



The Contents of *Sagu*: Increasing Pencak Silat Athletes' Endurance

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Abstract

Pencak silat is a traditional sport that is identical to a match number using full body contact physical activity. while endurance (VO₂max) serves to maintain physical condition during the match so that the body does not experience excessive fatigue. To support the gaining of good endurance, it is necessary to consume many sources of energy. This study aims to determine the effect of the nutritional content of *sagu* in increasing the endurance of pencak silat athletes. The nutritional content of 100 gram serving of *sagu* consists of 357 calories, 1.4 grams of protein, 0.2 grams of fat, 85.9 mg of carbohydrates. The sample in this study is 10 pencak silat athletes from Palopo City, which were carried out at the training location at the Palopo Madrasah Tsanawiyah Multipurpose Building and Muhammadiyah Palopo University Sports Field. The method used in data collection is an experiment using a one-group pretest and posttest design and the test instrument used is the Multistage-fitness test (MFT) running 20 M back and forth. The result of this study is that the nutritional content of *sagu* is able to increase the endurance of pencak silat athletes without giving any side effects.

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INTRODUCTION

Physical education aims to improve human performance through selected and intact physical activity media. To achieve the desired results, the improvement of skills and knowledge that can be maintained when combined with knowledge of physical activity and contribute to the educational mission of the school to provide a balanced approach in educating children

holistically (Mustafa & Dwiyo), and designed to improve physical fitness, develop motor skills, knowledge, healthy living behavior, sportsmanship, and emotional intelligence. The learning environment is carefully arranged to promote the growth and development of all physical, psychomotor, cognitive, and affective domains of each student (Mashud, 2019). Physical education fosters the quality of physical fitness with a dynamic health state that can handle the

physical demands to carry out daily activities even with additional physical activity without feeling tired.(Panggraita, Tresnowati, and Putri 2020)as well as tlevel of physical fitness that is closely correlated with each age group(Rasyidah Jalil et al., 2022).

One of the tradional sports which is passed down from the ancestors of the Indonesian is pencak silat which has elements of art and moves that can increase endurance and physical fitness as well as aspects related to conditions that require a fighter to defend himself when in a threatened or dangerous condition.(Syaifullah and Doewes 2020). Pencak silat is an activity that combines both elements of art and moves. There is a component of pencak silat that can be clearly achieved, especially the component of physical ability because every series of movements is an aerobic movement that can train and improve cardiovascular function (VO₂Max), as experts believe that dynamic physical activity or aerobic movement can increase the level of physical activity. a person's maximum aerobic metabolism.(Dahlan & Patawari)

Endurance is one of several elements that exist in physical fitness. For an athlete, endurance is an important component that requires muscle capacity to withstand or overcome fatigue for a long time and the higher the endurance, the higher the physical ability and productivity.(Mashud, 2019). Endurance is also the most important element of physical condition because it is the basis of other elements of physical condition(Ihsan, Sepriadi, and Suwirman 2018).

Endurance can be measured by the level of VO₂max achieved. Adequate energy and nutritional intake also affects an athlete's performance(Natural & Murbawani). Carbohydrates are the main source of energy to meet nutritional needs and are needed to form liver and muscle glycogen(Herita Warni et al.). Maximum oxygen uptake (VO₂max) that may be affected by body composition as well as body fat percentage is a commonly used to measure the body composition. A person's physical fitness will benefit by maintaining body fat levels within the normal range, especially the cardiorespiratory endurance, which is the most important aspect of physical fitness.(Kurnia, Kasmiyetti, and Dwiyanti 2020)

An important element in creating a better civilization is human resources. Quality human resources help build a better civilization, both physically and spiritually. It would be nice to start with healthy food and also meet the body's intake

needs in an effort to improve the quality of human resources. *Mens Sana In Coprore Sano*, which means "In a healthy body there is a strong soul" is a short statement of a Roman poet. Another aspect of *Maqashid Ash-Sharia* (reason for creating laws) called *hifdz an-nafs* is maintaining physical well-being (maintaining the body). *Maqashid Ash-Syariah* seeks to understand the good while avoiding evil(Cell et al. 2021)

