

Correlation of Body Age with anthropometric parameters in students

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Abstract: Obesity is becoming a pandemic these days. People are overweight and are losing the joy of self control. Lack of exercise, poor dietary habits lead to hypertension and diabetes mellitus. It is essential to make students aware of their faulty habits so they may correct it at an early age. We analyzed the BMI, Body age, Visceral Fat, Total and subcutaneous fat using an OMRON Machine by bioelectrical impedance for 52 students. About 60% of students whose body age was more than their actual age were counseled to eat rightly and exercise regularly.

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INTRODUCTION

Life style diseases like obesity, hypertension, DM, coronary heart disease and stroke in adults have been related to the prevalence of risk factors in adolescents. Overweight and obesity may account for as many as 15-30% of deaths from coronary heart disease and 65-75% of new cases of DM (Jousilahti P 1996). Diabetes is one of the most common chronic childhood diseases. 40% of individuals with diabetes in USA are younger than 20 years of age (Alemzadeh R 2007). The alarming rise in obesity during childhood and adolescence requires immediate interventions to prevent subsequent increase in risk for diseases and deaths as they grow up. It is now recognized that hypertension in children is common and in most cases represents early onset of essential rather than secondary hypertension (American academy of Pediatrics 2004, Lurbe E 2009). There is prevalence of high blood pressure in children and adolescents from 2%-24%. It is an important contributors to increased cardiovascular in later life, such as atherosclerosis. Blood pressure and hypertension prevalence rates are much higher in men than in women, demonstrating gender dichotomy in blood pressure (Ashwani 2012). Excessive body fat and hypertension are important public health challenges in both economically developing and developed countries (Kearney, PM 2004).

There is one another widely used method to gauge the nutritional status, especially obesity is Body Mass Index [BMI], which equals to {weight [in kg] ÷ height[in m²]} It can be used as an indicator for tracking body size throughout the life cycle (Pi-Sunyer Fx 1993). BMI is positively and independently associated with morbidity and mortality from hypertension, Type II Diabetes Mellitus and other chronic diseases (Fareed M 2014). The BMI is an attempt to qualify the amount

of tissue mass [muscle, fat and bone] in an individual and then categorize that person as underweight [<18.5], normal weight [22-24] or obese [>30] based on that value. The BMI trait is influenced by both genetic and non-genetic factors and it provides a paradigm to understand and estimate the risk factors for health problems (WHO Technical Report Series 1995). The BMI ranges are based on relationship between body weight and disease and death (NHLBI 1998). Overweight and obese individuals are at an increased risk for the diseases like coronary heart disease, dyslipidemia, Type II Diabetes mellitus, gall bladder disease, hypertension, osteoarthritis, sleep apnea, strokes, cancers of endometrium, colon and breast, epidural lipomatosis etc (Booth F 2000)

We performed a systematic review to determine the strength of evidence with regards to the existing findings for the relationship between body fat , BMI, body age and visceral fat.

MATERIAL AND METHODS

Students of medical, dental and paramedical of age group 18-23 years were taken for this study at Santosh Medical College in Physiology Department.

The following anthropometric parameters were measured using OMRON HBF 375 machine, a body fat analyzer working under principle of bio impedance analysis (BIA) method (Chintala KK 2015)

- Assessment of total body fat percent (TBF%)
- subcutaneous fat (Scf %)
- Visceral Fat (VF%)
- Body Age

The Omron Full Body Sensor Body Composition Monitor and Scale estimates the body fat percentage by the Bioelectrical Impedance Method. Muscles, blood, bones and body tissues with high

water content conduct electricity easily. On the other hand, body fat does not store much water, therefore has little electric conductivity. The Omron Full Body Sensor Body Composition Monitor and Scale sends an extremely weak electrical current of 50 kHz and less than 500 μA through your body to determine the amount of water in each tissue. (Chintala KK 2015)

Consent from subject volunteers was taken before they were considered for inclusion in the study.

Measuring height and weight

The subject stands comfortably barefooted with chin parallel to ground on a stadiometer. The details of actual age in years, sex, height are then entered in the OMRON machine. The subject is asked to stand on the weighing OMRON machine and hold its bars with hands parallel to the ground. The machine scans the person for visceral fat, and calculates body age. Correlations between body fat, BMI, body age and visceral fat were analysed.

