

# Correlation between body mass index, body perception and physical activity among university students

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## ABSTRACT

**Background:** With the current advancement in technology, sedentary lifestyles, and decreased physical activities, university students are highly prone to distorted body perceptions and obesity. However, limited studies have been conducted about body weight and body perception in university students studying in Pakistan.

**Objective:** This research aimed to determine correlation between BMI, body perception and physical activity in university students.

**Methods:** This is a correlational study. A sample size of 437 was calculated by online sample size calculator. Non-probability convenience sampling technique was used. The study was carried out in different universities of Islamabad and Rawalpindi and the tools such as International Physical Activity Questionnaire, Body Mass Index, and Figure Rating Scale were used. Data was analyzed using SPSS 22.

**Results:** BMI and body perception showed significant moderate positive correlation ( $r=0.472$ ,  $p<0.05$ ). Physical activity showed significant weak correlation with body perception and BMI ( $r=0.125$  and  $0.024$ ,  $p<0.05$ ).

**Conclusion:** It was concluded from the results of current study that students have misperceptions regarding their body weight but weight misperception was not a cognitive barrier in participants for physical activity and majority participants performed moderate to vigorous activities.

**Keywords:** Body perception, Body mass index, Correlation, Physical activity.

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## Introduction:

University students have sedentary lifestyles and are not as physically active as per the recommendations of the World Health Organization (WHO). In recent times, there is a surge of increased weight among students and adults. Eating processed food, high in fat content, academic stress, not actively taking part in

sports or outdoor activities are some factors that can lead to obesity.(1) According to WHO (2012), almost 300 million people were reported to be clinically obese.(2) The South Asian population has higher deposition of abdominal fat as compared to European regions. Pakistan is placed 165th (out of 194 countries) in terms of proportion of overweight population, with 22.2% of people over the age of 15 exceeding the threshold of obesity. This ratio is roughly congruent with other studies; which state one-in-fourth of Pakistani adults are overweight.(3)

Body Mass Index (BMI), body mass divided by the square of height (units of  $\text{kg}/\text{m}^2$ ), is a commonly used tool to screen overweight and obesity. Since body size is often either over or underestimated, the awareness about normal BMI can be beneficial to attain realistic perception about one's body weight and health.(4) Many young people seem to be unaware of

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the fact that they are not only overweight but also susceptible to many diseases. It seems that this population has a skewed perception regarding their body image. Obesity is also linked to emotional and social problems like depression. There is also a stigma attached to it which leads to feeling of rejection, shame and guilt, further worsening mental health.(5)

Body Image Dissatisfaction (BID) occurs when people have negative feelings about their own body and are unable to respect, appreciate and accept their body as it is. It takes a toll on the individual's self-esteem and confidence.(6) Literature suggests that when participants are asked to choose their ideal body types, they pick images that are similar to the types shown in the media and when they are asked to choose silhouettes of how they perceive themselves, they choose the exact opposite of what is shown in the media.(7) For Asian individuals, BMI between 23 and 27 kg/m<sup>2</sup> is overweight and BMI >27 kg/m<sup>2</sup> is obese. Waist to hip ratio (WHR) higher than 0.85 in females and higher than 1.0 in male means that they are at higher risk for developing serious health risk.(8)

Most researches in this area have focused on other geographical regions. Not many studies were conducted to assess the correlation between Body Mass Index (BMI), body perception and physical activity among university students. This study bridges the gap on this correlation specifically in Pakistan. Obesity is emerging as a public health problem. Weight misperception is the discordance between an individual's actual weight status and the perception of his/her weight. It is a common problem in the youth population as enumerated by many international studies. However, data from Pakistan in this area is deficient. It is observed that a typical university student in Pakistan may not have the accurate perception of their body weight. This lack of awareness and limited knowledge greatly increases the risk factors of obesity and being overweight. Such an attitude causes them to live a very unhealthy lifestyle. The inactive lifestyle throughout our modern society has outdated the need for physical activity. Sleep deprivation and poor dietary behaviors also impact students' intellectual level and academic records. The objective of this study was to ascertain the correlation between body mass index, body perception and physical activity among university students and to assess the knowledge of students regarding the cardiovascular risk factors especially obesity.

## Methods:

It was a correlational study. A sample size of 428 was calculated by online sample size calculator and we took data from 437 total students. The level of significance  $\alpha=0.05$  was used to check the hypothesis. Non-probability convenience sampling technique was used. The study included students from different universities, aged 18 -25 years. All students having any medical condition or history of cardiovascular disease, respiratory disease, endocrine issue or any hormonal imbalance were excluded. The study was carried out in different universities of Islamabad and Rawalpindi. Permission was obtained from the head of universities for our data collection process and took informed consent from the participants. This study was conducted from December 2021 to July 2022 after the approval from ERC; Ref# Riphah/RCRS/ REC/01193.