Indonesia, which is an agricultural country, has a large forest area which is one of the centers of biodiversity and food sources. *Sagu* (Metroxylon) is one of the traditional food products of indigenous peoples' culture that is passed down from previous generations(Ihsan, Sepriadi, and Suwirman 2018)and as a useful food source(Kadir et al.). This palm group plant contains high starch and has long been the staple food of the Papuan so that all parts of this plant are used for human needs(Suebu, Tanjung, and Suharno 2020)

North Luwu Regency in South Sulawesi has the largest *sagu* cultivation. Therefore, *sagu* can be grown as a food crop in the coastal area of North Luwu. *Sagu* plants thrive in the coastal area of northern Luwu due to good soil conditions caused by the high wet *sagu* starch production in the area, which exceeds 250 kg/tree(Kamma, Rampisela, and Rashid 2021). *Sagu* trees with low stems, midribs and the ends of the stems are removed from the trunk until only the *sagu* stems are left or can be called logs. To make shipping easier, the logs are broken into several pieces, one log has a diameter of 45 cm, a bark thickness of 3.1 cm, and a weight of about 120 kg. *Sagu* trees have a height range of 20 to 30 meters. From one *sagu* tree, 150-300 kg of starch can be produced, which has a high carbohydrate content but low protein(Ernawati, Heliawaty, and Diansari 2018). The test results of the nutritional content of *sagu* per 100 grams consist of 357 calories, 1.4 grams of protein, 0.2 grams of fat, 85.9 mg of carbohydrates.(Ansori 2022)

Sagu contains more carbohydrates than some other carbohydrate sources. *Sagu* contains more calories per serving than some other forms of carbohydrates, such as potatoes, rice, cassava, and sweet potatoes (gembili and sweet potatoes). This shows that rice, which has historically been the main source of carbohydrates in Indonesia, can be activated by *sagu*. In terms of calcium value and iron concentration, rice performs better than other mineral sources.(Dewayani et al. 2022).

METHODS

Experimental research is research conducted to ascertain the causal relationship between variables. The treatment given to the subject or object of research is one of the main aspects of experimental research (Alvin Kurnain, 2020). The approach used in this study is a quantitative approach. This research is a quantitative research where this research will answer research problems with statistical evidence (Pink Ektyara 2022).

This study uses a One Group Pretest-Posttest design with a sample of 10 athletes using saturated sampling. The test instrument for this research used the Multistage-Fitness Test (MFT Test) or the Bleep Test. This research was conducted at the training location at the Palopo Madrasah Tsanawiyah Multipurpose Building and the Muhammadiyah Palopo University Multipurpose Field.



Figure 1. Research Stages

As for the data collection technique using the spss v26 program, the details of the analysis are as follows: (1) descriptive test, to view and search for data in research based on the mean, maximum value, and others. (2) normality test, to test the data that has been obtained is normally or

not normally distributed. (3) difference and effect test, paired sample t-test to look for differences or influences from before and after treatment. (4) data percentage, to compare how big the percentage of pretest and posttest on the variables used.

Table 1. VO2max level classification norms (bleep test)

Female (units in ml/kg/min)						
age	13-19	20-29	30-39	40-49	50-59	60+
Very Poor	<25.0	<23.6	<22.8	<21.0	<20.2	<17.5
Poor	25.0-30.9	23.6-28.9	22.8-26.9	21.0-24.4	20.2-22.7	17.5-20.1
Fair	31.0-34.9	29.0-32.9	27.0-31.4	24.5-28.9	22.8-26.9	20.2-24.4
good	35.0-38.9	37.0-41.0	35.7-40.0	32.9-36.9	31.5-35.7	30.3-31.4
Excellent	39.0-41.9	37.0-41.0	35.7-40.0	32.9-36.9	31.5-35.7	30.3-31.4
Superior	>41.9	>41.9	>40.0	>36.0	>35.7	>31.4
Male (units in ml/kg/min)						
age	13-19	20-29	30-39	40-49	50-59	60+
Very Poor	<35.0	<33.0	<31.5	<30.2	<26.1	<20.5
Poor	35.0-38.3	33.0-36.4	31.5-35.4	30.2-33.5	26.1-30.9	20.5-26.0
Fair	38.4-45.1	36.5-42.4	35.5-40.9	33.6-38.9	31.0-35.7	26.1-32.2
good	45.2-50.9	42.5-46.4	41.0-44.9	39.0-43.7	35.8-40.9	32.3-36.4
Excellent	51.0-55.9	46.5-52.4	45.0-49.4	43.8-48.0	41.0-45.3	36.5-44.2
Superior	>55.9	>52.4	>49.4	>48.0	>45.3	>44.2

