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Domination Of Body Fat Distribution Based On Percent Of Body Fat In Late Adolescent Male And Female

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ABSTRACT

Background: Body composition consisting of body fat and non-fat body mass is an indicator of health profile. One method for assessing body fat mass is to measure body fat percentage. Body fat can be distributed in the trunk and extremities with many influencing factors, including gender. Still, it is not yet known whether body fat distribution will be different in different categories of body fat percentage.

Objective: To understand the differences in the dominance of body fat distribution based on body fat percentage in late adolescent male and female.

Method: This observational analytic study used a cross-sectional approach involving 40 male and female respondents (UMM Medical Faculty students) selected using purposive sampling. The data taken was in the form of height, mass, BMI and SFT which were then entered into the Jackson, Pallock, and Ward (1980) formula. The data obtained were analyzed using the fisher's test.

Result: The Fisher's test results showed a sig value of 0.409 > 0.005. meaning not significant, so there is no relationship between the distribution of body fat with body fat percentage

Conclusion: There is no difference in the dominance of body fat distribution based on body fat percentage in late adolescent male and female

Keywords : adolescents , body fat distribution, body fat percentage.

INTRODUCTION

Body composition consisting of body fat and non-fat body mass is an indicator of health profile. One of the methods for assessing body fat mass is to measure body fat percentage based on body mass index (BMI), abdominal circumference (LP), waist circumference (LPi), and belly-waist ratio (RPPi)1. BMI is a guide for determining overweight based on the quality index (body weight in kilograms divided by the square of height in meters kg/m^2) (Setiawan, D. and Setiowati, A, 2014).

Body weight (BB) is also often used to express growth. The body weight of adolescent girls before the runway grows by about 2 kg per year; when they enter the age of the runway, the average weight gain is around 3 – 3.5 kg per year. The peak weight gain for girls is at 18, with an increase of 8 kg per year. The muscle growth spurt is 3-6 months behind the weight growth spurt11.

Body fat consists of subcutaneous fat (fat under the skin) and visceral fat (found in the chest and abdominal cavities). Subcutaneous fat is abundant when infancy decreases steadily until the age of 6-8 years, increases again over the age of 8 years, and falls at the age of 11-12 years in girls and 14-16 years in boys. The average subcutaneous fat will increase again over the age of 19 in both men and women (Sudibjo P, 2012, Quinn, E. 2010).

Body fat distribution can be measured by various techniques, one of which is Skinfold Thickness (SFT). The American College of Sports Medicine (ACSM) states that SFT is a measurement of percent body fat with an accuracy of 98%. Measurements can use eight skin fold locations, namely in the Biceps, triceps, pectoral, subscapular, mid axilla, abdominal, supra iliac, femoris areas (Sudibjo P, 2012, Quinn, E. 2010).

From the description above, the researcher was interested in conducting this research because he wanted to find out whether the distribution of body fat would be different in different categories of body fat percentage.

METHODS

The research design used in this study was quantitative, with an analytic observational design and a cross-sectional approach. There are two groups in this study, namely groups of men and women.

This research was carried out at the UMM FK Physiology Laboratory. The population in this study were male and female students at the Faculty of Medicine, University of Muhammadiyah Malang. The sample in this study were male and female adolescents at the Faculty of Medicine, the University of Muhammadiyah Malang which fit the inclusion criteria. The sampling technique carried out by purposive sampling is a type of non-probability sampling (Sugiyono, 2010).

The inclusion criteria in this study were as follows:

1. Adolescent aged 17-20 years

2. Male and female

The exclusion criteria in this study were as follows:

1. Join a body-building program

2. Take amino acid supplements

3. Testosterone deficiency in men is known from a questionnaire about hormonal questions. Respondents experienced a decrease in hormones if there was a 'yes' answer to question number 1 or 7 or other than numbers 1 and 7 but more than three answers.

The independent variable (independent variable) in this study is gender and percent body fat, while the dependent variable (dependent variable) is body fat distribution.

The instruments used in this research are

1. Bioelectrical Impedance Analysis (BIA) Tanita Body Composition Analyzer BC-418.
2. Informed Consent Sheet
3. Interview sheet
4. Anthropometric measurement sheet to record measurement results on research subjects.

