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Profile of VO_2 Max Level on South Sulawesi PPLM Athletes

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Abstract--- *This research was descriptive (independent-variable). Population and samples were PPLM athletes of South Sulawesi selected in Non Random Sampling with the technique of saturated samples obtained as many as 15 male and female athletes. Data analysis techniques used descriptive percentage. Based on data analysis results, it can be deduced the condition of the South Sulawesi PPLM athlete rate varies based on the classification for males: very good = 0%, good 2 people = 33.3%, sufficient 4 people = 66.7%, less = 0%, very less = 0% and obtained the score of mean = 49.0333 with standard deviation = 4.10593, variance = 16,859, range = 10.60, minimum = 42.40, and maximum = 53.00. Classification for women: very good = 0%, good 1 person = 11.1%, sufficient 5 people = 55.6%, less 3 people = 33.3%, very less = 0% and obtained with the score mean = 39.2611 with standard deviation = 4.48684, Variance = 20,132, range = 12.95, minimum = 33.25, and maximum = 46.20. Thus the overall extent can be concluded that the VO_2Max level of PPLM athletes of South Sulawesi was dominant in sufficient category.*

Keywords--- *VO_2 Max, PPLM Athlete.*

I. INTRODUCTION

Physical fitness is the ability to complete daily tasks with a energy and a preparedness, with no meaningful fatigue and a relatively sufficient energy for the achievement of the fulfillment of leisure time and unexpected emergencies. One example of an activity done by a trainer for his athletes are physical exercise.

The elements of physical freshness are divided into 2 (two) aspects, first health-related physical freshness includes heart/lung endurance, muscular strength, muscular endurance, flexibility and body composition while the next aspect is physical freshness associated with skills that include speed, explosive power, agility, coordination and reaction speed. One of the most important components is endurance. Endurance the ability of a person to carry out continuous activities that lasts long enough. Strong body resistance and the most important is the energy that can be both aerobic *(VO_2Max*) and anaerobic.

VO_2Max is the maximum O2 volume processed by the human body during intensive activities. This maximal O2 Volume is a level of body capability expressed in liters per minute (ml/kg/min). *VO_2Max* is the maximum capacity to inhale, distribute, and use oxygen (Sharkey, 2003:74). *VO_2Max* can limit a person's cardiovascular capacity, *VO_2max* is regarded as the best indicator of aerobic endurance.

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By measuring the amount of oxygen used during the exercise, we know the amount of oxygen used by the working muscles. The higher the amount of muscle used, the higher the intensity of muscle work.

The aforementioned problems were underlying research at the PPLM Athlete's (Student training Center) South Sulawesi *Vo_2max* level profile on South Sulawesi PPLM athletes.

II. MATERIALS AND METHODS

This method of study was descriptive (independent variable). Population and samples were PPLM athletes of South Sulawesi selected in Non Random Sampling with the technique of saturated samples obtained as many as 15 male and female athletes. Data analysis techniques used descriptive percentage. Research was conducted in the region of South Sulawesi, precisely in Makassar, State University of Makassar (UNM).

Data collected using the results of the test bleep *VO_2Max*. The results of data collection about the ability of athletes into categories was very good, good, sufficient, less, and very less. Then data was analyzed using SPSS program.

III. RESULTS AND DISCUSSION

PPLM Athletes South Sulawesi consisted of 3 (three) sports branches namely Pencak Silat, athletics and Sepak Takraw, the total number of athletes PPLM was 15 people consist of 6 (six) male and 9 (nine) female.

A descriptive result of *VO_2Max* data of the listed athletes of PPLM South Sulawesi can be expressed as follows: The Mean or average score of *VO_2Max* level of the athlete of South Sulawesi PPLM was 49.03, Median or midpoint level *VO_2Max* the PPLM athlete of South Sulawesi if all sorted and divided two equally large, the median number was 50.20, the Mode or score that appears most often was 50.20, Standard Deviation was 4.10. and the variant which was the squared of Standard deviation was 16.85. Use of standard deviation IE to assess the average spread of samples, the *VO_2Max* -level Range of the South Sulawesi PPLM athlete is 10.60. Which was the result of a reduction of the maximum score with a minimum score of 53.00 42.40 = 10.60, Sum or the total amount of data level of the *VO_2Max* athlete PPLM South Sulawesi was 294.20, the level Percentiles *VO_2Max* the South Sulawesi PPLM athlete was 25% The data was below the *VO_2Max* 45.02 level, 50% of data was below *VO_2Max* 50.20 and 75% of data was below the *VO_2Max*52.62 level.