International Physical Activity Questionair - Short Form (IPAQ-SF), BMI, and Figure Rating Scale (FRS) were used as tools in this study. Body Mass Index (BMI) is calculated by dividing weight (kg or lbs.) by their height (m<sup>2</sup> or ft). FRS represents how a person recognizes his or her physical impression. It was an open access tool in which, individual chose the best figure that shows his or her present-day and his or her ideal body figure. In IPAQ-SF we calculated the results by MET calculated in METs minutes per /week and categorized accordingly. There are three categories of IPAQ which are high, moderate and low.

Through descriptive analysis of the demographic data, mean and standard deviation were calculated, whereas the variable graphs were through frequency and percentage. Data acquired was represented using tables and charts. Spearman's correlation for ordinal variables and Pearson's correlation for continuous variables was used. Data was analyzed using SPSS v.22.

## Results:

Frequencies and descriptive characteristics were used to evaluate socio-demographic features and are specified as mean, standard, deviations, and sample percentage. Sample size was 437 in number in which 212 (48.5%) were males, out of which 112 were medical students and 100 were non-medical participants. Similarly, 225 (51.5%) were females of which 101 were medical and 124 were non-medical participants. Mean age of the participants was 20.94±1.54 years. Respondents were requested to fill their weight (kg) and height (m) through which BMI was calculated. Mean value of BMI was 22.3±4.05. Majority of the

participants (45.8%, n=200) were classified with normal healthy weight while 26.5% (n=116) were overweight and 16.9% (n=74) were underweight and only 10.8% (n=47) were obese. Many students, almost 167 (38.2%) male and female, took part in vigorous physical activity in the last 7 days. While 146 (33.4%) had moderate and 124 (28.4%) had low physical activity. (Figure 1)

When students were asked to choose the figure that reflects their perception about how they look, majority students chose underweight category, and no one chose figures reflecting obesity. (Table 1)

Body satisfaction among individuals was done by

subtracting ideal figure and perceived figure. This shows that about 48.5% students incorrectly estimated their weight. (Figure 2)

The cross tab between BMI and Body perception showed the student's misperception regarding their weight and actual weight categorized through BMI. (Table 2)

A moderate positive correlation was observed between BMI and body perception and weak correlation with physical activity showing that actual BMI and perceived body weight are different. Similarly, BMI and body perception are weakly correlated with physical activity. (Table 3)