Data analysis used in this research is a univariate analysis and bivariate analysis. Univariate analysis was carried out to describe each research variable.

Univariate analysis in this study was about the characteristics of the respondents, including the amount of each sex, percent body fat, and fat distribution.

Bivariate analysis in this study aims to:

1. To find out the relationship between gender and percent body fat, it will show a relationship if the significance value is <0.005.
2. To find out the relationship between gender and body fat distribution, it will show a relationship if the significance value is <0.005
3. To find out the relationship between percent body fat and body fat distribution, it will show a relationship if the significance value is <0.005

RESULTS AND DISCUSSION

Following are the results of the frequency distribution of 80 UMM Medical Faculty students who were research respondents.

Table 1. General characteristics of research variables

General characteristics	**n**	**%**
Gender		
Male	40	50
Female	40	50
Body Fat Distribution		
Body	51	63.8

Extremity	29	36.3
% Body Fat		
Normal	74	92.5
% More Body Fat	6	7.5

1. Relationship between gender and % body fat

To determine the relationship between gender and % body fat, the chi-square test was used because gender was nominally categorical and % body fat was nominally categorical. Still, because it did not meet the chi-square test, an alternative test was used, namely Fisher's test. The following is the Fisher's test result:

Table 2. Fisher Test Result

	Significance	Notes
Fisher's Test	1,000	Not Significant

Based on the results of the Fisher's test, a sig value of 1,000 > 0.005 was obtained. meaning not significant so there is no relationship between gender and % body fat.

2. Relationship between gender and body fat distribution

To find out the relationship between sex and body fat distribution, the chi-square test was used because gender was nominally categorical and body fat distribution was nominally categorical. Still, because it did not meet the chi-square test, an alternative test was used namely Fisher's test. Here are the results of Fisher's test:

Table 3. Fisher Test Result

	Significance	Notes
Fisher's Test	0,000	Not Significant

Based on Fisher's test results, a sig value of 0.000 <0.005 was obtained, means significant so that there is a relationship between gender and body fat distribution.

3. Relationship between body fat distribution and % body fat

To find out the relationship between body fat distribution and % body fat, the chi-square test was used because the distribution of nominal categorical body fat and nominal categorical body fat % was used. Still, because it did not meet the chi-square test, an alternative test was used, namely the Fisher's test. The following is the Fisher's test result:

Table 4. Fisher Test Results

	Significance	Notes
Fisher's Test	0,409	Not Significant

Based on Fisher's test results, a sig value of 0.409 > 0.005 was obtained. Meaning not significant, so there is no relationship between the distribution of body fat with % body fat.

Skinfold Thickness (SFT) American College of Sports Medicine (ACSM)6 states that SFT measures percent body fat with an accuracy of 98%. Measurements can use 7 locations of skin folds, namely in the triceps, pectoral, subscapular, mid axilla, abdomen, supra iliac, and femoris areas. SFT value can represent subcutaneous fat7. SFT in this study was measured at eight sites: consisting of the pectoral. Triceps, subscapular, abdominal, suprailiac, femoral, mid-axilla, and biceps. Skinfold data in the abdomen, supra iliac, and subscapular are added to give the truncus distribution of fat.

In contrast, the SFT in the biceps, triceps, and femoral is added up to be the distribution of fat in the extremities (Cicek , et. al., 2014). The SFT sum aims to differentiate the distribution of central (truncus) and peripheral (extremities) fat. Based on the results, the study found that the female sample group had a greater SFT than the male group. These results indirectly indicate that factors of different sexes have been able to have a more significant influence than other factors, namely: age, genetics, hormones, gender, nutrition, socio-economic status, and physical activity. The relationship between the results of this study and these factors was not examined. Comparison of the average SFT between male and female Late Adolescence adolescents at the medical faculty of the University of Muhammadiyah Malang as a whole at eight measurement sites shows that there is a difference.

A normal measure of percent body fat (92.5%). The average percentage of body fat for women (11%) is the same for men (11%). These results differ from several previous studies. According to Wu and O'Sullivan (2011), women store more fat because they are more efficient at using the stored fat compared to men (Wu BN, O'Sullivan AJ. 2011). Women have a higher amount of the hormone estrogen. This estrogen hormone is known to decrease the oxidation of postprandial essential fatty acids, so this causes women to have more body fat. The optimal body fat percentage is around 10-15% (leJena , et. al., 2016).

