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Analisis Daya Tahan Kardiovaskular Pada Atlet Bola Tangan Sulawesi Selatan

Analysis Of Cardiovascular Endurance In South Sulawesi Handball Athletes

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Abstrak. This study aims to determine cardiovascular endurance (VO2Max) in South Sulawesi handball athletes. This type of research is quantitative descriptive. The population is South Sulawesi handball athletes. The sample used was 16 athletes who were considered to represent variations in terms of cardiovascular endurance VO2Max. The data collection technique in this study used a test. The method used is a test technique, the test in question is an endurance test (VO2Max) using a test and measurement in the form of a Multi-Stage test (bleep-test) carried out by athletes. The data analysis technique used is descriptive analysis. The sampling technique is with saturated samples. The data analysis technique used is descriptive analysis. From the results of this study, it can be concluded that the average level of VO2Max of South Sulawesi handball athletes using the bleep test is in the less category.

Kata Kunci : Cardiovascular, VO2Max, Handball

1 Introduction

Handball is a team sport where two teams, each consisting of 7 players (6 players and 1 goalkeeper) try to put the ball into the opponent's goal as much as possible and defend the goal to avoid the ball from being scored. This handball game is similar to soccer or futsal, except that the way to play the ball is using the hands, not the feet.

Physical condition plays an important role in handball, because handball athletes must move continuously to be able to score during the match. Handball does not only rely on good technical mastery, but also on prime physical condition obtained from good physical training.

The Cardiovascular System is a collection of organs that work together to carry out transportation functions in the human body. This system is responsible for transporting blood, which contains nutrients, metabolic waste, hormones, immune substances, and other substances throughout the body. Thus, it can be seen that the cardiovascular system has the main function of transporting blood and the substances it contains to all parts of the body.

Good physical fitness is not only supported by an ideal body mass index and cardiovascular endurance factors. Handball is a sport that is played with physical activity so that it requires large oxygen or is commonly called physical activity, aerobic physical activity. In addition to cardiovascular endurance, handball players must also have good agility to have good playing quality. This opinion is supported by previous research which states that someone with good endurance and stamina will have a high VO2 Max value, so that someone with poor endurance and stamina will have an impact on the VO2 Max level which is also bad.

During training or in matches, the athlete's VO2 max which is not optimal can be seen from the athlete's performance which decreases when shooting inaccurately or not hitting the target, when doing inappropriate passing techniques and the athlete's control of the ball and the field decreases (concentration decreases). Therefore, South Sulawesi handball athletes need to have good cardiovascular endurance (VO2 max) in order to be able to channel oxygen to support activities during the match process.

There is something that is of concern to researchers related to the description above and based on the researcher's observations, namely the VO2 max endurance of South Sulawesi handball athletes tends to be inconsistent. The athlete's performance decreases in the next set or match. This must be reviewed regarding the athlete's cardiovascular endurance to get good performance results. According to Suryabrata in his book entitled Research Methodology, states that the problem is the gap between expectations (das sollen) and reality (das sein), between needs and what is available, and between what should be and what exists.

2 Method

To influence these variables so that variable manipulation does not occur. This study aims to determine the contribution of hand eye coordination, wrist flexibility and leg muscle explosive power to the smash ability of volleyball.

1. Research Place

Research Place This research was conducted in the GORO Makassar field.

2. Type of research:

This type of research uses a descriptive-quantitative research approach technique with the analysis method used is a survey. According to Sugiyono (2013) quantitative research methods can be interpreted as research methods based on the philosophy of positivism, used for certain populations or samples, sampling techniques are generally used randomly, data collection uses research instruments, analysis and data are quantitative, with the aim of testing the hypothesis that has been set.

The survey method is a research method that uses a questionnaire as the main instrument for collecting data. This method is the most commonly used among students. The design is simple, the process is fast. But if done carelessly, the findings of this survey tend to be superficial even though in its analysis the researcher uses complicated statistics.

1) Population

According to Ari Kunto (2010: 173) Population is the total of all research subjects. Objects in the population are studied, the results are analyzed, concluded and the conclusion applies to the entire population. The population in this study were South Sulawesi handball athletes, while the number of populations to be studied was 16 people.

2) Sample

Sample is a part of the number and characteristics owned by the population. The sample in this study was 16 South Sulawesi handballs using the total sampling technique. According to Sugiyono (2013: 124), total sampling is a sampling technique that is the same as the population.

4. Data Analysis Techniques

The analysis is intended to obtain a general overview of the research data to be able to interpret and give meaning to the analysis data.

The data analysis technique used in this study is descriptive statistics with percentages. According to Arikunto (2006: 240) in general, data analysis work includes:

1. Preparation

2. Tabulation, in this study describes the analysis of cardiovascular endurance in South Sulawesi handball athletes.

The data obtained for each test item is raw data from the results achieved by the athlete. Furthermore, the raw results of each test item that has been achieved by the athlete with the specified category.

