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Relationship between body mass index and skeletal muscle mass

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Abstract

The present study aims at measuring body mass index and skeletal muscle mass of college going youths and to finding out the association between body mass index and skeletal muscle mass.

Methodology: The present study was conducted on 100 (male and female) subjects age 22.09 ± 2.17 who were purposively selected from Lovely professional University, Punjab, from among different professional courses (Education, physical education, M Tech, B Tech, EEE, ECE, MCA, BCA, BSC, and MSC) Data on body mass index was calculated using formula weight in kilogram divided by height in meter square and on skeletal muscle mass was collected using OMRON Body composition monitor with scale Model HBF-362, utmost care was given during data collection data was collected in the early morning to counter any alteration in the findings.

Statistical Procedure: Data was statically analyzed using descriptive statistics and Pearson product moment correlation coefficient.

Results and Interpretations: The findings of the present study revealed that the samples were having healthy body mass index and below average skeletal muscle mass and the result of the Pearson product moment correlation coefficient revealed strong negative correlation between body mass index and skeletal muscle mass as the p-value .000 is smaller than 0.01 at 99 degree of confidence.

Keywords: Body mass index, skeletal muscle mass, PPMCC

Introduction

During adolescence, body composition and body size markedly change. These changes are strongly associated with the development of various physical performance characteristics. Body mass index is used to predict individual's obesity status i.e. excess accumulation of the fat. Human body is mainly composed of three major different components in different proportions i.e. fat, muscle and bone the drastic increase and decrease in any of the component can have severe consequences on the well-being and physical performance. Body mass index is a height to weight ratio and is calculated in kilogram per height in meter square (kg/m^2) indicator of excess body fat and obesity. Skeletal muscle mass is the mass of the muscles associated to skeleton system. The study will help in understanding body composition deeply. Various studies are conducted in studying of body composition, but these sought clarity regarding whether the decrease in the one component of body composition is associated with the increase of the other. The literature till date has demonstrated that percent body fat and skeletal muscle mass is strongly associated (negatively) that the decrease in one will lead to increase in the other and vice versa (Kumar, D. 2016) [3].

Reason for conducting the research

Numerous previous studies are conducted on the study of body composition, but there is need of clarity regarding whether the decrease in the one component of body composition is associated with the increase of the other. The literature till date has demonstrated that percent body fat and skeletal muscle mass is strongly negatively associated that the decrease in one will lead to increase in the other and vice versa (Kumar, D. 2016) [3]. The relationship among body mass index and percent body fat was found positive indicating increase in BMI can lead to increase in the percent body fat which means BMI charts can be used as an indicator of body fat, but findings related to these are contradictory So the present study is framed to establish the relationship between body mass index and skeletal muscle mass which help in understanding the concept of body composition deeply and strengthen the relationship between body fat and BMI.

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Research Questions

What is the relationship between body mass index and skeletal muscle mass?

Objectives

To find out the relationship between body mass index and skeletal muscle mass.

Hypothesis

There will be a significant relationship between body mass index and skeletal muscle mass.

Methodology

Survey method was used to collect the data on 100 samples (male and female) age 22.09±.217 who were selected purposively from Lovely professional University, Phagwara, Punjab, from among different professional courses (Education, physical education. M Tech, B Tech, EEE, ECE, MCA, BCA, BSC, and MSC) Data on body mass index was calculated using formula weight in kilogram divided by height in meter square and on skeletal muscle mass was collected using OMRON Body composition monitor with scale Model HBF-362, utmost care was given during data collection data was collected in the early morning to counter any alteration in the findings. Data was statically analyzed using descriptive statistics and Pearson product moment correlation coefficient.

Analysis and Interpretation

The descriptive statistics of the data on 100 college going youths demonstrated that the youths were having healthy BMI (mean 22.96±3.62 kg/m²) with range 16-31.57 as the data was found symmetrical revealed by the normality testing of the data. In case of skeletal muscle mass (mean 31.97±4.014) the subjects were having below average amount of skeletal muscle mass with range minimum 21.90 to maximum 38.20 data was further tested for normality and the subsequent testing revealed that the data was negatively skewed i.e. not symmetrical meant that most of the score in the distribution was above mean value. Further to find out the relationship between body mass index and skeletal muscle mass the result of Pearson product moment correlation coefficient is presented below:

Table 1: Correlation table showing relationship between body mass index and skeletal muscle mass

Variable	Variable Correlated	r.-value	P-value
BMI	SMM	-.356**	.000

** . Correlation is significant at the 0.01 level (2-tailed).

The above table clearly revealed the relationship between skeletal muscle mass and Body mass index (r = -.356**) which is significant as the p-value .000 is smaller than 0.01 at 0.01 level of significance.

Discussion on Hypothesis Testing

The present study was conducted assuming that body mass index will have significant relationship with skeletal muscle mass and the data has supported the assumption hence the hypothesis was accepted at 0.01 level indicating strong negative relationship which further strengthening the association of body mass index and percent body fat and percent body fat and skeletal muscle mass (Kumar, D. 2016) [3] established strong positive relationship between body mass index and fat percentage whereas the study published in International journal of physical education, sports and health showed strong negative relationship between fat percentage and skeletal muscle mass.

Conclusion: On the basis of the findings of the study following conclusions can be drawn:

The body mass index has inverse relationship with skeletal muscle mass which means the increase in body mass index will decrease skeletal muscle mass and vice versa.

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