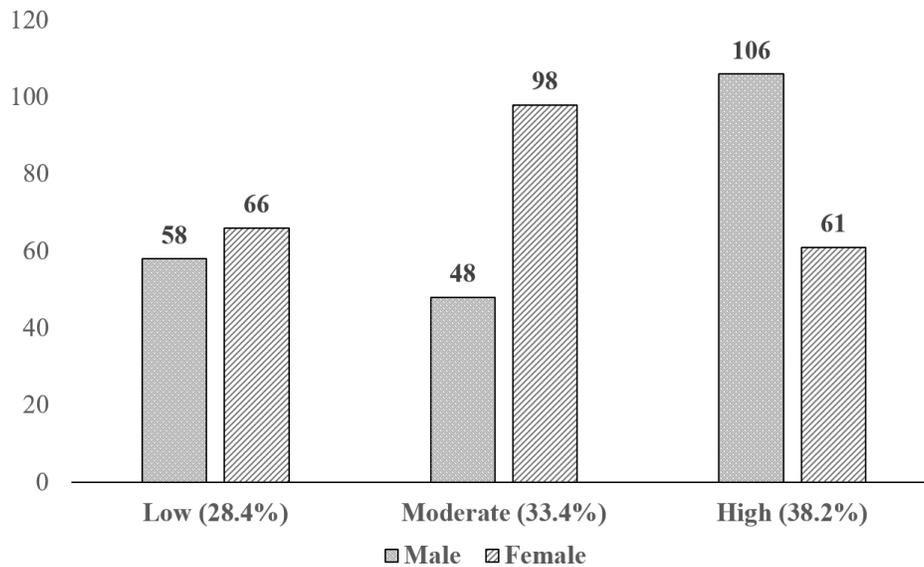


Figure 1: Gender wise physical activity level

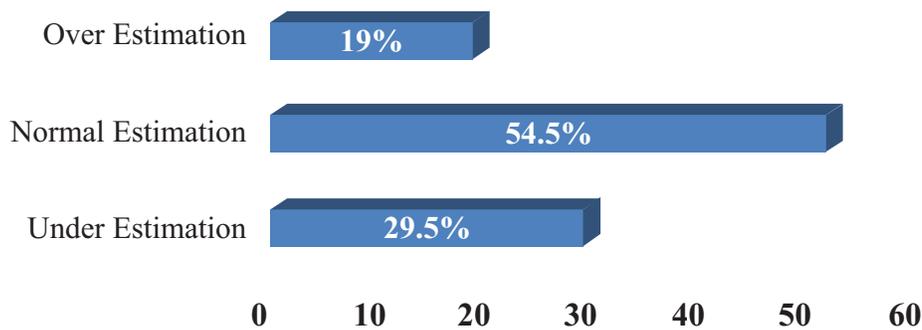


Figure 2: Body weight estimation

**Table 1: Body perception through Figure Rating Scale (FRS)**

Body perception	Perceived figure [n (%)]	Ideal figure [n (%)]
<b>Underweight</b>	230 (52.6%)	270 (61.8%)
<b>Normal</b>	200 (45.8%)	163 (37.3%)
<b>Overweight</b>	7 (1.6%)	4 (0.9%)

**Table 2: Cross-tabulation of BMI and body perception (perceived)**

Body Mass Index	Body perception (perceived figure)		
	Underweight	Normal	Overweight
<b>Underweight</b>	62	12	0
<b>Normal</b>	123	77	0
<b>Overweight</b>	36	77	3
<b>Obese</b>	9	34	4

**Table 3: Correlation between BMI, Body Perception and Physical activity**

Correlation analysis	r -value
<b>Body Mass Index &amp; body perception</b>	0.472*
<b>Body Mass Index &amp; physical activity</b>	0.125*
<b>Body Perception &amp; physical activity</b>	0.024*

\*Correlation is statistically significant at the 0.05 level (2-tailed)

### Discussion:

The purpose of this research was to find correlation between BMI, physical activity and body perception conducted on male and female students at universities. The findings of the current study revealed the actual weight categories and weight perception of university students which depicted their thoughts about their body shape and weight. As it is evident from the literature that body weight misperception can lead to eating disorders and certain health issues so by knowing the status of student's current level of body perception, future action can be taken to evade the issue.

Results of the current study revealed that although majority students have normal body weight according to BMI, but their perception was not accurate regarding their weight. In our study, 51.5% correctly estimated their weight while 48.5% misinterpreted their body weight. Similar findings were discussed by K. Boutahar et al. in a survey of university students on the association of anthropometric profile/health and body image. They showed an increased rate of body

dissatisfaction and underestimated their body weight.(9) It has been seen that in Asian countries, incidence of overestimation of body weight and struggle to reduce weight was high, whereas their body weights were typically low.

Another study in Pakistan conducted on undergraduate university students displayed an increased number of participants with weight misperception (42.2%).(10) About 1/3rd female university students in Karachi showed weight misperception.(11)

In our study, positive moderate correlation was found between BMI and body perception with  $r= 0.47$  which indicates that BMI and body perception do not have strong relationship with each other. Body satisfaction among individuals was done by subtracting ideal figure and perceived figure. This shows that about 48.5% students incorrectly estimated their weight. Similar findings reported in 2019 among Saudi women, demonstrated that BMI positively correlated with Body Image Dissatisfaction, with small correlation  $r=0.135$ .(6)

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Our results showed that many students took part in either moderate (33.4%) or vigorous activity (38.2%). In concurrence study conducted in 2021 on Pakistani Students, assessed that 36% were doing vigorous activity and 60.6% were doing moderate activity.(12)

Physical activity in our study showed very weak relationship with Body Perception and majority participants performed moderate to vigorous activities which indicates that weight misperception was not a cognitive barrier in participants of current study and they were physically active. In concurrence, a Saudi Arabian study conducted among university students reported that no relation was found between body perception and physical activity level.(13)

These findings are not in accordance with previous research which proposed that body image dissatisfaction is associated with minor probability of participation in physical activity in both gender participants. The possible reason for these contrasting results might be age group as participants of this study were 34–65 years old while current study participants were younger (18-25 years) and healthy.(14)

A thought-provoking outcome in the current study is that although majority students are normal (45.8%) according to BMI and percentage of overweight (26.5%) and obese (10.8%) participants was small, but a large number (48.5%) of participants perceive their weight incorrectly which indicates their dissatisfaction towards their weight. It could be justified by the reason that BMI gives information regarding physical measurements of body including weight and height of individual, but perception is related to shape of the body or specific body areas so individuals with normal BMI can also show dissatisfaction towards shape of body. It can be alarming as misperception of body can lead to eating disorders among students who are more concerned with body shape.(15)

The limitation of this study was the questionnaire (IPAQ) used, which only informed us about the physical activity practices of participants for the last seven days. Only BMI was used for obesity, waist to hip ratio which gives information about central obesity was not considered. It is recommended to observe eating behaviors of students as weight misperception is related to eating disorders. Waist to hip ratio is a far more reliable tool than BMI for the purpose of assessing obesity. But it is not as common or well known among the population. In future researches, abdominal obesity is as important to check for as overall obesity. For this

study, our participants were young adults; we propose that it should be done on children as well in the future.

