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Analysis of Body Fat Percentage Mapping in Sport Science Study Program Students

Yadi Jayadilaga [1] *, Alimuddin [2], Ibrahim [3]

[1 2] Universitas Negeri Makassar, South Sulawesi, Indonesia
[2] Universitas Negeri Padang, West Sumatera, Indonesia
[3] Universitas Cenderawasih, Papua, Indonesia
* Corresponding Author: yadi.jayadilaga@unm.ac.id

Abstract: Body fat percentage is a description of the amount of fat in the body. Body fat distribution varies by individual. The purpose of the study was to determine the percentage of fat in sports science study program students. This study is a quantitative descriptive study using a cross-sectional design. There were 32 students involved in this study. Sample determination was carried out by accidental sampling technique. Body fat percentage was measured using Bioelectrical Impedance Analysis tool. This study uses descriptive statistics to analyze data by describing or describing the data that has been collected. In the study found data from 32 students, the percentage of body fat in the ripped category was 5 students, excellent category was 1 student, good category was 9 students, fair category was 7 students, poor category was 7 students, and very poor category was 3 students.
Keywords: Body Fat Percentage, Mapping, Sport Science, Study Program, Students

Introduction

Every human needs a balanced fat composition to sustain daily activities. Body fat plays an important role in providing energy for the body and supporting the process of cell growth. Body fat percentage refers to the amount of fat in the body compared to the total body weight. Fat not only serves as a source of energy, but also as an essential component in protecting vital organs and regulating body temperature. However, the balance of fat levels is very important, as excessive amounts of fat can trigger various metabolic disorders that negatively affect health (Halim & Suzan, 2020).

The body has a natural mechanism to use calories as needed, while excess unused calories will be stored in fat tissue. The main store of excess energy in the body is subcutaneous adipose tissue, which lies under the skin (Bays, 2014). As we age, there is a change in the distribution of body fat, with a tendency for reduced subcutaneous fat and increased fat accumulation in the abdominal area (Ponti et al., 2020). This phenomenon is often associated with an increased risk of metabolic diseases, especially in individuals who have a less active lifestyle and an unbalanced diet.

Body fat distribution varies between individuals, influenced by genetic, age and lifestyle factors. Some individuals with a low body mass index (BMI) still have fat accumulation in the abdominal area, known as visceral fat (Romanello et al., 2023). In addition, fat may also be deposited in the hips, thighs, arms and other parts of the body. Uneven or excessive distribution of body fat may contribute to an increased risk of metabolic diseases. Even in normal-weight individuals, an unhealthy distribution of body fat can still increase the risk of certain diseases, such as diabetes and heart disease.

Body fat percentage is a good indicator in assessing a person's metabolic risk factors. A high percentage of body fat is often associated with an increased risk of insulin resistance, hypertension, as well as dyslipidemia, all of which are major factors in the development of cardiovascular disease. Therefore, monitoring and managing body fat composition is important to prevent future health complications. In addition, assessment of body fat distribution also provides further insight into individual-specific disease risk.

Obesity is one of the major consequences of excess body fat and a significant global health problem. Obesity is defined as a condition of nutritional imbalance due to the accumulation of excess fat in subcutaneous tissues and internal organs. The main cause of obesity is an imbalance between energy intake and energy expenditure, which is often exacerbated by a high-calorie diet and lack of physical activity. Apart from lifestyle factors, obesity can also be influenced by genetic and environmental factors.

Uncontrolled excess body fat can increase the risk of various chronic diseases, including heart disease, type 2 diabetes and other metabolic disorders. In addition, obesity can reduce a person's quality of life, cause psychological disorders such as stress and depression, and increase the risk of premature death. Therefore, maintaining a balance of body fat through a healthy diet, adequate physical activity, and an active lifestyle is an important step in maintaining long-term health. Based on the description of the data presented at the beginning, it makes the author's foundation for mapping the percentage of body fat in sports science study program students.

Method

This study is a quantitative descriptive study with a cross-sectional design, which aims to measure the percentage of student body fat at one specific point in time. The cross-sectional design was chosen because it allows data collection at one time without the need to make repeated observations, making it more efficient in seeing an overview of the body fat condition of university students. This study focuses on analyzing the distribution of body fat and how it varies among different individuals. With this approach, the study can provide a preliminary picture of the body fat condition of university students as well as possible influencing factors.