Factors that affect percent body fat include genetics, gender, age, diet, physical activity, psychological conditions, drugs, and hormones. The analysis results in this study showed no difference in the location of body fat distribution when viewed from body fat percentage. Body fat distribution is categorized into trunk and extremities, while body fat percentage is categorized into standard and more. This proves that each individual has certain factors that play a role in influencing body fat percentage, not always the excess fat percentage distributed in the extremities or vice versa. This also shows that body fat distribution cannot describe body composition. Body fat percentage is the ratio of body fat mass to body composition. Someone who has the same weight and height does not necessarily have the same percentage of fat because the amount of fat in our body also depends on our activities and daily diet.

The results obtained in this study also show the influence of gender on the distribution of body fat. Body fat in men and women tends to differ in the distribution pattern. The accumulation of fatty

tissue in women occurs around the hips, thighs, arms, back, and abdomen (extremities), while in men, the accumulation of adipose tissue occurs in the abdomen (truncus). Body fat in certain areas is very dependent on the number and fat cells (American College of Sport Medicine. 2006).

CONCLUSION

There is no difference in the dominance of body fat distribution based on body fat percentage in late adolescent male and female at the Faculty of Medicine, University of Muhammadiyah Malang. Descriptively, the category of body fat percentage above 13% is dominated by the distribution of trunk body fat in both male and female late adolescents at the Faculty of Medicine, University of Muhammadiyah Malang. Descriptively, the category of percent body fat below 13% is dominated by the distribution of trunk body fat in late adolescent boys, while the distribution of body fat in extremities in late adolescents is female at the Faculty of Medicine, University of Muhammadiyah Malang

REFERENCES

American College of Sport Medicine. 2006. ACSM's guidelines for exercise testing and prescription (7th ed). USA: Lippincott Williams and Wilkins.

Cicek , Betul; Ozturk, Ahmet; Unalan, Demet; Bayat, Meral; Mazicioglu, Mustafa Mumtaz;Kurtoglu,Elim,2014, Four-Site skinfolds and body fat percentage reference in 6-ti-17-year old Turkish children and adolescent, The Journal of Pakistan Medical Association JPMA Vol.64. Hal.1154

leJena , Baltic ZM , Glisic Milica , Ivanovic Jelena , Boskovic Marija , Popovic Milka and Lovrenovic Mirjana, 2016, Relationship between Body Mass Index and Body Fat Percentage among Adolescents from Serbian Republic, Journal of Childhood Obesity Vol.1 no.29. hal 1-5.

Quinn, E. 2010, Calculate Body Fat by Measuring Skinfolds: Does measuring skinfold thickness determine body fat percentage? : ACSM's Guidelines for Exercise Testing and Prescription.

Ramadani A, 2012, Kekurangan Gizi pada Anak Balita Berdasarkan Composite Index of Anthropometric Failure (CIAF) di Provinsi Nusa tenggara Barat, Universitas Indonesia, Depok.

Setiawan, D. and Setiowati, A, 2014, Hubungan Indeks Massa Tubuh (IMT) Terhadap Kekuatan Otot Pada Lansia Di Panti Wredha Rindang Asih III Kecamatan Boja, *Journal of Sport Sciences and Fitness*, hal. 31-32.

Sherwood, L, 2012, *Human Physiology: From Cells To Systems*, Sub bab:*Energy Balance and Temperature Regulation*,Ed 7, Brooks Cole, USA

Soetjiningsih, 2013, Tumbuh Kembang Anak, 2 ed, CV. Sagung Seto, Jakarta

Sudibjo P, 2012, Penilaian Presentase Lemak Badan pada Populasi Indonesia dengan Metode Anthropometris, Jurnal Staff UNY, hal.20-36

Sugiyono. (2010). *Metode Penelitian Kuantitatif Kualitatif dan R&D*. Bandung: Alfabeta

Wu BN, O'Sullivan AJ. 2011. Review article: Sex difference in energy metabolism need to be considered with lifestyle modification in humans. J Nutr Metab. doi:10.1155/2011/391809.09.