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An Analysis of Nutritional and Vo2Max Status of UNMUS Volleyball Club Players

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Abstract

Objective. It is felt that the physical training of UNMUS Volleyball Club members is still lacking. A good frequency of physical exercise is 2-5 times per week. The coach has also never carried out a fitness test to determine the physical fitness level of UNMUS Volleyball Club members. The contribution to this research is the physical development of UNMUS volleyball players. The human body gets nutrition in the form of animal protein and vegetable protein. One type of food alone cannot fulfill all the body's needs for various nutrients. Based on their function, we can group nutrients into three, namely energy substances consisting of carbohydrates, fats, and proteins. Anaerobic energy systems are divided into galactic anaerobes (phosphagen systems, without producing lactate) and lactic anaerobes (lactate systems, producing lactate). The galactic anaerobic system provides the ready-to-use energy necessary to initiate high-intensity physical activity. The energy source is obtained from the breakdown of ATP and PC stores available in the muscles.

Materials and methods. The type of research used is quantitative research with descriptive methods. The sample size is 18 players. Techniques for collecting data on nutritional status using methods of measuring height, weighing, and recording age. *VO2 max* measurement with MFT (Multistage Fitness Test). The data analysis technique uses percentages.

Results. At maximum activity, this system can only be maintained for 6-8 seconds because ATP and PC stores are very small, every 1 kg of muscle contains 4-6 mM ATP and 15-17 mM PC. 1 Mol = 1000 mM is equivalent to 7-12 calories. The results of the Multistage Fitness test study on the CLUB UNMUS volleyball team had the largest VO2max value of 51.82 and the smallest 34.18. The team's average (mean) VO2 max was 41.70 ml/kg/minute and was included in the poor category.

Conclusion. Meanwhile, the percentage of body mass index (BMI) test results for CLUB UNMUS volleyball players, totaling 18 players, is normal.

Keywords : Volleyball, Vo2Max, Nutrition, UNMUS

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Introduction

Sport is an active physical activity that plays a very important role in maintaining a person's health and/or physical fitness. However, the current reality shows that sport is still not a basic need for the majority of society. This happens for various reasons, such as being busy, having no time, unfavorable economic conditions, lack of interest in exercising, or not having the skills to exercise, which has made ordinary people stay away from sports. Sports achievements carried out professionally aim to produce athletes' achievements in sports which are supported by good facilities and infrastructure. In several activity matches, including national regional matches. Every athlete must be given guidance in a good way to obtain maximum performance. Athletes whose potential will be developed will be more honed. Observation results that the physical training of UNMUS Volleyball club members is still lacking. A good frequency of physical exercise is 2-5 times per week. The coach has also never carried out a fitness test to determine the physical fitness level of UNMUS Volleyball club members. The contribution to this research is the physical development of UNMUS volleyball players.

According to Muhajir (2007: 57), physical fitness is the body's ability and ability to make adjustments (adaptation) to the physical freedom given to it (from the work it does every day) without causing excessive fatigue. Physical fitness is a person's ability and ability to do work or carry out daily tasks with sufficient strength and endurance, without causing significant fatigue, so that there is remaining energy that can be used to enjoy free time and carry out activities that come suddenly. or suddenly.

This requires a process using various benchmarks so that prospective athletes can enter and be accepted as athletes (Muskanan, 2015). Paying attention to the importance of studying the factors that support sporting achievement, coaches no longer need to doubt that coaching efforts must be based on training and mastery of physical, technical, tactical, and strategic aspects as well as the mental maturity of champions so that they can become good provisions for the players. Achievement in sports is full of various abilities and complex movement skills. An athlete generally has movements that include running fast, stopping suddenly and immediately moving again, jumping, reaching, turning quickly, and taking wide steps without losing body balance at all.