A total of 32 students were involved in this study as research subjects. The sampling technique was carried out using the accidental sampling method, which is a sampling technique based on anyone who happens to be available or encountered during the research. This method was chosen because it is practical and can be used in situations where the target population is not fully identified beforehand. However, this technique has limitations, such as the lack of overall population representation, so that the results of this study are more descriptive and cannot be widely generalized.

Body fat percentage measurements were taken using Bioelectrical Impedance Analysis (BIA), a commonly used method for assessing body composition. It works by sending a weak electric current through the body to measure electrical resistance, which is then used to estimate body fat percentage. Once the data was collected, it was analyzed using descriptive statistics. Descriptive statistics were used to describe the characteristics of the data, including the mean, distribution, and variation in students' body fat percentage. The results of this analysis are expected to provide insight into

trends in the body fat levels of university students as well as a basis for further research related to their health and fitness.

Results & Discussion

Results

The study entitled “Analysis of Body Fat Percentage Mapping in Sports Science Study Program Students” aims to analyze and map the distribution of body fat percentage in Sports Science Study Program students. This study was conducted to understand variations in body fat levels among students, which can provide insight into their fitness levels and potential health risks they may face. Using quantitative methods and a cross-sectional design, this study measured the body fat percentage of students at one specific time. Measurements were made using the Bioelectrical Impedance Analysis (BIA) method, which is a non-invasive technique to assess body composition. The data obtained was analyzed descriptively to see the distribution of body fat based on fitness level categories, such as Competition Shape, Lean, Average, to Very Poor. The results of this study are expected to serve as a basis for students and faculty in designing more effective training programs and fitness improvement strategies, as well as providing an initial overview of the importance of maintaining body fat composition within healthy limits to support physical performance and overall health.

Table 1. Descriptive Statistics

	N	Minimum	Maximum	Mean
Fat Percentage	32	8	40	21.73

Table 1 presents descriptive statistics regarding the body fat percentage of the 32 students who were the subjects of the study. The data shown includes the number of samples (N), minimum value, maximum value, and mean value of the measured body fat percentage. From the measurement results, the lowest body fat percentage found was 8%, while the highest percentage reached 40%, indicating considerable variation among individuals in this study. The average body fat percentage of the students was 21.73%, which gives a general idea of the body fat composition of this group. This information is useful for understanding the distribution of body fat in the student population and can serve as a basis for analyzing the relationship between body fat levels and other factors related to health and fitness.

Tabel 2. Body Fat Rating Scale

Body Fat Rating Scale	Men (%)	Women (%)
Competition Shape (Ripped)	3-6	9-12
Very Lean (excellent)	≤ 9	≤ 15
Lean (Good)	10-14	16-20
Average (Fair)	15-19	21-25
Below Average (Poor)	20-25	26-30
Very Poor	26-30 +	31-40 +

Table 2 presents a body fat percentage grading scale based on different fat composition categories for men and women. The scale is classified into six categories, ranging from Competition Shape (Ripped) to Very Poor, which reflect a person's fitness and health level based on their body fat percentage. For men, the Competition Shape (Ripped) category has a range of 3-6%, while for women it is in the range of 9-12%, which is commonly held by competitive athletes. The Very Lean (Excellent) category indicates a very low level of body fat but still within healthy limits, which is ≤9% for men and ≤15% for women. Lean (Good) indicates an ideal body condition with a range of 10-

14% for men and 16-20% for women. Meanwhile, average (Fair) indicates a range of body fat that is still within normal limits, which is 15-19% for men and 21-25% for women. Below Average (Poor) indicates a higher-than-average body fat percentage, with a range of 20-25% for men and 26-30% for women, which can increase the risk of metabolic disorders. The Very Poor category indicates very high levels of fat, which is ≥26% in men and ≥31% in women, who are at high risk of obesity and related diseases. This scale can be used as a guideline in assessing one's fitness status as well as understanding the health risks associated with body fat percentage.

