

# Gender Difference in BMI and Body Fat Percentage Estimated by Fat Analyzer in Adolescents

Ankalayya B.<sup>1</sup>, Lakshmi Pathi Rao R.<sup>2</sup>, Sudhir Modala<sup>1</sup>

## ABSTRACT

**Introduction:** The body fat percentage is heavily correlated with certain chronic diseases, but its exact estimation is not easy. BIA is the one of the reliable method and its non-invasive to estimate body fat percentage. The present cross sectional study aimed as to compare body mass index and body fat in genders.

**Material and method:** Among 100 subjects (50 male and 50 female) in the age group 17- 26 yrs. The anthropometric measurements and body fat percentage were measured by slandered procedures.

**Results:** We found that BMI and body fat percentage is more in females than males.

**Conclusion:** This study concludes that BMI is strongly associated with body fat percentage in females than males.

**Keywords:** Body fat percentage, body mass index, bioelectrical impedance

The height, weight and blood pressure of the subjects was measured with measuring tape, weighing machine and sphygmomanometer respectively.

## Measurement of the Body Fat Percentage

Body fat percentage was measured by the bioelectric impedance method by using an Omron (Fat analyzer HBF-375) bioelectric impedance analyzer which measures the impedance. The gender, height and age of the subjects were entered in the instrument, the subjects are informed to stand bare foot on instrument and said to hold sensor handle in 90 degrees, the digital reader of the body fat percentage was recorded. The general principle behind bioelectrical impedance analysis is that two or more conductors are attached to a person's body and a small electric current is sent through the body. Each (bare) foot may be placed on an electrode, with the current sent up one leg, across the abdomen and down the other leg.

## STATISTICAL ANALYSIS

The data were expressed in mean±SD and they were analyzed by using the SPSS version 17 [Statistical Package for Social Sciences] statistical software. The significance level was set at p values which were < 0.05 and it was considered as significant.

## RESULTS

One hundred (100) participants were included in this study, 50 were male and remaining 50 were female healthy subjects. The baseline parameters like mean age, mean weight, mean height, mean BMI and mean Body fat percentage for each group are comparable and are summarized in Table 1. and it shows the significant difference in age, Height, BMI and Body fat percentage between the groups (p = <0.05).

## DISCUSSION

The present cross sectional study was carried out in 50 males and 50 female healthy subjects. Evaluation of BMI and body fat percentage in genders was done with the help of non-invasive instrument Fat analyzer (omron- HBF 375). The key

## INTRODUCTION

Obesity is defined as immoderate accumulation fat in the body.<sup>1</sup> It is the one of the major health problem in developed and developing countries.<sup>2</sup> Obesity is the most commonly caused by a excessive food intake, decreased physical activity, genetic susceptibility and sedentary life. Excessive body fat is association with type II diabetes, hypertension and cardiovascular diseases.<sup>3,4</sup> The most common parameters used for obesity are waist hip ratio, body mass index, waist height ratio and waist circumference.<sup>5</sup> BIA is the one of the reliable method to measure body fat percentage. It is a non-invasive method to estimate accurate body composition.<sup>6</sup> BIA have many benefits such as safe, low price, simple, rapid, easy to perform and movable.<sup>7</sup> The current study aimed to compare BMI and body fat percentage by performing BIA in adolescents.

## MATERIAL AND METHODS

The total of 100 healthy young adults (50 males and 50 females) were included in this study with age range from 18 to 30 years. The study was conducted on the first year BDS students from the institute. The approval of the Ethical Committee was obtained. The non smoker, non alcoholic, non diabetic, having normal pulse rate, blood pressure, normal heart sounds and having no evidence of illness and having perfect physical, mental and psychological well being were included in the study. A brief history was taken and general physical examination of all the volunteers was done with main emphasis on cardiovascular diseases, renal diseases. None of the subjects took any medication at the time of study. All the tests were carried out between 11 am to 4 pm. The procedure was explained and informed consent was obtained after the subjects had read a description of the experimental protocol.

<sup>1</sup>Assistant Professors, Department of Physiology, Rohilkhand Medical College and Hosiptal, Bareilly, UP -243006, <sup>2</sup>Assistant Professor, Department of Physiology, Kerala Medical College, Palakkad, India

**Corresponding author:** Ankalayya B, Department of Physiology, Rohilkhand Medical College and Hosiptal, Bareilly, UP -243006, India

**How to cite this article:** Ankalayya B., Lakshmi Pathi Rao R., Sudhir Modala. Gender difference in BMI and body fat percentage estimated by fat analyzer in adolescents. International Journal of Contemporary Medical Research 2016;3(3):716-717.