RESULTS AND DISCUSSION

Explaining the results of descriptive statistical research, the number of samples (N) is 10, then the difference (range) of the maximum and minimum values is 21, the athlete with the largest (maximum) score of pretest 44 and posttest

44, while the athlete with the smallest score (minimum) pretest 23 and posttest 23 The average value or mean of the 10 total samples of pretest 32.62 and posttest 33.13 with a standard deviation of 7.101 for pretest and 7.196 for posttest.

Table 2. The results of the descriptive statistical research of pretest and posttest

	Statistics	Pretest	posttest
	N	10	10
	Range	21	21
	Min	23	23
	Max	44	44
	Std. Deviation	7,101	7,196
Vo2max	Very poor	2	2
	Poor	4	3
	Fair	2	3
	good	2	2
	Excellent	0	0
	Superior	0	0

In experimental research, it is necessary to conduct a normality test to determine whether the population is normally or not normally distributed. Here are the results of the normality test as follows:

Table 3. Normality test results

Data group	Sig. (2-tailed)	Sig	Information
Pretest	0.200	0.05	Normal
posttest	0.200	0.05	Normal

The significance value (p) in the Kolmogrov-Smirnov test is 0.200 ($p > 0.05$), so based on the Kolmogrov-Smirnov normality test the data is normally distributed.

The X and Y hypothesis testing uses a paired sample t-test. In this study, the X variable is the nutritional content of *sagu* and the Y variable is endurance. The hypothesis that the author has determined is that there is a significant effect of the nutritional content of *sagu* on the endurance of pencak silat athletes. For further explanation, see Table 4

Table 4. The results of hypothesis testing X against Y

	mean	N	Std. Deviation	Std. Error Mean
Pretest	32.62	10	7,101	2,246
Posttest	33.13	10	7,196	2,276

1) The initial test has an average value (mean) of 32.62 from 10 data. The data distribution (Std.

deviation) obtained is 7.101 with a standard error of 2.246

2) The final test has an average value (mean) of 33.13 from 10 data. The distribution of data (Std. deviation) obtained is 7,196 with a standard error of 2,276

Correlation or relationship between the two pretest data (pretest) and the final test (posttest). Pay attention to the Sig column in the correlations table.

Table 5. Paired sample correlations

	N	Correlation	Sig.
Pretest& posttest	10	,999	,000

In the processed data, it can be seen that the significance value (p) in the Kolmogrov-Smirnov test is 0.00 ($p < 0.05$), meaning that the two data (variables) are correlated or related.

Because in *sagu* there are carbohydrates that serve as the body's main energy source. The more energy that is used when doing physical activity, the more carbohydrates will be needed by the body and to minimize the occurrence of excessive fatigue during activities or the body's endurance decreases.

Based on the theoretical study and framework above, it can be formulated the hypothesis of this research, namely that there is a significant effect of the nutritional content of *sagu* in increasing the endurance of pencak silat athletes.



Figure 2. Conducting initial data collection test (pretest)



Figure 4. Giving treatment to athletes



Figure 5. Final data collection test (posttest)

CONCLUSION

The results of the research description above show that *sagu*, which is a traditional food, can be used as a staple food for athletes because of the nutritional content in it which can increase the endurance of pencak silat athletes. *Sagu* is one of the largest producers of carbohydrates for the formation of the body's main energy and the price is affordable and easy to find. Aspects due to the lack of understanding contained in *sagu* makes *sagu* unable to compete with rice as a traditional staple food source. Good endurance is influenced by the consumption of healthy and high-carbohydrate foods because they can produce abundant energy.

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