Analysis of Body Mass Index (BMI) Profile of Pekalongan City Pencak Silat Athletes

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Abstract: In order to achieve optimal and unhindered performance during pencak silat competitions, it is important for an athlete to pay attention to the appropriate level of body fat. The condition of body fat is an important indicator in assessing athlete health, which is often measured using anthropometric methods. The aim of this research is to determine the Body Mass Index (BMI) of outstanding pencak silat athletes, with the aim of providing a general picture of their weight classification. Sample: The subjects in this research were the Pencak Silat athletes from Pekalongan City with a total of 11 athletes. Method: This research uses an ex–post-facto method. The instrument uses body weight and height to determine BMI. Results: The Body Mass Index (BMI) of Pekalongan city's pencak silat athletes shows that one athlete or 9% fall under the underweight category, nine athletes or 82% are in the normal weight category, one athlete or 9% fall under the overweight category, and there are no athletes in the categories of obesity and obesity II. Thus, the average Body Mass Index (BMI) of Pekalongan city's pencak silat athletes falls within the normal category, indicating good outcomes for their performance. One important predictor of motor skills is the combination of height and body weight; these two factors are crucial as they affect athletes' motor skills. Conclusion: Body Mass Index (BMI) is one way to assess athletes' body condition to prepare and maintain performance in both the short and long term.
Keywords: Body Mass Index (BMI), Pencak Silat.

INTRODUCTION

Pencak Silat, a martial art rich in Indonesian cultural heritage and national identity, is not only a collection of fighting techniques, but also reflects a philosophy of life and deep local wisdom (Ediyono & Widodo, 2019). In Pekalongan City, a cultural center known for its diversity of arts and sports, Pencak Silat is not just a physical practice, but a harmonious blend of technical skill, physical strength and mental endurance (Teguh et al., 2024).

Pencak Silat in Pekalongan City is not only studied for self-defense purposes, but also as a concrete manifestation of commitment to health and fitness. As one of the most diverse martial arts in the Southeast Asia (Yudaparmita et al., 2023), Pencak Silat encompasses a variety of styles and styles, each of which is unique in its movements, techniques and fighting strategies.

In this article, we will explore more deeply the Body Mass Index (BMI) profile of Pencak Silat athletes in Pekalongan City. BMI is important in this context because it reflects an athlete's body composition, which can influence their performance in training and competition. Through a careful analysis of BMI, we hope to provide a better understanding of the relationship between body composition and athletic performance in Pencak Silat practitioners.

An athlete must maintain their body in an ideal condition. This aims to enhance the athlete's performance during competitions. Optimal physical condition enables athletes to execute techniques and strategies more effectively, enhancing speed, strength, and endurance during competitions. When the body is in prime condition, the risk of early fatigue decreases, allowing athletes to sustain high performance throughout the duration of the competition. (Arini & Wijana, 2020).

Body weight is the result of a balance between energy intake through nutrition and energy expenditure through physical activity or exercise. (Prasetyo, 2019). If energy intake exceeds expenditure, body weight will increase. Conversely, if energy expenditure exceeds intake, body weight will decrease. (Gurning, 2024). Body weight should be maintained within an ideal range, neither below nor above the established standards. Body Mass Index (BMI) is a parameter used to determine whether someone's weight falls into the categories of normal, underweight, or overweight. (Kusnandar et al., 2020).

The ideal anthropometric composition, supported by good techniques, will result in optimal performance for a basketball athlete during competitions. Anthropometric characteristics, body composition, and mass contribute to training and match performance. In pencak silat, anthropometry is closely related to the level of Body Mass Index (BMI) that athletes possess, as an ideal BMI affects optimal anthropometry. BMI is calculated by dividing body weight (kg) by height (m) squared. Body Mass Index (BMI) can be used to measure body composition and categorize athletes' weight as underweight, normal, or overweight. (Budi et al., 2020).

An ideal Body Mass Index (BMI) is crucial in supporting the technical skills and physical abilities of a basketball athlete. An ideal BMI helps ensure that an athlete maintains the correct proportion between muscle mass and fat, which is vital for performance in sports that rely on strength, speed, and agility. (Abdul Muin & Nugroho, 2022).

In pencak silat, having an ideal BMI enables players to move faster on the field, jump higher, and endure longer during intense matches. (Garcia-Gil et al., 2018). Optimal body weight also helps prevent injuries that often occur due to excessive strain on joints and muscles. An athlete with an ideal BMI can be more effective in dribbling, shooting, and defense, all of which require a combination of precision, strength, and endurance. (Setiowati, 2014).

In addition, an ideal BMI also contributes to the efficiency of the body's metabolism, ensuring that players have enough energy for high performance throughout the game. Players with an ideal BMI tend to have better endurance, allowing them to play at high intensity without quickly feeling fatigued. This is crucial in basketball games that often proceed at a fast pace and require consistent performance from start to finish. (Arini & Wijana, 2020).

