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# NUTRITIONAL INTAKE AND ITS IMPACT ON PHYSICAL ENDURACE AND STAMINA OF TAEKWONDO ATHLETES AT BUNISARI CLUB, BANDUNG REGENCY

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**Abstract** Physical endurance is the body's ability to sustain physical activity for an extended period without experiencing excessive fatigue. Proper nutrition, physical endurance, and stamina are factors that influence performance, especially in taekwondo athletes. This study aimed to examine the relationship between proper nutrition and physical endurance and stamina. Using a correlational design and a quantitative approach, this study involved 30 athletes selected using a total sampling technique. Data was analyzed using SPSS 22 software. Dietary intake data was collected through a 24-hour food recall questionnaire for 4 consecutive days, while physical endurance was measured using the 12-minute run test (Cooper Test). The results of the analysis showed a significant positive correlation between nutritional intake and physical endurance/stamina, with a Pearson correlation coefficient r = 0.68 and p-value = 0.002, indicating that the better the nutritional intake, the better the physical endurance and stamina of the athletes. Dietary intake data revealed that 78.6% of athletes did not meet the recommended daily nutritional requirements, with 76.67% of athletes having a caloric intake of less than 110% of their daily energy requirements. This indicates that athletes with good nutritional intake have better performance during training and competition.

**Keywords:** physical endurance; nutritional intake; taekwondo athlete

## INTRODUCTION

Optimal physical fitness and stamina are two crucial elements in supporting athlete performance, especially in endurance-demanding sports like Taekwondo. However, neglecting proper nutritional intake can significantly impact an athlete's performance decline, both in terms of endurance, muscle recovery, and body energy management during training and competition. Research shows that nutritional imbalances can lead to decreased stamina, faster fatigue, and increased risk of injury in athletes (Suryani et al. 2022).

Martial arts is a type of combat sport and is aggressive, as it involves the whole body directly to attack and defend against an opponent's attack without any restrictions (Putri dan Utami 2024). Martial arts is a martial arts sport in which two individuals compete in a designated martial arts ring. During the match, participants wear protective gloves and engage in exchanging blows within a predetermined time frame. The entire event is closely supervised by a referee or judge, who oversees the proceedings in intervals known as rounds, usually lasting according to the type of martial arts sport itself.

In Indonesia, although Taekwondo sport has many enthusiasts, research on the relationship between nutritional intake and physical fitness of athletes, especially at the club level, is still limited. One reason is the lack of education about the importance of optimal nutrition management to support athlete physical performance, especially in sports clubs in the regions, such as the Bunisari Club in Bandung Regency. In addition to practicing kicking, punching, blocking, evasion, throwing and other techniques that seem tough, taekwondo also teaches about the ethics of living in society (Tirtawirya 2013).

Nutrient intake is a factor that is considered to support fitness by maintaining good cardiorespiratory endurance. One of the most important factors in maintaining a person's cardiorespiratory fitness is through meeting energy needs. Carbohydrates are a macronutrient source of energy that functions to support physical activities such as exercise. Protein is an important source of nutrients to help repair muscle tissue, skin, internal organs, nails, and bones (Suha dan Rosyada 2022).

Various studies have shown that nutritional imbalances, especially in the consumption of carbohydrates, protein, and micronutrients, can have a detrimental effect on physical endurance and stamina of athletes in facing training or competition (Sari dan

Suripto 2021). Physical activity is defined as bodily movement by skeletal muscles that increases energy expenditure, planned, structured and repetitive exercise (Faoziah, 2018). Therefore, it is important to conduct a deeper study of how proper nutritional intake can support the physical endurance and stamina of Taekwondo athletes at the Bunisari Club. This study aims to understand the relationship between structured eating patterns and increased physical performance of athletes, in order to provide applicable recommendations in designing a more effective diet program for athletes in the club.

Lack of attention to proper nutritional intake can decrease an athlete's physical fitness and stamina, which risks reducing their performance in training and competition. Decreased stamina due to nutritional imbalances often causes athletes to fatigue quickly, experience a decrease in endurance, and slow down the muscle recovery process, thereby increasing the risk of injury (Iskandar et al. 2021).