RESULTS

Body age is based on resting metabolism. Body age is calculated by using weight, body fat percentage and skeletal muscle percentage. This is a guide to whether body age is above or below the average actual age. 30 out of 52 students have body age more than the actual age, suggesting that about 60 % have wrong dietary habits and need to add exercise to their daily routine.

Body fat serves a vital role in storing energy and protecting internal organs. We carry two types of fat in our bodies: 1) essential fat which is stored in small amounts to protect the body and 2) stored fat which is stocked for energy during physical activity. While too much body fat may be unhealthy, having too little fat can be just as unhealthy.

Visceral fat is found in the abdomen and surrounding vital organs. It is different from fat found directly underneath the skin, which is referred to as subcutaneous fat. Visceral fat can go largely unnoticed because it’s not visible to the naked eye. One way visceral fat can be seen is through Magnetic Resonance Imaging (MRI). Too much visceral fat is thought to be closely linked to increased levels of fat in the bloodstream, which may lead to conditions such as high cholesterol, heart disease and type 2 diabetes. In order to prevent or improve these conditions, it is important to try to reduce the amount of visceral fat levels to an acceptable level. (Chintala KK 2015)

Table 1 shows mean body mass index, actual age, body age, visceral fat, whole body fat, skeletal fat.

Table 2 and Graphs 1-5 shows correlation between anthropometric parameters.

Table 1: Mean Anthropometric Parameters

| S.No. | VARIABLE NAME | MEAN ±STANDARD DEVIATION [S.D.] |
|-------|-----------------------|---------------------------------|
| 1. | Body Mass Index [BMI] | 21.6 ± 3.42 |
| 2. | Actual Age | 19.3± 1.6 |
| 3. | Body Age | 26.07 ± 8.23 |
| 4. | Visceral Fat | 4.68 ± 2.77 |
| 5. | Whole Body Fat [WBF] | 16.73 ± 6.59 |
| 6. | Skeletal Muscle Fat | 31.76 ± 4.79 |

Table 2: Correlation between Anthropometric Parameters

| SL.No | VARIABLE PAIRS | SIGNIFICANCE | CORRELATION COEFFICIENT |
|-------|----------------------------------|--------------|-------------------------|
| 1. | BMI and Body Age | 0.01 | 0.911 |
| 2. | Body Age and Visceral Fat | 0.01 | 0.850 |
| 3. | BMI and Visceral Fat | 0.01 | 0.833 |
| 4. | Body Age and WBF | 0.01 | 0.462 |
| 5. | Body Age and Skeletal Muscle Fat | 0.05 | -0.303 |