These movements are carried out repeatedly and for a long time, during the game process. The result of the moving process will cause fatigue which has a direct impact on the work of the heart, lungs, circulatory system, breathing, muscle work, and the body's joints. Physical ability is one of the most dominant components in sports achievements. Sports achievements cannot be separated from elements of tactics, technique, and the quality of physical condition. Another methodological issue to consider is the definition of PA or physical fitness used in each study and its measurement techniques. Because each indicator addresses a different PA domain, results may vary between studies depending on the instruments and time limits used (Pedro C Halal et al, 2006). Athletes need the qualities of strength, endurance, flexibility, speed, agility, and good movement coordination. This aspect is needed to be able to move and react well during the game. Athletes want to continue to progress or maintain their achievements, apart from having to train their technique, they also have to train physically regularly so they can find out what physical training is needed, so they need to know how much influence a series of exercises has on Anaerobic Standing Power (VO2Max).

Based on the opinions above, it can be concluded that physical fitness is a person's ability to carry out daily activities within a certain time without experiencing significant fatigue. A person who has good physical fitness will not experience disturbances in bodily functions in carrying out their work so they can increase work productivity. Humans always desire satisfaction and happiness in their lives. The needs of life are increasing day by day, making people try hard to fulfill them, so the harder people try to face life's challenges in meeting their

needs, the more they need a healthy body. With a healthy body, it will be easier for humans to carry out their activities well. A good level of physical fitness in a person's body can be obtained apart from doing regular exercise and having to pay attention to several factors that are no less important that influence the level of physical fitness. Physical fitness can be considered an integrated measure of most if not all, body functions (skeletal, cardiorespiratory, hematocirculatory, psychoneurological, and endocrine-metabolic) involved in the performance of daily physical activities and/or physical exercise (Ortega et al. ., 2008).

The human body gets nutrition in the form of animal protein and vegetable protein. One type of food alone cannot fulfill all the body's needs for various nutrients. Based on their function, we can group nutrients into three, namely energy substances consisting of carbohydrates, fats, and proteins. A person's nutritional condition is a reflection of what they consume over a long period. Factors that influence nutritional status will interact with each other so that they have implications for a person's nutritional status. The adaptive response to exercise training is determined by a combination of several factors: duration, intensity, type of exercise, and frequency of exercise, but also by the quality and quantity of nutrition before and after exercise. period (Jeukendrup, 2017) Currently, anthropometric measurements (body measurements) are widely used in assessing nutritional status, especially if there is a chronic imbalance between energy and protein intake. Anthropometrics as an indicator of nutritional status can be done by measuring several parameters.

Parameters are a single measurement of the human body, including age, weight, height, upper arm circumference, head circumference, chest circumference, hip circumference, and thickness of fat under the skin. To produce energy, there are two energy systems in the body, namely the anaerobic energy system (does not require oxygen) and the aerobic energy system (requires oxygen). Anaerobic energy systems are divided into galactic anaerobes (phosphagen systems, do not produce lactate) and lactic anaerobes (lactate systems, produce lactate). The galactic anaerobic system provides the ready-to-use energy necessary to initiate high-intensity physical activity. The energy source is obtained from the breakdown of ATP and PC stores available in the muscles. At maximum activity, this system can only be maintained for 6-8 seconds because ATP and PC stores are very small, every 1 kg of muscle contains 4-6 mM ATP and 15-17 mM PC. 1 Mol = 1000 mM is equivalent to 7-12 calories.

Internal factors are things that already exist in the body that are permanent, including heredity, age, and gender. Meanwhile, external factors include body activity, fatigue, environment, and smoking habits. The availability of nutrients in the body will affect the ability of muscles to contract and cardiovascular endurance. Athletes have unique nutritional needs based on age, gender, athlete level, regular exercise and body weight, fulfillment of nutrients sourced from the food eaten every day, adequate rest arrangements, and maintenance of good health. Physical fitness and body health are conditions that cannot be separated. Research results (Holway & Spriet, 2011) explain that Nutrition for team sports requires knowledge of the physiology of specific sports training and competition coupled with social skills to be able to apply dietary recommendations within a multi-professional sports science framework. and the medical group and coaching staff. The reality, even when working with team sports athletes, is that an individualized approach is required to meet each athlete's nutritional and hydration needs.