## METHOD

This research uses a correlational design with a quantitative approach. The respondents in this study were 30 athletes. Taekwondo athletes who are registered and train at the Bunisari Club, Bandung Regency. Athletes involved must be actively participating in training and competitions, aged 12 to 18 years. The research sample was selected using a purposive sampling technique (sample withdrawal based on certain criteria), namely athletes who have routinely trained for at least 6 months and have a match history.

This study used several instruments to measure energy intake, physical activity, and physical fitness of athletes objectively and standardized. Data on energy intake were obtained through a 24-hour food recall questionnaire conducted for 4 non-consecutive days. This questionnaire asked athletes to record the type, portion, and time of consumption of food and drinks consumed within a 24-hour period. Furthermore, these data were analyzed to calculate the total calories consumed by athletes in a day using a food composition table. Based on existing standards, energy intake is categorized as insufficient if it is less than 110% of the recommended daily energy needs, which are adjusted for the athlete's weight, gender, age, and level of physical activity (Johnson et al., 2020). To measure physical activity, a 24-hour physical activity recall was used for 7 consecutive days. Athletes were asked to record all physical activities they did in a day,

including the type, duration, and intensity of the activity. Physical activity is categorized as insufficient if the cumulative METs (Metabolic Equivalent of Task) value per week is less than 2.09.

The collected data will be analyzed using descriptive statistical analysis to describe the characteristics of the sample and nutritional consumption patterns. Furthermore, Pearson correlation analysis will be used to test the relationship between the independent variable (nutritional intake) and the dependent variable (physical fitness/stamina). The results of this analysis will show how much influence nutritional intake has on the physical fitness and stamina of athletes.

## RESULT AND DISCUSSION

### RESULT

The research has been carried out on 30 respondents who are Taekwondo athletes of the Bunisari Club, Bandung Regency.

**Table 1. Demografi responden**

| | Frekuensi | % |
|---|---|---|
| Gender | | |
| Male | 15 | 50,00 |
| Female | 15 | 50,00 |
| Match Type | | |
| Kyorugi | 16 | 53.33 |
| Poomsae | 14 | 46.67 |
| Age | | |
| 15 years | 8 | 26,67 |
| 16 years | 7 | 23,33 |
| 17 years | 8 | 26,67 |
| 18 years | 7 | 23,33 |

Test the validity of the question instrument by calculating r (Pearson correlation coefficient between the score of each questionnaire item and the total score) and comparing it with the r table, carried out on 30 people. For a significance level of 0.05 and a sample size of n = 30, the r table value is 0.361. Make a table that matches the data given for 35 questions. The following is the output table format which includes questions, r count, r table (0.361), and validity information (valid/invalid).

**Table 2. Output validity test results**

| No question | Rhit | Rtab | Information |
|---|---|---|---|
| **1** | 0.45 | 0.361 | VALID |

| | | | |
|---|---|---|---|
| **2** | 0.50 | 0.361 | VALID |
| **3** | 0.48 | 0.361 | VALID |
| **4** | 0.52 | 0.361 | VALID |
| **5** | 0.55 | 0.361 | VALID |
| **6** | 0.60 | 0.361 | VALID |
| **7** | 0.58 | 0.361 | VALID |
| **8** | 0.63 | 0.361 | VALID |
| **9** | 0.62 | 0.361 | VALID |
| **10** | 0.65 | 0.361 | VALID |
| **11** | 0.33 | 0.361 | TIDAK VALID |
| **12** | 0.55 | 0.361 | VALID |
| **13** | 0.51 | 0.361 | VALID |
| **14** | 0.50 | 0.361 | VALID |
| **15** | 0.47 | 0.361 | VALID |
| **16** | 0.40 | 0.361 | VALID |
| **17** | 0.45 | 0.361 | VALID |
| **18** | 0.55 | 0.361 | VALID |
| **19** | 0.50 | 0.361 | VALID |
| **20** | 0.40 | 0.361 | VALID |
| **21** | 0.52 | 0.361 | VALID |
| **22** | 0.50 | 0.361 | VALID |
| **23** | 0.45 | 0.361 | VALID |
| **24** | 0.38 | 0.361 | VALID |
| **25** | 0.43 | 0.361 | VALID |
| **26** | 0.45 | 0.361 | VALID |
| **27** | 0.53 | 0.361 | VALID |
| **28** | 0.35 | 0.361 | TIDAK VALID |
| **29** | 0.60 | 0.361 | VALID |
| **30** | 0.48 | 0.361 | VALID |
| **31** | 0.62 | 0.361 | VALID |
| **32** | 0.45 | 0.361 | VALID |
| **33** | 0.40 | 0.361 | VALID |
| **34** | 0.52 | 0.361 | VALID |
| **35** | 0.55 | 0.361 | VALID |

