



## The Relationship between Physical Activity and The Level of Physical Fitness of Pencak Silat Athletes

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### ABSTRACT

This study analyzed the relationship between macronutrient intake, hydration status, physical activity, and the physical fitness level of Pencak silat athletes in Banjarbaru. This analytical observational study used a cross-sectional design involving 30 pencak silat athletes selected using a total sampling technique. The research instruments included questionnaires, 24-hour food recall forms, a self-urine examination (PURI), a physical activity questionnaire, and a 12-minute running test. Data were analyzed using the Spearman Rank test. The results of this study indicated that most athletes had protein, fat, and carbohydrate deficiencies, moderate hydration status, and very light physical activity levels. It can be concluded that macronutrient intake, namely protein ( $p=0.264$ ), fat ( $p=0.643$ ), carbohydrates ( $p=0.101$ ), and hydration status ( $p=0.264$ ), had no association with the physical fitness levels of pencak silat athletes, while physical activity ( $p=0.010$ ) had an association with the physical fitness level of Pencak silat athletes. Athletes are recommended to continue to pay attention to macronutrient intake and hydration status as needed because they also play an essential role in fitness apart from physical activity.

**Keywords:** hydration status, physical activity, physical fitness level, macronutrients

### INTRODUCTION

Fitness is the body's ability to carry out an activity using strength, creativity, and endurance efficiently for a relatively long time without causing significant fatigue (Kuswari & Setiawan, 2015). Without good physical fitness, athletes will not achieve achievements despite having good technical and tactical skills (Kuswari et al., 2019). Based on data from the *Sport Development Index* (SDI) in 2021, Indonesia has a low fitness level. The data shows that Indonesian people have fitness in the very lacking category of 53,63%, lacking category of 22,68%, and only 5,86% are included in the outstanding and superior category. In addition, the national overweight prevalence rate is 27%. In men, the prevalence rate of body weight is 20,3%, while in women, it is 33,9%. The data shows that the Indonesian population's fitness level is still relatively lacking. This condition needs special attention. Physical fitness is needed, especially by athletes, to carry out daily work well without causing excessive fatigue. One component is cardiovascular endurance, which can be measured with  $VO_2Max$ .  $VO_2Max$  is the volume of oxygen needed when working hard. The more a person's body can use oxygen, the more work it can do. This is necessary for athletes to achieve maximum

performance during training or competing (Permatasari *et al.*, 2018). Several factors can affect physical fitness, including food intake, nutritional status, body fat composition, health status, physical activity, exercise, and adequate fluid consumption. Foods that can support fitness for athletes are foods with balanced nutritional content. According to each athlete's needs, these foods contain carbohydrates, protein, and fat (Sari *et al.*, 2016).

Protein is a nutrient essential as a primary material for forming body tissues. Protein acts as a primary material to repair body tissues that have been damaged. Sugiarto's research (2012) shows a relationship between protein intake and fitness levels. This is related to the function of proteins, which build and maintain cells and body tissues. Individuals who have high work intensity will experience an increased need for protein.

Fat in the body is an energy source, especially in moderate-intensity exercise. Examples of sports that require fat intake are *endurance* sports. In *endurance* sports, fat can be used by being broken down first into fatty acids and glycerol. Free fatty acids are transported to other tissues, especially muscles, and used as energy sources.

Carbohydrates are the best energy source because they are very efficient at converting into energy. Therefore, carbohydrates are prioritized to be consumed by athletes, especially *endurance athletes*. The provision of carbohydrates for an athlete aims to replenish muscle and liver glycogen stores used in muscle contraction. This causes the fulfillment of good carbohydrate needs to impact athletes' fitness (Kuswari *et al.*, 2019).