Physical activity level	kcal/kg/day	kcal/day
General physical activity 30-40 minutes/day, 3 times a week	Normal diet, 25-35	1 800-2 400[a]
Moderate levels of intense training 2-3 hours/day, 5-6 times a week[b]	50-80	2 500-8 000[c]
High-volume intense training 3-6 hours/day, 1-2 sessions/day, 5-6 times a week[b]	50-80	2 500-8 000[c]
Elite athletes[d]	150-200	Up to 12 000[e]
Large athletes[d]	60-80	6 000-12 000[f]

a: Values estimated for a 50-80 kg individual
b: Moderate levels of intense training use lower level of range, high-volume intense training uses upper level of range
c: Values estimated for a 50-100 kg individual
d: Depending on training periodisation, and the volume and intensity of training
e: Values estimated for a 60-80 kg athlete
f: Values estimated for a 100-150 kg athlete

Source: (Potgieter, 2013)

Figure 1. Energy requirements for physical needs

Physical fitness is the main capital in human life, a high level of physical fitness will also support increased activities carried out every day. Usually, with abnormal nutritional status, the body will also have difficulty or be disturbed when carrying out activities, especially sports activities. For example, children who are overweight (obese) will have difficulty carrying out quite complex sports movements. Because sport is a physical activity that requires sufficient energy to do it (Irianto, 2013). In the game of volleyball, physical fitness is required to perform volleyball technical movements. The basic technique of playing volleyball consists of serves which include bottom serve, top serve, and jump serve techniques. Basic passing techniques consist of Upper Passing Technique, lower passing. Basic blocking techniques and basic smash or spike techniques include open smash, semi smash, fast smash (Hiskya, 2019). In the game of volleyball, to make a good jump when smashing, you have to have sufficient estimation and ability (Hiskya, 2019). The level of the volleyball game itself requires the physical and skills needed to improve the technique and mental state of the volleyball player.

Newness in study This is the condition physique player Can improve For match. Contribution to study This is increase ability physique in face volleyball match next.

Materials and methods

The type of research used is quantitative research with descriptive methods. The sample size is 18 players. Techniques for collecting data on nutritional status using methods of measuring height, weighing, and recording age. *VO2 max* measurement with MFT (Multistage Fitness Test). The data analysis technique uses percentages.

a. Average

$$M = \frac{\Sigma X}{N}$$

1. Percentage

$$X = \frac{F}{N} \text{ x } 100\%$$

Results

Research results should be presented in tabular form and described in a logical order. The results of data collection from CLUB UNMUS volleyball players were: To determine the amount of *VO2 max* and nutritional status, the tests and measurements used were the Multistage Fitness test and Body Mass Index (BMI). The results of the Multistage Fitness test on the CLUB UNMUS volleyball team consisting of 18 players had the *largest VO2 max score of* 51.82 and the smallest of 34.18. The average (average) *VO2 max* of the team is 41.70 ml/kg/minute and is included in the not-very-good category. In the good category there is 1 person, and the

percentage is 5%, in the good category there are 8 players with a percentage of 44%, in the Fair category there are 8 people with a percentage of 44% of the players, in the not enough category there are 1 player. The percentage is 5%.