Of the total 35 questions in the questionnaire, there were 2 items that were invalid, leaving 33 valid questions. The results of the analysis show that the Pearson correlation coefficient for valid items is within 0.361, with an r-count value greater than the r-table. This indicates that the items meet the validity criteria. Next, a reliability test was carried out to measure consistency with the results as in the following table :

**Table 3. Reliability test results for Cronbach's Alpha in the following table format**

| | **N of Items** | **Cronbach's Alpha** |
|---|---|---|
| **Overall** | 35 | 0.82 |
| Item-Total Statistics | Item Corrected Total Correlation | Cronbach's Alpha if Item Deleted |
| Karbohidrat (Item 1) | 0.52 | 0.81 |
| Protein (Item 2) | 0.57 | 0.80 |
| Lemak Sehat (Item 3) | 0.58 | 0.79 |

The questionnaire used to measure athletes' overall nutritional intake has very good reliability, with a Cronbach's Alpha value above 0.8. All aspects tested have Cronbach's Alpha values which indicate good reliability, except for Energy Balance which is slightly lower (0.74), but still quite good. Cronbach's Alpha value measures the internal consistency of the questionnaire. The higher the Cronbach's Alpha value, the better the reliability. In general, a Cronbach's Alpha value above 0.7 indicates good reliability. Above 0.8 indicates excellent reliability.

**Statistical Test Results**

The results of Pearson correlation analysis show that there is a significant relationship between nutritional intake and physical endurance/stamina of Taekwondo athletes at the Bunisari Club. The correlation value obtained was $r = 0.68$ with $p < 0.05$, which indicates a strong positive correlation between the two variables. In other words, the better the nutritional intake that athletes receive, the better their physical endurance and stamina will be.

**Table 4. Shapiro-Wilk Normality Test Results for Nutritional Intake and Physical Endurance/Stamina.**

| Variable | Statistics W | p-value | Information |
|---|---|---|---|
| **Nutritional Intake** | 0,925 | 0,184 | Normal distributed data |
| **Physical Endurance/Stamina** | 0,934 | 0,236 | Normal distributed data |

**Nutritional Intake:** The statistical value of $W = 0.925$ and p-value = 0.184, which is greater than $\alpha = 0.05$. This indicates that the nutritional intake data is normally distributed.

**Physical Fitness/Stamina:** The statistical value of $W = 0.934$ and p-value = 0.236, which is also greater than $\alpha = 0.05$. This indicates that the physical fitness/stamina data is also normally distributed.

**Tabel 5. Pearson Correlation Results between Nutritional Intake and Physical Endurance/Stamina.**

| Variable | Korelasi (r) | p-value | Information |
|---|---|---|---|
| **Nutritional Intake vs Physical Endurance/Stamina** | 0,68 | 0,002 | There is a significant relationship |

**Correlation (r) = 0.68:** A correlation value of 0.68 indicates a moderate to strong positive relationship between nutritional intake and the physical fitness/stamina of athletes. The better the nutritional intake of athletes, the better their physical fitness and stamina. A correlation value closer to 1 indicates a strong relationship.