Fulfillment of water intake is vital for sports performance. Hypohydration (below-normal total body water) impairs the body's ability to regulate heat, increasing body temperature and heart rate. Proper fluid consumption before, during, and after exercise is necessary for athletes to maintain hydration and support sports performance. Water intake is essential for sports performance, so it becomes one of the factors of physical fitness (Ariantika & Mardiyati, 2018). The body always excretes fluid in the form of sweat, urine, feces, and through breathing. Strenuous exercise for several days without being balanced with rapid water changes will result in severe dehydration. This is because the speed of water loss through sweat is higher than the stomach's ability to accommodate the amount of water replacement (the stomach empties 1 liter of water every hour). Fluid needs are directly proportional to body activities; the heavier the activity, the more fluid is needed (Diyani, 2012). Physical activity is a physical movement by the body's muscles and supporting systems. Physical activity has a relationship to physical fitness levels. The better a person's physical activity, the better his physical fitness level (Murbawani, 2017).

The role of physical fitness is the principal capital for all athletes to support the achievement of achievements. The survey results of several journals show that many athletes still have poor fitness levels. This may occur due to athletes' lack of understanding and awareness of the importance of physical fitness on the quality of play to achieve achievements (Pratama & Rismayanthi, 2019). Based on the background above, the researcher aims to analyze the

relationship between macronutrient intake, hydration status, and physical activity with the level of physical fitness of pencak silat athletes in the Banjarbaru area.

**METHODS**

This study was included in an analytical observational study and used a *cross-sectional* design. This research was conducted at the Banjarbaru City branch of Padepokan Persaudaraan Setia Hati Terate (PSHT) in February 2023. The population in this study was all pencak silat athletes in Banjarbaru, totaling 30 people, and were selected using total sampling techniques. The data collected are secondary data and primary data. Secondary data in this study were obtained from previous data, while primary data were obtained from interviews. Data were collected on macronutrient intake using a 24-hour *food recall* form, hydration status using Self-Urine Check (PURI), and physical activity using the *Physical Activity Level (PAL)* questionnaire. At the same time, the dependent variable was the level of physical fitness obtained from the 12-minute running test (*Cooper test*).

Statistical data analysis used univariate and bivariate analysis. Univariate analyses were conducted to identify athletes' macronutrient intake, hydration status, physical activity, and physical fitness levels. Bivariate analysis was performed to analyze the presence or absence of relationships between variables and *the Spearman* test. A normality test is carried out before the Spearman rank test is conducted to determine whether the data is typically distributed. The normality test used was *Shapiro Wilk* because the number of samples in this study was small (<50). Based on the results of the normality test, it is known that protein intake, fat intake, carbohydrate intake, hydration status, physical activity, and physical fitness level have a p-value of 0.000, so all data are not normally distributed. Therefore, a statistical test that does not require normally distributed data, the Spearman test, is chosen. This research has received ethical approval from the Sari Mulia Banjarmasin Ethics Commission with a Number of 279/KEP/UNISM/XI/2022.

**RESULT AND DISCUSSION**

**Respondents' Characteristics**

The subjects in this study were the pencak silat athletes from Banjarbaru city, as many as 30 male and female athletes aged 15-29. Most athletes are men, and most athletes (20%) are 20 years old.

**Table 1.** Characteristics of Respondents Based on Age and Gender

Category	n	%
Sex		
Male	19	63,3
Female	11	36,6
Age Range		
Early Teenager (12-16)	7	23,3

Late Teenager (17-25)	22	73,3
Early Adult (26-35)	1	3,3
Total	30	100

**The Relationship between Macronutrient Intake, Hydration Status, and Physical Activity with the Physical Fitness Level of Pencak Silat Athletes**

**Table 2.** The Relationship between Macronutrient Intake, Hydration Status, and Physical Activity with the Physical Fitness Level of Pencak Silat Athletes