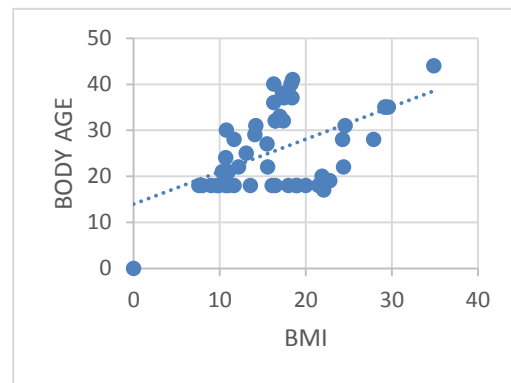


Figure 1: correlation of BMI-body age

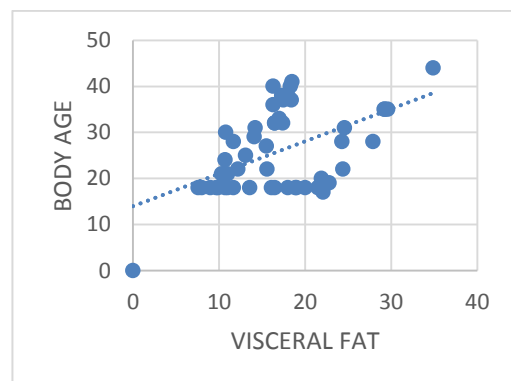


Figure 2: Correlation of VF-body age

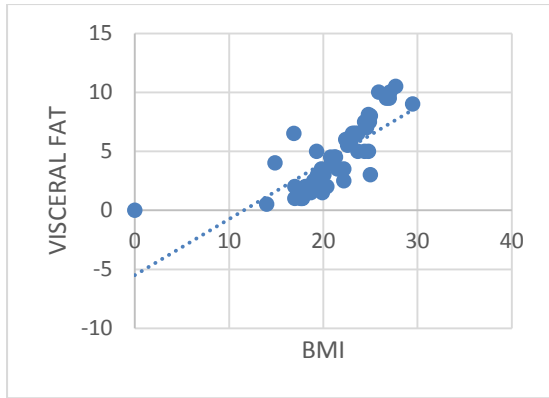


Figure 3: Correlation of BMI-VF

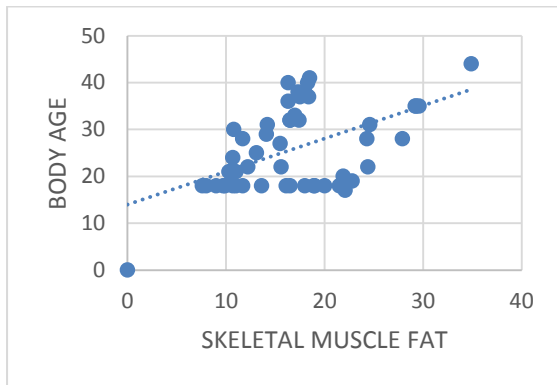


Figure 4: Correlation of skeletal FAT-body age

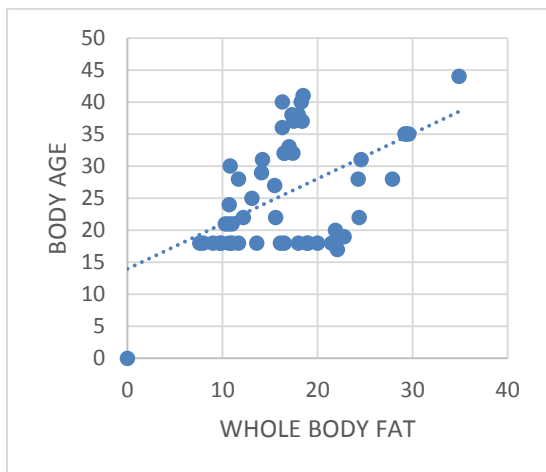


Figure 5: Correlation of body FAT-body age

DISCUSSION

Students who were overweight exercise and decreased their weight by 2kg showed a decrease in Body age. This shows that the body age is correlated with body weight. Lesser the weight, lower the BMI, visceral fat and closer the body age with the person's actual age.

The heart needs to work more if there is more fat tissue around the capillaries. The need to reduce fat in woman accumulated in the hips and males in abdomen i.e gynoid /android form of obesity is essential to give rest to the heart and promote longevity, fitness. By right eating, exercise and

right thinking the students were counseled to follow health laws (Sri Sri Paramhansa Yogananda2015)

Many studies have reported a significant relationship between hypertension and risk factors such as age, BMI, smoking and physical inactivity (Hennessy E 2010). These are also the main causes of increase in body age [biological age] based upon our fitness level. Regular activity is a key part of managing diabetes along with proper meal planning taking medications as prescribed and stress management. When we are active, our cells become more sensitive to insulin so it can work more efficiently. Our cells also remove glucose from the blood using the mechanism totally separated from insulin during exercise. Therefore, physical activity has important health benefits for children and young adolescents and is also associated with more resistible biological cardiovascular disease risk factor profiles by lowering blood pressure, maintaining the lipoprotein levels and decreases the adiposity and thus enhancing their abilities to perform daily tasks (Dubbert P.M. 2002).The benefits of regular physical activity also includes lowering of cholesterol level, burning of calories to maintain weight, strengthening the heart for proper blood circulation, muscles and bones, maintaining the flexibility of joints, improving the balance to prevent falls, reducing symptoms of depression and improving the quality of life.

CONCLUSION

By right eating, exercise and right thinking the students were counseled to follow health laws.

Two words makes a person healthier: Eat less.

There are lots of reasons for people to lose weight. To be healthier. To look better. To feel better. To have more energy. No matter what the reason, successful weight loss and healthy weight management depend on sensible goals and expectations. The foundation of a successful weight loss program remains a combination of a healthy diet and exercise customized for you. Simply reducing food intake to lose weight can lead to a decline in muscle mass and bone density. So even though the weight goes down, resting metabolism is reduced making the body more prone to putting on fat. More skeletal muscle can prevent "rebound" weight gain.

Exercising half hour daily for 5-7 times a week can help lose weight, improve fitness and mental alertness.

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