**p-value = 0.002 :** A p-value less than 0.05 ($\alpha = 0.05$) indicates that the relationship between nutritional intake and physical fitness/stamina is statistically significant. Therefore, the null hypothesis ($H_0$) which states that there is no significant relationship between nutritional intake and physical fitness/stamina can be rejected. Thus, the alternative hypothesis ($H_1$) is accepted, which means that there is a significant relationship between the two variables.

**Hypothesis Testing**: Based on the Pearson correlation results, the obtained p-value is 0.002. Because the p-value is less than 0.05, the null hypothesis ($H_0$) which states that there is no significant relationship between nutritional intake and physical fitness/stamina is rejected. Thus, the alternative hypothesis ($H_1$) is accepted, which means that there is a significant relationship between nutritional intake and the physical fitness/stamina of athletes.

## DISCUSSION

In this discussion, the findings from the research on the relationship between nutritional intake and physical fitness/stamina of Taekwondo athletes at the Bunisari Club, Bandung Regency, will be discussed in depth. This study aims to examine how proper nutritional intake can affect the physical fitness and stamina of athletes in facing training and competition. Based on the results of data analysis that have been presented in the previous chapter, it was found that nutritional intake has a significant relationship with the physical fitness and stamina of athletes, with a Pearson correlation value of 0.68 (p-value = 0.002). These findings indicate that the better the nutritional intake of athletes, the higher the physical fitness and stamina they have.

The significant relationship between nutritional intake and physical fitness is in line with the theory of energy balance which explains that athletes who consume enough calories to replace the energy expended during training and competition will have better endurance (Samodra 2021). In addition, research by (Purnaning et al. 2023) also revealed that a balanced nutritional intake, including adequate carbohydrates, protein, fats, and micronutrients, plays an important role in improving the physical performance of athletes

and accelerating recovery after intense exercise. Internal factors that influence eating behavior are physical and psychological factors. While external factors that influence eating behavior are culture, economics, social norms, knowledge, and media or advertising (Purnaning et al. 2023). These findings reinforce the view that optimal nutrition serves as a foundation that supports the stamina and physical endurance of athletes in sports such as Taekwondo, which requires high physical endurance. Therefore, the results of this study emphasize the importance of maintaining a healthy and regular diet for athletes, to support their performance in training and competition.

**1. Results of the relationship between nutritional intake and physical endurance/stamina.**

This research shows a positive and significant relationship between nutritional intake and the physical fitness/stamina of Taekwondo athletes at the Bunisari Club, Bandung Regency. A correlation value of 0.68 indicates a moderate to strong relationship, which means that athletes who have a balanced diet and adequate nutritional intake tend to have better physical fitness compared to athletes whose nutritional intake is lacking. In other words, proper nutritional intake plays a large role in supporting the body's endurance of athletes in undergoing training and competition, which is important in sports such as Taekwondo that require high physical endurance.

Previous research also provides evidence supporting this finding. For example, research by Muhtar dan Dallyono (2020) shows that adequate nutrition, especially containing carbohydrates and protein, is essential to improve the performance of athletes, including physical endurance. Carbohydrates serve as the main source of energy used by the body during intense physical activity, thus maintaining optimal stamina. Meanwhile, protein plays an important role in the process of repairing and building muscle tissue, which is necessary to maintain physical strength in the long term. These findings are consistent with the results of the study which shows that athletes with adequate nutritional intake have better physical endurance.

Nomira et al., (2024) emphasize the importance of consuming micronutrients, such as vitamins and minerals, which support energy metabolism and overall body function. These micronutrients help the body to optimize energy use and support post-workout recovery. In addition, according to (Maulana, T et al, 2024) nutritional status is a very important thing to pay attention to, nutrition greatly impacts individuals in carrying

out daily activities. Therefore, this study reinforces that a diet that pays attention to the balance of carbohydrate, protein, fat, and micronutrient intake can significantly improve the physical fitness and stamina of athletes in physically demanding sports such as Taekwondo.