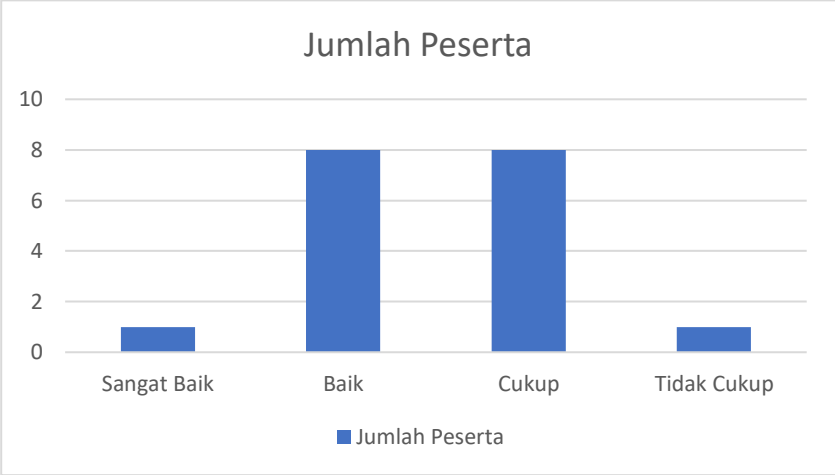

Figure 2. VO2 Max level

Meanwhile, the results of the Body Mass Index Test (BMI) of 18 players at CLUB UNMUS itself had the largest BMI value of 26 and the smallest of 17.20. The average (mean) BMI of the players is 22.26 ml/kg/minute. In the normal category, the percentage was 14 people, namely 77.78%, in the fat category with excess mild BB levels, there were 3 players with a percentage of 16.67%, in the thin category, there was 1 players with a mild excess BB level, with a percentage of 5.56%. The percentage of CLUB UNMUS volleyball players is classified as normal.

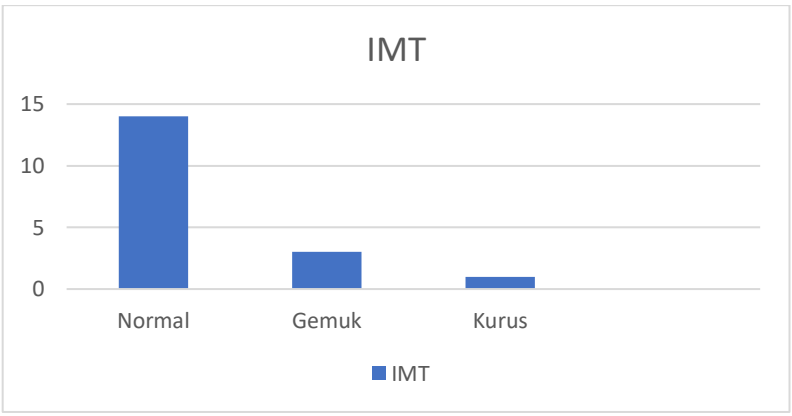

Figure 3. BMI of volleyball players

Discussion

You need physical exercise to do activities. Apart from that, nutrition is also a necessity to balance every activity carried out which must be given priority. Every nutritional intake we get from food and drink can be the main capital for carrying out every sports activity. In playing volleyball, good physical abilities are required. Therefore, it seems that a volleyball athlete needs to increase aerobic capacity to load phosphagen energy stores better and faster to continue to perform better throughout the game (Balassas, 2013).

By *VO2 max standards*. For Regional category players who exceed 50 ml/kg/minute, there are several players who exceed the top standard, but there are players who fall short of

the specified standard. Therefore, it is necessary to provide training that places more emphasis on physical abilities. Physical abilities must be supported by good nutritional intake. Because with exercise the nutrients consumed will turn into glucose and become energy. Anaerobic glycolysis produces energy (2-3 ATP), also producing lactic acid. Almost all sports such as football, volleyball, and basketball use this energy system (Syafrizal & Wilda, 2009).

The food that must be consumed by players must have high nutritional content because it can help athletes to carry out much needed physical skill training. Apart from the inhibiting factor being drinking alcohol, smoking coaches must often help to monitor players so that this habit can be eliminated to gain good physical abilities. The nutrients needed by athletes consist of macronutrients and micronutrients. It belongs to the macronutrient group, namely carbohydrates, fat, and protein, while micronutrients are vitamins and minerals (Syafrizal & Wilda, 2009). For volleyball players with very low VO2Max levels. This type of training should be filled with exercises to increase cardiovascular endurance.

Conclusion

The Multistage Fitness test results for the CLUB UNMUS volleyball team had *the largest VO2max score of* 51.82 and the smallest of 34.18. The average (mean) *VO2 max* of the team was 41.70 ml/kg/minute and was included in the poor category. In the good category, there is 1 person, and the percentage is 5%, in the good category there are 8 players with a percentage of 44%, in the Fair category there are 8 people with a percentage of 44% of the players, in the not enough category there are 1 player. The percentage is 5%.

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Confession

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Conflict of interest

The authors declare no conflict of interest.

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