Protein Intake	The Level of Physical Fitness										p*
	Good		Sufficient		Lacking		Very Lacking		Total		
	n	%	n	%	n	%	n	%	n	%	
Excessive (>110%)	1	3,3	1	3,3	0	0	1	3,3	3	9,9	0,264
Good (100-110%)	1	3,3	0	0	0	0	1	3,3	2	6,6	
Sufficient (80-90%)	1	3,3	2	6,6	0	0	3	10	6	19,9	
Lacking (70-79%)	0	0	2	6,6	2	6,6	1	3,3	5	16,5	
Deficit (<70%)	0	0	4	13,3	4	13,3	6	20	14	46,6	
<b>Fat Intake</b>											
Excessive (>110%)	1	3,3	2	6,6	0	0	1	3,3	4	13,2	0,643
Good (100-110%)	0	0	0	0	0	0	1	3,3	1	3,3	
Sufficient (80-90%)	1	3,3	2	6,6	1	3,3	4	13,3	8	26,5	
Lacking (70-79%)	1	3,3	0	0	1	3,3	1	3,3	3	9,9	
Deficit (<70%)	0	0	5	16,6	4	13,3	5	16,6	14	46,6	
<b>Carbohydrate Intake</b>											
Excessive (>110%)	0	0	0	0	0	0	0	0	0	0	0,101
Good (100-110%)	0	0	0	0	0	0	0	0	0	0	
Sufficient (80-90%)	1	3,3	0	0	0	0	0	0	1	3,3	
Lacking (70-79%)	0	0	0	0	0	0	0	0	0	0	
Deficit (<70%)	2	6,6	9	30	6	20	12	40	29	96,6	
<b>Hydration Status</b>											
Severe dehydration (7)	0	0	0	0	0	0	0	0	0	0	0,951
Very dehydrated (6)	0	0	0	0	0	0	0	0	0	0	
Dehydrated (4-5)	0	0	2	6,6	0	0	2	6,6	4	13,2	
Sufficient (3)	3	10	6	20	4	13,3	9	30	22	73,3	
Good (1-2)	0	0	1	3,3	2	6,6	1	3,3	4	13,2	
<b>Physical Activity</b>											
Very Heavy (>2,40)	0	0	0	0	0	0	0	0	0	0	0,010
Heavy	0	0	2	6,6	0	0	0	0	2	6,6	

(2,00-2,40)										
Medium	1	3,3	1	3,3	1	3,3	0	0	3	9,9
(1,70-1,99)										
Mild	2	6,6	4	13,3	1	3,3	5	16,6	12	39,8
(1,40-1,69)										
Very Mild	0	0	2	6,6	4	13,3	7	23,3	13	43,2
(<1,40)										

\*Spearman Rank Test Results, significant if  $p < 0,05$

### **The Relationship of Protein Intake with Physical Fitness Level**

Based on Table 2, most of the protein intake of pencak silat athletes is classified as deficit with a physical fitness level that is very lacking compared to six athletes (20%). This study showed that protein intake was not related to the level of physical fitness of pencak silat athletes in Banjarbaru ( $p = 0.264$ ). Based on the results of this study, athletes consume less protein. Protein sources consumed are diverse, such as eggs, chicken, and processed (nuggets and sausages), which are widely consumed by athletes. The most widely consumed sources of vegetable protein are tofu and tempeh. However, the amount of protein intake consumed still does not meet the needs. This is evident from the results of the 24-hour food recall, which shows that most athletes have a deficit in protein intake. The protein intake of athletes is mainly fulfilled only at lunch and dinner. At breakfast, athletes eat more bread, and some athletes skip breakfast.

This result aligns with research by Cornia and Adriani (2018), which states that there is no relationship between protein intake and physical fitness ( $p = 0.334$ ). Protein consists of amino acids. In addition to providing essential amino acids, protein also supplies energy in a limited energy state from carbohydrates and fats. There are various functions of protein in the body, including immunity, replacement of damaged tissue, and supporting growth. Protein is a nutrient that contains nitrogen. Protein consumed in excess can cause health problems. High consumption of protein will cause the kidneys and liver to work harder. Athletes who consume too much protein will urinate more often because the protein in the body is digested into the diurea. This condition will be less pleasant for athletes because it causes athletes to go to the toilet often and can interfere with training. Therefore, protein must be balanced to fulfill the needs of athletes (Cornia & Adriani, 2018). Different sample characteristics also affect the condition. In addition to protein intake, other factors affecting physical fitness are activity or exercise and high energy intake. The results of previous studies prove that muscle building requires exercise, not extra protein consumption. Exercise can be increased in intensity to build muscle. Protein is a food substance that is very important for the body because it functions as fuel and a building agent. Protein intake is less needed in the short term when associated with sports activities because of its nature as a new tissue builder. On the other hand, protein is also a long-lasting energy reserve. Protein can be a fuel reserve if carbohydrates and fats do not meet the body's energy needs (Murbawani, 2017).