Measurement of Body Mass Index has become a significant priority in basketball, but in Indonesia, particularly among school athletes, BMI measurement is not widely implemented. So far, athlete development processes have focused more on physical, technical, tactical, and mental aspects. Health aspects, specifically BMI measurement, are still considered less important.

This research aims to analyze the Body Mass Index (BMI) levels of achievement athletes in Pekalongan City in order to categorize the weight status of basketball athletes. The results of BMI measurements serve as a reference for designing appropriate training and development programs for athletes.

METHOD

This research employs a descriptive ex-post-facto study design. (Ramadhan, G., & Juniarti, 2020). *Ex-post facto is a type of research method that does not have direct control over variables.* (Sugiyono., 2016). The population and sample consist of all achievement-level pencak silat athletes from Pekalongan City, totaling 11 athletes. The sampling technique used was total sampling. The athletes from Pekalongan City have a body height of 162.36 ± 4.82 cm and a body weight of 52.73 ± 4.56 kg. Data collection was conducted in October 2023 at Muhammadiyah University Pekajangan. The research instrument used was a Body Mass Index (BMI) test is calculated by measuring body weight (in kilograms) divided by height (in meters squared). (Borowiec et al., 2023).

$$BMI = \frac{\text{Berat Badan}}{(\text{Tinggi Badan})^2}$$

Picture 1. Rumus BMI

Data collection techniques were performed using procedures for measuring weight and height, with a validity and reliability level of 0.98 (Prasetyo, 2019). Data analysis utilized the Reference Standard Assessment (PAP) to measure Body Mass Index (BMI) criteria. Indonesian-specific BMI categories have been established based on clinical experience and research from several developing

countries (Ministry of Health, 2018), as shown in the table below.

Table 1. BMI Criteria for Pencak Silat Athletes from Pekalongan City

No	Kriteria	Bmi (Kg/M2)
1.	*Underweight*	BMI < 18,5
2.	Normal	BMI 18,5 - 22,9
3.	Overweight	BMI 23 - 24,9
4.	Obesitas	BMI 25-29,9
5.	Obesitas II	>30

The data from Body Mass Index measurements were then analyzed using Microsoft Excel application to determine the number of pencak silat athletes categorized as underweight, normal weight, overweight, obesity, and severe obesity.

RESULTS

Descriptive statistics of the study are presented as mean and standard deviation. The data in this research is displayed as Mean $\pm$ SD. The primary data in this study are Height 162.36 $\pm$ 4.82, Weight 52.73 $\pm$ 4.56, and Body Mass Index 20.018 $\pm$ 1.92. Below is Table 2 showing the statistical data :

Table 2. Statistical Analysis of Research Samples

Statistics	Tinggi_Badan	Berat_Badan	BMI
Mean	162.36	52.73	20.018
Std. Error of Mean	1.454	1.378	.5799
Median	162.00	51.70	19.800
Mode	157	48	19.6a
Std. Deviation	4.822	4.569	1.9234
Variance	23.255	20.880	3.700
Kurtosis	-1.334	-1.333	.272
Std. Error of Kurtosis	1.279	1.279	1.279

The research results of the Body Mass Index (BMI) levels among achievement-level pencak silat athletes from Pekalongan City using the Reference Standard Assessment (PAP) can be seen in Table 2 and Figure 2 below.

Table 3. Criteria for BMI of Pekalongan City Pencak Silat Athletes

No	Kriteria	Bmi (Kg/M2)	Frekuensi	Frekuensi Kumulatif
1.	*Underweight*	BMI < 18,5	1	9%
2.	Normal	BMI 18,5 - 22,9	9	82%
3.	*Overweight*	BMI 23 - 24,9	1	9%
4.	Obesitas	BMI 25-29,9	0	0%
5.	Obesitas II	>30	0	0%