S. No	Parameter	Male (n=50) Mean ±SD	Female(n=50) Mean± SD	P-Value
1	Age(yrs)	20.98±2.89	19.2±1.29	0.000
2	Height(cm)	167.54±6.0	156±4.1	0.000
3	Weight(Kg)	63.85±16.5	61.9±13.2	0.502
4	BMI	23.39±4.29	25.6±5.07	0.010
5	Body fat %	21.2±6.8	32.12±5.5	0.000

p value <0.05 is taken as significant

**Table-1:** Shows Mean ± SD value of Age, Weight, Height, BMI and Body fat% in male and female subjects

findings of this study in that, it shows significant difference in between BMI and BF% in genders. Earlier studies reported that Rush et al.<sup>9</sup> who examined European, Maori, Pacific Islanders and Asian Indian adults reported the significant positive correlation in BMI-BF% in all these races. Jackson et al.<sup>10</sup> observed Caucasians with Blacks, P. Deurenberg<sup>11</sup> did in Caucasians, this correlation was significant. More recent large study by S. Meeuwse<sup>12</sup> using UK adults has shown that the association is not especially good. This is particularly so when BMI is less than 25 kg/m<sup>2</sup>, particularly in men. BMI values of most of our participants were between 20–30 kg/m<sup>2</sup>, whereas the BMI range varied among other studies. Umesh Pralhadrao lad et al<sup>13</sup> reported strong correlation in between BMI and BF%.

## CONCLUSION

From this study, it is concluded that Body Mass Index (BMI) is strongly associated with body fat percentage (BF %) estimated by fat analyzer HBF- 375(BIA) in adolescents. Our observations revealed that there was a significant increase in BMI and Body Fat percentage in females than males.

## REFERENCES

1. World Health Organization:Obesity and overweight: fact sheet N0311; 012. <http://www.who.int/mediacentre/factsheets/fs311/en/index.html>.
2. Kannel WB, d'Agostino R, Cobb JL. Effect of weight on cardiovascular disease. *Am J Clin Nutr.* 1996;63: 419S–422S.
3. Must A, Spadano J, Coakley EH, Field AE, Colditz G, et al. The disease burden associated with overweight and obesity. *JAMA.* 1999;282:1523–1529.
4. Kopelman PG. Obesity as a medical problem. *Nature.* 2000;404:635–643
5. Deurenberg P, Van der Kooy K, Leenen R, Weststrate J, Seidell J. Sex and age specific prediction formulas for estimating body composition from bioelectrical impedance: a cross-validation study. *Int J Obes.* 1991;15:17–25.
6. Sharma AM:Obesity and cardiovascular risk.Growth Horm IGF Res. 2003, A (13 Suppl):S10–17
7. Houtkooper LB, Lohman TG, Going SB, Howell WH. Why bioelectrical impedance analysis should be used for estimating adiposity. *Am J Clin Nutr.* 1996;64:436S–448S.
8. Impedance analysis should be used for estimating adiposity. *Am J Clin Nutr.* 2000;64:436S–448S.
9. Rush EC, Freitas I, Plank LD:Body size, body composition and fat distribution: comparative analysis of European, Maori, Pacific Island and Asian Indian adults. *Br J Nutr.* 2009;102:632–641.

10. Ackson AS, Stanforth PR, Gagnon J, Rankinen T, Leon AS, Rao DC, Skinner JS, Bouchard C, Wilmore JH:The effect of sex, age and race on estimating percentage body fat from body mass index: the heritage family study.*Int J Obes Relat Metab Disord.* 2002;26:789–796.
11. Deurenberg P, van der Kooy K, Hulshof T, Evers P:Body mass index as a measure of body fatness in the elderly.*Eur J Clin Nutr.* 1989;43:231–236.
12. Eeuwsen S, Horgan GW, Elia M:The relationship between BMI and percent body fat, measured by bioelectrical impedance, in a large adult sample is curvilinear and influenced by age and sex.*Clin Nutr.* 2010;29:560–566.
13. Umesh Pralhadrao Lad et al., Correlation Between Body Mass Index (BMI) Body Fat Percentage and Pulmonary Functions in Underweight, Overweight and Normal Weight Adolescents:*Journal of Clinical and Diagnostic Research.* 2012;6:350-353.

**Source of Support:** Nil; **Conflict of Interest:** None

**Submitted:** 26-12-2015; **Published online:** 09-01-2016