1. Result level VO_2 Max athletes men PPLM South Sulawesi

Results of the frequency of the final data rate *VO_2Max* The Catholic student family of the State University of Makassar can be complete in the appendix, while the summary of the percentage results in the table below.

Table 1: Recapitulation of *VO_2 Max* Levels of Men Athletes PPLM South Sulawesi

No	Interval	Frequency	Percentage	Criteria
1.	57 – 62	0	0	Very good
2.	52 – 56	2	33.3	Good
3.	44 – 51	4	66.7	Sufficient
4.	39 – 43	0	0	Less
5.	<38	0	0	Very Less
Total 6 100				

Source : 2014 Profile

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According to the table above, it can be noted that the percentage of *VO_2Max* rate data with a sample amount of 6 people (100%), who have a very good category of 0 people (0%), a good category of 2 people (33.3%), which was categorized as sufficient as 4 people (66.7%) and the category was less 0 people (0%), as well as none in the category of very less.

A descriptive result of *VO_2Max* data of the listed athletes of PPLM South Sulawesi can be expressed as follows: The Mean or average score of *VO_2Max* level of the athlete of South Sulawesi PPLM was 39.26, Median or midpoint level *VO_2Max* the PPLM athlete of South Sulawesi if all sorted and divided two equally large, the median number was 40.80, the Mode or score that appears most often was 33.25, Standard Deviation was 4.48. And the variant which was the squared of Standard deviation was 20.13. Use of standard deviation IE to assess the average spread of samples, the *VO_2Max* -level Range of the South Sulawesi PPLM athlete was 12.95. Which was the result of a reduction of the maximum score with a minimum score of 46.20 33.25 = 12.95, Sum or the total amount of data level of the *VO_2Max* athlete PPLM South Sulawesi was 353.35, the level of percentiles *VO_2Max* the South Sulawesi PPLM athlete was 25% The data was below the *VO_2Max* 34.12 level, 50% of data was below *VO_2Max* 40.80 and 75% of data was below the *VO_2Max* 42.10 level.

2. Result level VO_2 Max Women Athletes PPLM South Sulawesi

Results of the final data frequency percentage of the *VO_2Max* of the PPLM South Sulawesi athletes can be seen in the appendix, while the summary of the percentage results in the table below.

Table 2: Recapitulation of *VO_2Max* Levels of Women Athletes PPLM South Sulawesi

No	Interval	Frequency	Percentage	Criteria
1.	49 – 53	0	0	Very good
2.	44 – 48	1	11.1	Good
3.	35 – 43	5	55.6	Sufficient
4.	29 – 34	3	33.3	Less
5.	< 28	0	0	Very less
Total 9 100				

Source : 2014 Profile

According to the table above, it can be noted that the percentage of *VO_2Max* rate data with the number of samples as much as 9 People (100%), who have a very good category of 0 people (0%), a good category of 1 person (11.1%), categorized as sufficient as 5 people (55.6%) While the category was less 3 people (33.3%), and there are no categories for very less. Data analysis results about the level of *VO_2Max* athletes PPLM South Sulawesi was categorized simply.

Physical activity in the shortest time and explosive was largely obtained from the anaerobic system (ATP-PC and LA), while the physical activity in the long time energy was seized from the aerobic system. The characteristics of the above system, was the basis that need to be understood in the preparation of training programs for various sports branches.

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The energy used by the body to perform the activity is supplied, but the energy can not be absorbed directly from the food. The energy prepared by the body to perform the activity was ATP, resulting from the breakdown of food. As it was raised by Foss (1998:133) that ATP compounding was produced from the reduction of food eaten.

The ATP energy system (adenosine tri phosphate) that if broken down will be able to produce energy, and its energies can be worn by cells or tissues, including for muscle contraction when exercising. One ATP molecule if broken was estimated to produce an ATP of about 7 to 12 kcal. ATP consists of adenosine and ribose, which bind to three phosphate groups.