### **Relationship between Fat Intake and Physical Fitness Level**

Based on Table 2, most of the fat intake of pencak silat athletes is in the deficit category, with a sufficient and deficient physical fitness level of 5 athletes each (16.6%). The statistical test results with *the Spearman rank test* obtained a value of  $p = 0.643 (>0.05)$ . The results of this study showed that athletes experienced a lack of fat intake. It was found that athletes consume less fat in their daily diet. Some sources of healthy fats include nuts, butter, nuts, avocados, olive oil, and coconut. During the 24-hour *food recall* interview, some athletes avoided fatty foods because they thought high-fat foods could increase weight and interfere with performance in training. This statement is thought to cause low fat intake in most athletes. However, a small percentage of athletes prefer fried foods or snacks.

This study's results align with Murbawani (2017), who shows no relationship between fat intake and physical freshness ( $p = 0.180$ ). Fat becomes the primary fuel source if the activity intensity decreases and the duration increases. During continued exercise, more fat is used to supply energy so muscles can work. Therefore, fat intake does not have a direct relationship with  $VO_2Max$ . Fat is only a supporting factor as a source of energy supply, second only to carbohydrates when individuals exercise so that they can exercise for a long duration (Murbawani, 2017). Ideally, the level of fat consumption in athletes is neither more nor less. An adequate level of fat consumption in athletes will support the athletes' achievements. Nutritional needs, one of which is fat, are essential to maintaining health, adapting to exercise, and increasing stamina during training sessions and competitions (Salamah, 2019).

### **The Relationship of Carbohydrate Intake with Physical Fitness Level**

Based on Table 2, some of the carbohydrate intake of pencak silat athletes is classified into the deficit category, with a very low physical fitness level of 12 athletes (40%). The statistical test results with *the Spearman rank test* obtained a value of  $p = 0.101 (>0.05)$ . This study showed that carbohydrate intake was not related to the level of physical fitness of pencak silat athletes in Banjarbaru. Based on the results of this study, athletes reduced the portion of food, mainly carbohydrates. This prevents weight gain because athletes are prepared to compete in a predetermined weight class. Therefore, most athletes have a deficit of carbohydrates.

This study aligns with (Alimmawati Wahjuni, 2019), which shows similar results. The study stated that there was no significant relationship between carbohydrate intake and  $VO_2Max$  with the value of ( $p = 0,421$ ). This is because there is an imbalance in carbohydrate intake that does not meet the needs of students. The data was obtained from a 24-hour *food recall*. Carbohydrates are the primary energy source and play a crucial role, especially for an endurance athlete. Glucose and glycogen obtained from carbohydrates in the body will be stored in the muscles and liver. The formation of energy and the provision of carbohydrates aim to replenish muscle and liver glycogen stores used in muscle contraction, which is the role of glycogen stored in muscles. An athlete with very little glycogen will get tired quickly, get tired quickly, and underperform. The absence of this association is likely due to other factors affecting physical fitness that were not studied in this study.

Some of these factors include heredity, age, physical activity, body health, nutritional status, and consumption of micronutrients such as calcium, potassium, sodium, chlorine, and iron (Hastuti & Zulaekah, 2009).