### **Conclusion:**

It is concluded from the results of current study that students have misperceptions regarding their body weight but weight misperception was not a cognitive barrier in participants for physical activity and majority participants performed moderate to vigorous activities.

**Disclaimer:** It was part of thesis project (DPT) which was done in Riphah International University.

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**Source of Funding:** None to declare

### **References:**

1. Akram M, Ghous M, Tariq I, Khan H, Paracha M, Hussain B. The association between physical activity with cognitive and cardiovascular deconditioning in age related decline of college students. *JPMA. J. Pakistan Med. Assoc.* 2018 Dec 1;68:1755-8.
2. Tapera R, Merapelo MT, Tumoyagae T, Maswabi TM, Erick P, Letsholo B, Mbongwe B. The prevalence and factors associated with overweight and obesity among University of Botswana students. *Cogent Medicine.* 2017 Jan 1;4(1):1357249.
3. Jafar TH, Haaland BA, Rahman A, Razzak JA, Bilger M, Naghavi M, Mokdad AH, Hyder AA. Non-communicable diseases and injuries in Pakistan: strategic priorities. *The Lancet.* 2013 Jun 29;381(9885):2281-90.
4. Khanna D, Peltzer C, Kahar P, Parmar MS. Body Mass Index (BMI): A Screening Tool Analysis. *Cureus.* 2022 Feb 11;14(2).
5. Karp SM, Gesell SB. Obesity prevention and treatment in school-aged children, adolescents, and young adults—Where do we go from here?. *Primary prevention insights.* 2015;5:1.
6. Alsehli R, Aljadani H. Weight Control Behaviors among Female University Students in Saudi Arabia. *International Journal of Pharmaceutical Research and Allied Sciences.* 2020;9(4):133-41.
7. Mills JS, Shannon A, Hogue J. Beauty, body image, and the media. *Perception of beauty.* 2017 Oct 25:145-57.

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8. Verma M, Rajput M, Kishore K, Kathirvel S. Asian BMI criteria are better than WHO criteria in predicting Hypertension: A cross-sectional study from rural India. *Journal of family medicine and primary care*. 2019 Jun;8(6):2095.
9. Boutahar K, Chetoui A, Kaoutar K, Najimi M, Chigr F. Anthropometric status and body image perception among Moroccan university students. *Revue d'Épidémiologie et de Santé Publique*. 2019 Sep 1;67(5):311-7.
10. Saleem MD, Ahmed G, Mulla J, Haider SS, Abbas M. Weight misperception amongst youth of a developing country: Pakistan-a cross-sectional study. *BMC Public Health*. 2013 Dec;13(1):1-8.
11. Sirang Z, Bashir HH, Jalil B, Khan SH, Hussain SA, Baig A, Taufeeq M, Samad K, Kadir MM. Weight patterns and perceptions among female university students of Karachi: a cross sectional study. *BMC Public Health*. 2013 Dec;13(1):1-8.
12. Waseem M, Siddiqui H, Fazal M, Laiq I, Tariq I. Frequency of hypertension risk factors and level of knowledge among university students of twin cities in Pakistan. *Foundation University Journal of Rehabilitation Sciences*. 2021 Jul 18;1(2):39-44.
13. H. AL-Otaibi, S. Nassef and T. Raouf, "Body Shape Dissatisfaction, Weight Status and Physical Activity among a Sample University Students in Saudi Arabia," *Food and Nutrition Sciences*, Vol. 4 No. 6, 2013, pp. 616-625.
14. Coelho CG, Giatti L, Molina MD, Nunes MA, Barreto SM. Body image and nutritional status are associated with physical activity in men and women: The ELSA-Brasil study. *International journal of environmental research and public health*. 2015 Jun;12(6):6179-96.
15. Bombak AE. Obese persons' physical activity experiences and motivations across weight changes: a qualitative exploratory study. *BMC public health*. 2015 Dec;15(1):1-9.

**Authors Contribution:**

**Khalid M:** Design, acquisition, interpretation, drafting, final approval and agreement to be accountable for all the work.

**Khan SA:** Acquisition, interpretation, drafting, revising, final approval and agreement to be accountable for all the work.

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