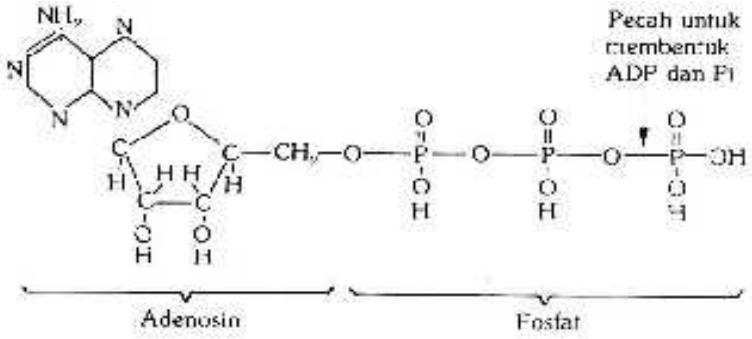

Figure 1: ATP Dimensional Structure

$$ATP + H2O \longrightarrow ADP + Pi + Energy\ 7\text{-}12\ kkal$$

Breaking down ATP can rapidly generate energy because it only requires a single reaction. To break down ATP was required water (H2O), and as the it catalysis (enzyme) was ATP ase. ATP stored in the Muscle contractile section, with not much reserves. In every kilogram of muscle there was 4 6 Mili Mol ATP or according to (Foss, 1998) which states that the ATP deposits were about 4 mmol/kg of muscle. Because the deposits were just as small as the Fox (1993) has stated, if used with maximum intensity (maximum strength/maximum speed/Powermax), ATP will run out in just about one to four seconds. If you want to work with the maximum intensity of longer time, you need to create ATP. The most rapid way of making ATP was to break down the PCr (FOSFO kreatin) which was also available in muscle cells.

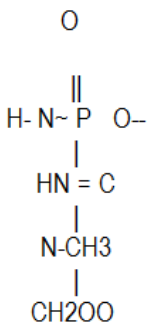

Figure 2: PCr (Fosfo Kreatin) Dimensional Structure

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PCr was a compound that can be used to make ATP if ATP needs were very high, or muscles work with maximum intensity, while the ATP reserves were thinning. PCr was stored in muscle contractile with a limited reserve, which was about 15 17 Mili Mol/kg of muscle (Fox, 1993). Build ATP from PCr as fast as solving ATP so that one can run 100 meters at a constant speed. The energy system that exerted ATP, then continued manufacture (synthesis) of PCr was often called a phospfagen system (ATP-PCr system).

The ready-to-use energy in the body was adenosine tripospat (ATP), which was very limited in number. For the continuous work to be required to ressynthesis ATP through aerobic and anaerobic metabolic processes. The formation of ATP in Aerob is influenced by the respiratory system, cardio-vascular system, oxygen conveyance system (hemoglobin level) and tissue biochemical system. When performing intense physical activity, there was an increase in oxygen demand by the muscles that are working, this oxygen demand was derived from ventilation and oxygen exchange in the lungs. Ventilation is a mechanical process for inserting or removing air from the lungs. One of the parameters used to measure cell functional capacity is the maximum oxygen volume (*VO_2Max*). *VO_2Max* is a measure of how much amount of oxygen the body can be processed to produce energy. It is measured in millimeters of oxygen per kilogram of bodyweight per minute Pamput, 2013).

Regular diet and sleep were not separated from the role to produce an excellent *VO_2Max*. Athletes who have a high *VO_2Max*will have good aerobic endurance. According to M. Sajoto (1995:8). Aerobic Endurance is a whole unit of inseparable physical condition components, both its enhancement and maintenance. This means that in improving the physical condition of all components should be developed even with a priority system according to the circumstances or status required. The advantages of the exercise are the muscles of the synapses from the muscle fibers to become thicker and stronger, increasing muscle size, strength of muscle tone, increased muscle endurance and the number of capillaries, it will cause the blood circulation of the muscles better (Harira, 2013).

IV. CONCLUSION

From the results of the research that has been done, it was obtained that the level of *VO_2Max* athletes PPLM South Sulawesi was a descriptive result of 3 people, only 9 people and less 3 people.

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