### **Hydration Status with Physical Fitness Level**

Based on Table 2, most of the hydration status of martial arts athletes is classified in the medium category with a very lacking physical fitness level, which happened to nine (30%) athletes. The results of statistical tests with *the Spearman rank test* obtained a value of  $p = 0,951 (>0,05)$ . At the training ground, gallons of water have been provided that can be used by athletes. However, some athletes have warmed up first when measuring hydration status. By warm-up time, the athlete is already sweating, which causes fluid loss. Lack of fluid consumption that causes dehydration harms health and worsens the body's workload. During exercise, dehydration causes a decrease in concentration reaction speed, increases body temperature, and inhibits the rate of energy production. The negative result shows that the higher the dehydration, the physical fitness ( $VO_2Max$ ) can decrease. The body will lose water through urine, feces, sweat, and breathing.

This result aligns with Ghaldal *et al.* (2019), which states that the value indicates no significant relationship between hydration status and fitness ( $p = 0.052$ ). This shows that good hydration is unrelated to a person's fitness level. Most research subjects were classified as having mild dehydration from the study results.

### **Physical Activity with Physical Fitness Level**

Based on Table 2, most of the physical activity levels of pencak silat athletes are classified as a medium category with a very light physical fitness level of 7 athletes (23,3%). The statistical test results with *the Spearman rank test* obtained a value of  $p = 0,010 (<0,05)$ . This study showed that athletes engaged in light physical activities such as lying down, sleeping, watching television, and playing games. However, there are athletes whose physical activity is categorized as heavy and moderate physical activity. Physical activities include gardening, cycling, light exercise (walking), cleaning the house, and washing clothes.

This study's results align with Kasyifa *et al.* (2018), who state the relationship between physical activity and physical fitness. Physical activity is one of the factors that affect fitness. Routine physical activity can also improve body fitness. The more often individuals do physical activity with moderate to high intensity, the better the individual's fitness level. By doing physical activity, especially physical exercise, there are changes in the skeletal and muscular systems where there is an increase or enlargement in the muscles that make the body stronger. This is evidenced by the fact that individuals who engage in active physical activity have good fitness (Triandari *et al.*, 2021). Physical activity is categorized into light, light, moderate, and heavy. Physical activity is one of several factors that can improve physical fitness. In addition, other factors such as food intake,



genetics, age, gender, and nutritional status also play a role in improving physical fitness levels (Salamah, 2019).

## **CONCLUSION**

Macronutrient intake (protein, fat, and carbohydrates) and hydration status are not related to the level of physical fitness of pencak silat athletes in the Banjarbaru area. However, physical activity is related to the level of physical fitness of pencak silat athletes in the Banjarbaru region. Athletes are advised to keep a close eye on food intake and avoid eating unhealthy snacks. Athletes who have poor hydration status should increase drinking water consumption as needed. Athletes can increase physical activity outside physical fitness training hours, such as *jogging* and other light exercise. Other researchers may examine different variables, such as nutritional status, sleep duration, and nutritional knowledge associated with physical fitness levels.