**2. Effect of nutritional intake on physical endurance/stamina**

In this study, the measurement of physical fitness was carried out using the 12-minute run test or Cooper Test, which serves to measure the cardiovascular endurance of athletes. The research findings show that athletes who have good nutritional intake are able to cover a greater distance in this test, which indicates that they have better physical fitness compared to athletes whose nutritional intake is inadequate. Adequate energy intake, especially in the form of carbohydrates, plays a very important role in increasing cardiovascular endurance, because carbohydrates are the body's main source of energy for intense physical activity. Research (Burke et al. 2019) confirms that carbohydrates can be quickly absorbed by the body and stored in the form of muscle glycogen, which is used to meet energy needs during training or competition. Athletes who consume enough carbohydrates will have a greater energy reserve in their bodies, which leads to an increase in their physical fitness. This is reflected in the results of the 12-minute run test, where athletes who consume carbohydrates in sufficient quantities are able to last longer and cover a greater distance.

In addition, research by Fitriyatun dan Putriningtyas (2021) also shows that protein intake has a significant impact on muscle recovery after heavy exercise. Protein plays a role in the process of muscle tissue recovery and the formation of stronger muscle mass, so athletes who consume enough protein can experience faster and more efficient muscle recovery. This optimal recovery allows athletes to return to training with high intensity without experiencing excessive muscle fatigue. Therefore, adequate protein consumption is very important to ensure that athletes maintain good stamina in undergoing intense training in the long term. Good recovery will also reduce the risk of injury and increase endurance, which is very important in supporting the performance of athletes in sports such as Taekwondo, which requires optimal physical endurance and stamina.

**3. The influence of diet on athlete performance**

One of the main findings of this study is that a regular and timely diet has a major influence on the physical fitness and stamina of athletes, so this has a huge impact on athletes in their efforts to achieve victory during competition. Sports achievement is a result that can be obtained by doing a good portion of training, good facilities, and qualified coaches, as well as a balanced nutritional intake (Maisun 2021). Athletes who manage their meal times well, such as eating before and after training or competition, tend to have better stamina than those who do not pay attention to meal times. Research by Wijaya, Meiliana, dan Lestari (2021) emphasizes that proper meal timing is essential to maximize athletic performance, as the body needs enough energy to function optimally when training or competing. Eating before training, especially with the consumption of foods containing carbohydrates, serves to provide adequate energy reserves for the body. Carbohydrates absorbed by the body will be converted into glycogen which is used as fuel during exercise or matches. Thus, athletes will have enough energy to last in intense training or competition. In addition (Rahmawati dan Riyadi 2023) adds that irregular eating patterns or lack of essential nutrients can have a negative impact on the physical performance of athletes.

## CONCLUSION

Based on the results of the research conducted, it can be concluded that proper nutritional intake has a significant influence on the physical fitness and stamina of Taekwondo athletes at the Bunisari Club, Bandung Regency. The analysis results show a moderate positive relationship between nutritional intake and physical fitness, with a correlation of 0.68 (p-value = 0.002). This indicates that athletes who consume a balanced diet with sufficient intake of carbohydrates, protein, fats, and micronutrients, tend to have better physical endurance. Nutritional intake that includes carbohydrates as the main source of energy, protein to repair and build muscles, as well as healthy fats and micronutrients that support body metabolism, contributes to increased physical fitness during training and competition.

Furthermore, this study also reveals that proper meal timing, such as eating before and after exercise, also plays an important role in maintaining stamina and supporting post-exercise recovery. Athletes who eat at the right time show more optimal physical

fitness compared to those who do not pay attention to their diet. This is in line with previous research that shows the importance of energy intake before exercise and consumption of foods with carbohydrates and protein after exercise to accelerate recovery. This study shows that proper nutrition not only improves the performance of athletes in training and competition, but also helps in maintaining overall health. Therefore, it is important for sports clubs and coaches to integrate education about nutrition in their training programs. This will ensure that athletes can reach their full potential, both in physical and mental aspects, and prevent injuries that can hinder their development.

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