Table 3. Frequency Percentage Rate Fat

Body Fat Rating Scale	Frekuensi
Competition Shape (Ripped)	5
Very Lean (excellent)	1
Lean (Good)	9
Average (Fair)	7
Below Average (Poor)	7
Very Poor	3

Table 3 presents the frequency distribution of body fat percentage based on the previously categorized rating scale. From the results of the study, 5 people were in the Competition Shape (Ripped) category, which indicates a very low level of body fat, usually owned by athletes or individuals with high fitness levels. Only 1 person fell into the Very Lean (Excellent) category, indicating a still low level of body fat but still within healthy limits. A total of 9 people fell into the Lean (Good) category, which reflects an ideal and healthy body condition. Meanwhile, 7 people were classified in the Average (Fair) category, which indicates that most individuals have body fat composition within the normal range. In addition, 7 people were classified in the Below Average (Poor) category, which indicates a tendency for body fat to be higher than average and potentially increase health risks. Finally, 3 individuals fell into the Very Poor category, which indicates very high levels of body fat and a high risk of various metabolic diseases. This data provides an overview of the distribution of body fat composition among the study participants and can be used as a basis for further analysis related to health and fitness.

Discussion

This study aims to determine the percentage of body fat in students of the Sports Science Study Program. Of the 32 students involved, the results showed that 5 students were in the ripped category, 1 student in the excellent category, 9 students in the good category, 7 students in the fair category, 7 students in the poor category, and 3 students in the very poor category. This distribution shows that there are variations in body fat levels among students, which can be influenced by various factors, including lifestyle, physical activity levels, and eating habits.

The presence of students in the ripped and excellent categories indicates the presence of individuals with very good fitness levels. They most likely have a regular exercise regimen as well as a balanced nutritional intake, which contributes to an ideal body composition. However, the number of students in this category is still relatively small, so it is important to evaluate the factors that might affect the overall fitness level of the Sports Science student population.

On the other hand, 7 students fell into the fair category, which means that they are still within normal limits but may have a higher risk of increasing body fat if they do not maintain a balance between energy intake and physical activity. Meanwhile, 7 students in the poor category and 3 students in the very poor category indicate a group with excessive body fat levels, which may negatively affect their metabolic health and fitness.

Both underweight and overweight conditions are factors that can trigger changes in the body's metabolism that contribute to the development of various diseases. Individuals who are underweight or overweight are more susceptible to viral infections and other health problems (Moser et al., 2019). This indicates that both underweight and overweight are of concern in the context of student health and wellness.

Furthermore, the conditions of underweight, overweight and obesity also have an impact on reducing one's quality of life. Individuals with unbalanced body fat percentages tend to experience mental and physical health disorders that can affect overall well-being (Lorem et al., 2017). Therefore, a holistic approach in maintaining body fat balance is essential to ensure optimal physical and mental health.

An increase in body fat percentage beyond normal limits can lead to various health problems. A high body fat percentage is associated with increased mortality (Woolcott & Bergman, 2018). It is associated with the risk of heart disease, type 2 diabetes, and other metabolic disorders that can reduce life expectancy.

Interestingly, a high percentage of body fat is not only experienced by individuals with a high body mass index (BMI) but can also occur in those with a normal BMI. This phenomenon is known as metabolic obesity in normal weight individuals (Padwal et al., 2016). This confirms that body fat percentage is a more accurate indicator than BMI in assessing an individual's health risk.

The results of this study provide an important picture of the variation in body fat percentage of Sports Science students. These findings can be the basis for planning intervention programs aimed at improving student fitness and health, such as the development of more effective exercise patterns and education on the importance of balanced nutrition.

Overall, this study highlights the importance of maintaining body fat balance within healthy limits. The Sport Science Study Program can utilize these findings to design fitness improvement strategies for students, both through an academic curriculum that emphasizes the importance of healthy body composition and through exercise programs tailored to the needs of everyone. With a comprehensive approach, it is expected that students will have a higher awareness of the importance of maintaining body fat balance to support their health and physical performance in the future.

Conclusion

Based on the results of the study, the distribution of body fat percentage of students of the Sports Science Study Program shows quite diverse variations. A total of 5 students is in the ripped category, which indicates an excellent level of fitness and minimal body fat levels. Only 1 student is in the excellent category, indicating that only a few students have an ideal body composition with optimal fat levels. A total of 9 students fell into the good category, which is still within the healthy and ideal range to support physical performance. However, it was found that 7 students were in the fair category, which means that although they are still within normal limits, they have the potential to increase body fat which can have an impact on health. Furthermore, 7 students fell into the poor category, and 3 students were in the very poor category, indicating high levels of body fat that could increase the risk of metabolic disorders and reduce overall fitness. These results indicate that more attention needs to be paid to students' lifestyles, including diet and physical activity, to maintain body fat balance within healthy limits and support their academic and physical performance.

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