Total	11	100%
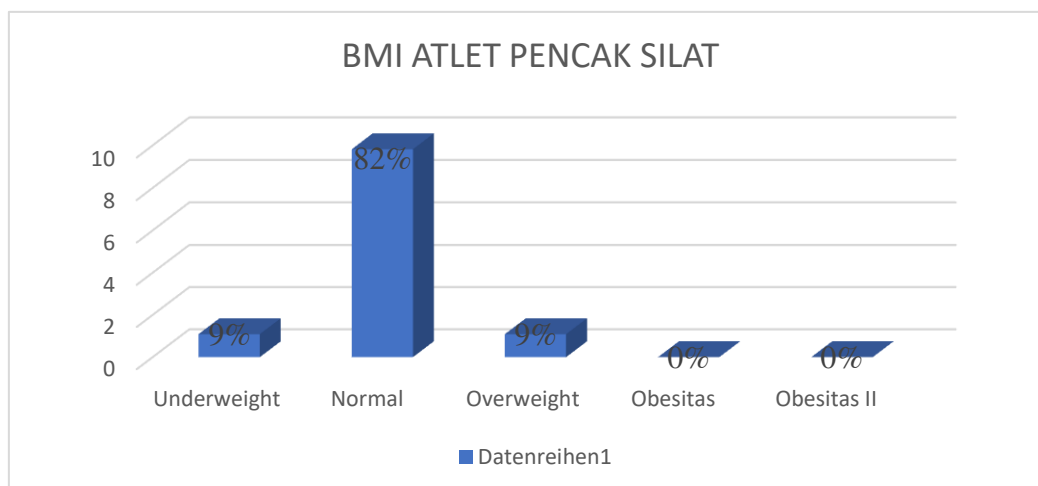
Picture 2. Hasil Diagram BMI Atlet Pencak Silat Prestasi Kota Pekalongan

Based on Table 2 and Figure 1 above, it shows that the Body Mass Index (BMI) of achievement athletes in Pekalongan City demonstrates that one athletes or 9% are in the underweight category, nine athletes or 82% are in the normal weight category, one athlete or 9% is in the overweight category, and there are no athletes in the obesity or severe obesity categories. Therefore, the average Body Mass Index (BMI) of achievement pencak silat athletes in Pekalongan City falls within the normal category.

DISCUSSION

The Body Mass Index (BMI) of achievement pencak silat athletes in Pekalongan City overall falls within the normal category. BMI values are a comparison of weight to height. (Adiningsih et al., 2014), Thus, it can be determined whether an athlete's weight is ideal compared to their body size. An athlete's body mass index is also influenced by body posture, age, gender, ethnicity, ancestry, and energy balance according to research. (Aprilia & Sumi., 2014). The interaction between body weight and height is a significant predictor of motor skills. (Gryko et al., 2022).

Based on the research findings, the average Body Mass Index (BMI) of achievement-level pencak silat athletes from Pekalongan City falls within the moderate category. This indicates that the athletes in the school maintain a good balance of body weight, which supports the maintenance of an ideal weight crucial for their activities. This ideal body condition certainly has a positive impact on athletes' performance during training and competitions. (Martín-Rodríguez et al., 2024). Maintaining a balanced and ideal BMI not only helps improve performance on the field but also reduces the risk of injuries. (Guimarães et al., 2023). Athletes

with controlled body weight tend to have better endurance and speed, which are crucial aspects in pencak silat. (Hoffman, 2020).

Therefore, it is crucial for athletes to continuously monitor and maintain their BMI within an optimal range. This will support their success in both the short term, such as performance in the next game, and in the long term, such as throughout their sports career. Maintaining an ideal BMI not only enhances physical performance but also contributes to the overall health of the athletes. (El Ghoch et al., 2013). Nevertheless, it is important to continue monitoring and evaluating their dietary patterns to ensure that nutritional intake remains optimal according to the body's needs and the athlete's performance.

The results of this study are consistent with the research conducted by Fatikasari et al. (2021), which found that BMI predominantly falls within the normal category. These findings indicate positive outcomes because pencak silat athletes require an ideal body composition to perform skills in basketball, and basketball athletes also need an ideal BMI, as it can affect their performance if not optimal. (Wibowo, C., & Dese, 2019).

The research results also indicate that there are athletes who fall into the categories of underweight and overweight based on their body mass index (BMI). These conditions are clearly disadvantageous for both the individual athletes and their teams, as suboptimal body weight can reduce the effectiveness of athletes in performing various techniques in pencak silat. Pencak silat techniques can be executed more successfully with good physical condition and anthropometric measures (height and body weight). Therefore, anthropometric parameters also play a crucial role in determining agility outcomes, such as the importance of body dimensions in motor skill tests, including height, body weight, or Body Mass Index (BMI). (Popowczak et al., 2022).

CONCLUSION

Based on the results of this study, it can be concluded that Body Mass Index (BMI) is one way to assess athletes' body condition to prepare and maintain performance in both the short and long term. Most high-achieving pencak silat athletes in Pekalongan City have a BMI within the normal range, indicating they have a healthy and ideal weight for their athletic performance. Factors such as strength, speed, endurance, playing skills, understanding of strategy, and teamwork are also crucial in basketball. However, there are still some players with BMIs below or above the normal range, indicating room for improvement in weight management and nutrition. Therefore, it is recommended that schools and pencak silat coaches collaborate to develop nutrition and training programs tailored to meet the needs of each player.

Conflict of Interest

The author states that they have no conflicts of interest.

Acknowledgment

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