994; 74: 49-94 .
- How to cite this article: Ayushi Ghanshyam Patel, Gira Thakrar. Correlation of BMI with physical activity and fatigue in college going students. *Int J Health Sci Res.* 2023; 13(5):38-42.
DOI: <https://doi.org/10.52403/ijhsr.20230505>