3 Results

The description of the data from the research results aims to provide a general overview of the distribution of VO2 Max data distribution of South Sulawesi handball athletes. The values presented after being processed from raw data using descriptive statistics, namely average, standard deviation, mode, median, and frequency distribution. The summary of the results of the descriptive statistical calculations is as in table 1 below:

Table 1. Summary of research results

Statistics	VO2 MAX
Sample	16
Average	40.93

Median	40.08
Standard Deviation	42.1
Variance	17.75
Range	13.08
Minimum	33.9
Maksimum	47.7

Based on the research data on VO2 Max of South Sulawesi handball athletes, the minimum value was 33.90 and the maximum value was 47.70 scores with a range of 13.08 scores. The average value of 40.93 scores has a median of 40.08 scores and a standard deviation of 42.1 scores and a variance of 17.75 scores.

Raw data on VO2Max of South Sulawesi handball athletes can be arranged in its frequency distribution. It is known that 16 people were sampled in the study, where 5 people (33.33%) had VO2Max below average, 4 people in the average class (23.33%) and 7 people (43.33%) above the average class.

2. VO2 Max Category of South Sulawesi Handball Athletes

Description of VO2 Max data of South Sulawesi handball athletes has been done, then a presentation of the results of the VO2 Max analysis of South Sulawesi handball athletes is made based on several categories that refer to the VO2 Max norm.

It is stated that the results of the VO2Max of South Sulawesi handball athletes converted based on the research category in the following table 2:

Table 2. List of percentage scale assessment conversions for VO2 Max criteria for South Sulawesi handball athletes

No.	Category	Class Interval	Frekuensi Absolut	Frekuensi Relatif(%)
1	Very Good	->48.6	0	00.00
2	Good	43.4-48.5	5	33.33
3	Enough	39.3-43.3	4	20.00
4	Less	33.9-39.2	7	46.67
5	Ver less	-<33.8	0	00.00
Total			16	100.00

Based on Table 2 above, it is known that 16 people in the research sample where no very good category was found, 5 people (33.33%) in the good category, 4 people (20.00%) in the sufficient category and 7 people (46.67%) in the less category and no very less category was found. From the description of the data and categories that have been presented, it can be obtained that the highest percentage of VO2 Max of South Sulawesi handball athletes is in the less category distribution, then followed by the distribution of good and sufficient categories. Furthermore, the very good and very less categories were not found. Thus, it can be concluded that

overall the total percentage of VO2 max of South Sulawesi handball athletes is in the less category.

4 Discussion

Based on the description of the results of data analysis and conversion of VO2Max assessment of South Sulawesi handball athletes. That of the 16 research samples, each of whom obtained a score through the results of descriptive analysis which were converted into a category percentage scale assessment table using an interpretation consisting of:

The category is very lacking as many as 0 people (00.00%), athletes who are included in the lacking category are 7 people (46.67%), athletes who are included in the sufficient category are 4 people (20.00%), athletes who are included in the good category are 5 people or (33.33%), and athletes who are included in the very good category are 0 people or (00.00%).

Based on the results of this study, South Sulawesi handball athletes are in the lacking category, namely 46.67%. This is because the intensity of training carried out by South Sulawesi handball athletes is still lacking. For the training schedule itself, it is still 3 times a week with a time intensity of less than 150 minutes. As a result, South Sulawesi handball athletes rarely do exercises related to increasing cardiovascular endurance (VO2 max). This cardiovascular endurance training has a big influence on the athlete's game on the field, both during training and performance when competing.

According to Janssen (1989) who put forward the results of his research, that the anaerobic threshold value can be determined through the pulse rate. The increase in pulse rate with exercise intensity has a linear correlation, but in very intensive exercise running parallel, it was found that the increase in pulse rate lags behind at a certain point (deflection), this condition indicates that the exercise intensity has reached the maximum that can be done with maximum anaerobic and aerobic energy supply. In determining the intensity of exercise to reach the exercise zone, in accordance with the objectives of the exercise to be developed, the pulse rate can be used as a measure, called the training heart rate.

This will help players to improve their physical fitness as a form of adaptation to the main needs in playing handball. Playing handball is not just enough to have good playing techniques and skills but must be able to have the main supporting factor, namely prime physical condition. Good physical condition will help players to be able to show their ability to play handball well. Low cardiorespiratory endurance will hinder players from displaying good handball play during normal playing time and high playing intensity. The cardiorespiratory ability (VO2Max) of South Sulawesi handball athletes depends on the level of quality of their training.

In displaying handball playing skills such as carrying techniques by bouncing the ball (dribbling), passing and shooting the ball into the goal, athletes will always move. During the game, an athlete will dribble/carry the ball while playing, in addition to displaying a good playing pattern, athletes are required to be able to pass

the ball to friends, and in achieving a victory it is necessary to be able to shoot the ball into the target or goal. In addition, to show a good playing pattern, a player must be able to pass or pass the ball to his friend, and to achieve victory must be able to shoot the ball towards or towards the goal. Players who perform movements with the three techniques directly require cardiorespiratory endurance or VO2Max. For athletes to maximize handball playing skills, they really need the appropriate level of VO2Max when making continuous movements both in the process of attacking and defending.

5 Conclusion

Based on the results of descriptive data analysis, it can be concluded as follows The results of the VO2MAX study using the bleep-test instrument obtained from Makassar City Handball Athletes are in the Less classification with a percentage of (40.93%).

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