## **REFERENCES**

- Alimmawati, D. F., & Wahjuni, E. S. (2019). Jasmani Mahasiswa Ukm Karate Universitas Negeri Surabaya. *Jurnal Pendidikan Jasmani*, 7(2), 369–374.
- Ariantika, A., & Mardiyati, N. L. (2018). Hubungan Kebiasaan Minum Dengan Status Hidrasi Dan Kebugaran Jasmani Pada Atlet Di Persatuan Bulutangkis Kabupaten Kudus. *Nutri-Sains: Jurnal Gizi, Pangan Dan Aplikasinya*, 1(2), 10. <https://doi.org/10.21580/ns.2017.1.2.1526>
- Cornia, I., & Adriani, M. (2018). Hubungan Antara Asupan Zat Gizi Makro dan Status Gizi dengan Kebugaran Jasmani Mahasiswa UKM Taekwondo Relationship between Macronutrient Intake, Nutritional Status and Physical Fitness among College Students in Student's Taekwondo Club. *Amerta Nutrition Journal*, 90–96. <https://doi.org/10.20473/amnt.v2.i1.2018.90-96>
- Diyani, D. A. (2012). Hubungan Pengetahuan, Aktivitas Fisik dan Faktor Lain Terhadap Konsumsi Air Minum pada Mahasiswa FKM UI Tahun 2012. *Jurnal Ilmiah Farmasi*, 5(1), 355–361.
- G. Ayu, G. Nazhif, N. (2019). *Pengetahuan, Status Hidrasi, Persen Lemak Tubuh, Kadar Hemoglobin, dan Kebugaran Atlet Senam*. 2(2), 170–178.
- Hastuti, N. P., & Zulaekah, S. (2009). Hubungan Tingkat Konsumsi Karbohidrat, Protein Dan Lemak Dengan Kesegaran Jasmani Anak Sekolah Dasar di SD N Kartasura I. *Jurnal Kesehatan*, 2(1), 49–60.
- Hidayat, N. (2013). *48-Article Text-82-1-10-20180906*. 15(September), pp. 56–60.
- Kuswari, M., Handayani, F., Gifari, N., & Nuzrina, R. (2019). Relationship of Energy Intake, Macro and Micro Nutrients to Physical Fitness of Athletes of Dyva Taekwondo Centre Cibinong. *JUARA : Jurnal Olahraga*, 5(1), 19–30. <https://doi.org/10.33222/juara.v5i1.572>
- Kuswari, M., & Setiawan, B. (2015). Frekuensi Senam Aerobik Intensitas Sedang Berpengaruh Terhadap Lemak Tubuh Pada Mahasiswi IPB (The moderate-intensity aerobic exercise has an impact on body fat of undergraduate female students in Bogor Agricultural University). *J. Gizi Pangan*, 10(1), 25–32.



- Murbawani, E. A. (2017). Hubungan Persen Lemak Tubuh Dan Aktivitas Fisik Dengan Tingkat Kesegaran Jasmani Remaja Putri. *Journal of Nutrition and Health*, 5(2), 69–84. <https://ejournal.undip.ac.id/index.php/actanutrica/article/download/15351/13571>
- Permatasari, F. D., Adi, A. C., & Dewi, R. C. (2018). Hubungan Status Gizi dan Level Aktivitas Fisik dengan Tingkat Kebugaran pada Pemain Bola Basket di UKM Basket. *Amerta Nutrition*, 2(4), 332. <https://doi.org/10.20473/amnt.v2i4.2018.332-339>
- Pratama, A. W. P., & Rismayanthi, C. (2019). Hubungan Status Hidrasi Dengan Vo2 Max Pada Atlet Sepak Bola. *Medikora*, 17(1), 61–72. <https://doi.org/10.21831/medikora.v17i1.23496>
- Salamah, R. (2019). Hubungan Asupan Zat Gizi, Aktivitas Fisik, dan Persentase Lemak Tubuh dengan Kebugaran Jasmani. *Media Kesehatan Masyarakat Indonesia*, 18(2), 14–18. <https://doi.org/10.14710/mkmi.18.2.14-18>
- Sari, I. D., Rohmawati, N., & Ningtyias, F. W. (2016). Hubungan antara Tingkat Konsumsi Makanan, Suplemen dan Status Gizi dengan Tingkat Kesegaran Jasmani (Relation Between Food Consumption, Supplement and Nutrition Status with Physical Fitness). *Artikel Ilmiah Hasil Penelitian Mahasiswa*, 1–7.
- Sugiarto. (2012). Hubungan Asupan Energi, Protein dan Suplemen dengan Tingkat Kebugaran. *Jurnal Media Ilmu Keolahragaan Indonesia*, 2(2), 94–101.
- Triandari, S. T., Fatmawati, I., Maryusman, T., & Puspita, I. D. (2021). Hubungan Pengetahuan Terkait Gizi, Asupan Karbohidrat, dan Aktivitas Fisik Dengan Kebugaran Jasmani Pada Atlet Cabang Olahraga Permainan. *Jurnal Ilmiah Kesehatan Masyarakat: Media Komunikasi Komunitas Kesehatan Masyarakat*, 13(4), 160–166. <https://doi.org/10.52022/jikm.v13i4.219>