Analysis of Technical Performance and Recovery in North Sumatera Wrestling Athletes Long Term Training PON XXI/2024

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Abstract. Wrestling is a sport that aims to improve performance. Achievement can be realized by knowing and preparing thoroughly for good technical performance coupled with a recovery level that quickly returns to normal conditions such as before training or competition. This research aims to determine the technical performance and recovery of North Sumatera wrestling athletes in the Long-Term Regional Training Centre for PON XXI/2024. This research method is a quantitative method with a descriptive method, the aim of the descriptive method is to describe or create a systematic, factual and accurate picture of the facts, characteristics and phenomena studied regarding technical performance and recovery in North Sumatera wrestling athletes for the Long-Term Regional Training Centre PON XXI/2024. The subjects in this research were 18 people taken using total sampling technique. The subject will be given a wrestling technique parameter test and then carry out a pulse test. Next, a pulse test will be carried out again to see the level of quality of recovery or recovery from the origin of the pulse. The instruments in this research were wrestling technique parameter tests and pulse tests. The research results show that wrestling technical performance has a maximum score of 88.30, a minimum of 70.00 with a mean of 79.71. Recovery or recovery of the pulse after 5 minutes, shows a maximum value of 141 times/minute, a minimum of 110 with a mean of 122.05. The conclusion of this research is that there is a significant relationship between the level of wrestling technical performance and the quality of recovery or decrease in an athlete's pulse rate, which is influenced by the technical performance of each athlete. The higher the athlete's level of technical performance, the better the quality of recovery.

Keywords: Performance, Technique, Recovery, Wrestling, Recovery.

1 Introduction

The recovery period is a complex process that aims to restore the body's energy, repair damaged muscle tissue after exercise, and start a process of adapting the body to exercise (Sinaga and Sihombing, 2018). Ratno, et al (2017) stated that recovery aims to restore body functions after

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carrying out high-intensity activities or training to normal conditions. Therefore, effective recovery techniques are needed so that an athlete is able to participate in the next training session well without experiencing fatigue. Proper recovery is an important part that must be considered for an athlete so that the athlete's condition remains in top condition .

Active recovery is a form of physical recovery carried out using light intensity movements, for example jogging and walking (Subrata and Hakim, 2019). According to Fitrianto and Maarif (2020) active recovery is a recovery process by carrying out physical activity but at a light volume and intensity level. Like jogging after high-intensity training or competition.

Meanwhile, according to Afriwardi and Rezky (2008), active recovery is when cessation of exercise or activity occurs slowly by reducing the quality and quantity of activity until the metabolite results are at normal levels. From the statements above, it can be concluded that active recovery is a method of physical recovery using light intensity movements such as jogging or walking which is done after high intensity training or matches

Passive recovery is carried out by not doing any physical activity or complete rest (Spencer et al., 2006)6. According to Afriwardi and Rezky (2008), recovery is said to be passive if activities are stopped immediately without going through a stage of reducing the quality or quantity of activities. This is in line with Sinaga and Sihombing (2018) who say that passive recovery is a form of rest in which one simply remains silent without any physical activity such as remaining still or completely resting (sitting). Passive recovery refers to stopping suddenly after carrying out intensive anaerobic training activities (Parwata, 2015).

The sport of wrestling has existed since ancient times and has become an integral part of human history. Wrestling is also known as the oldest competitive sport in the world, wrestling has appeared in every match since the ancient Olympics. Wrestling is almost the same as judo, where both sports are identical with two people facing each other and trying to overcome their opponent by pulling, pushing, slamming, tackling and locking until the opponent's back is pressed against the mat. There are two styles competed in the sport of wrestling, namely Greek Roman style and Freestyle, as explained by Raiko Petrov (1996:12) that:

Official competitions are organized for the following age groups: 14, 16, 18 and 20, in the following two modern wrestling styles: Free style, allowing to hold the opponent's legs and use one's own legs in performing holds, and Greco-roman style, prohibiting to hold the opponent below the waist and perform holds with one's own legs.

Deka Ismi, et al 2020 Wrestling is an achievement sport which has the characteristic that it is a sport that involves using body parts, trying to bring down the opponent by pulling, pushing, tackling, slamming, pressing, holding, so that the opponent sticks to the mat without breaking the rules which has been specified. Mastery of basic techniques is very important because it determines the overall skill and proficiency of movements in a sport, meaning that a person must be skilled at carrying out several basic technical movements. So, by mastering good basic techniques, an athlete will have a greater chance of achieving an achievement. By mastering basic techniques, for example, a soldier has a lot of ammunition and complete weapons, making it easier to carry out attacks and defenses, and can be more varied in implementing strategies (Hadi, 2004: 16-17)

The pulse is a wave that is felt in the arteries which is caused by the pumping of blood by the heart towards the blood vessels. The pulse can be felt or palpated in arteries that are close to the

surface of the body, such as the temporal artery which is located at the bend of the ankle, the brachial artery which is located in front of the crease of the elbow joint, the radial artery which is located in front of the wrist, and the carotid artery which is located at the level of the wrist. thyroid cartilage. The pulse frequency for normal people is the same as the heart rate. Heart rate can easily be measured by measuring the pulse.

Heart rate is controlled by the central nervous system which receives feedback from sensory receptors located on the walls of blood vessels. An increase in nerve impulses from the brainstem to the sympathetic nerves causes a decrease in the diameter of peripheral blood vessels, increases stroke volume and increases pulse frequency, which plays a very important role in increasing blood pressure. An increase in blood pressure causes an increase in new receptor activity by sending a signal to the brain stem to immediately reduce impulses from the sympathetic nerves.

During physical exercise, the heart rate is largely controlled by a balance between inhibition by the vagus nerve and stimulation of the heart's sympathetic nerves. In a resting state, the sympathetic nerve's influence is more dominant than the vagus nerve. If the autonomic nerves to the heart are blocked, the resting pulse frequency from an average of 70 beats per minute will increase to 100 beats per minute.

It is known that the heart rate increases during physical exercise. This increase is caused by an increase in the need for blood to transport O2 to active parts of the body, a buildup of CO2, an increase in body temperature, a buildup of lactic acid, and a reduction in O2.

If the intensity of exercise is increased, it will be followed by an increase in pulse frequency and conversely a decrease in exercise intensity will be followed by a decrease in pulse frequency. The decrease in pulse frequency occurs linearly in accordance with the Conconi Principle. However, if the intensity of training continues to be increased, the relationship becomes non-linear.

The chronic effect of physical exercise on pulse rate can be seen from the resting pulse frequency. Pulse frequency or also called base pulse is the pulse that is measured in the morning before getting out of bed. This pulse provides information about a person's physical condition. Apart from using pulse frequency, physical condition can also be measured by the time the pulse returns after exercise. The faster the pulse after exercise. The faster the pulse returns to a resting state, the better a person's physical condition and conversely the slower the recovery pulse, the worse the physical condition. It is also stated that resting heart rate decreases as the period of exercise increases.

Physical exercise carried out aerobically for a long time and continuously will cause an increase in heart size, namely an increase in the atrium and ventricle space, especially in the left ventricle. It is stated that aerobic activity with recovery less than once per week will cause thickening of the heart muscle. Thickening of the heart muscle due to continuous physical exercise more than once per week is caused by an increase in heart muscle glycogen.

2 Method

This research was carried out using quantitative descriptive methods, the aim of the descriptive method is to describe or create a systematic, factual and accurate picture of the facts, characteristics and inter-phenomena studied regarding technical performance and recovery in North Sumatra wrestling athletes at the Long-Term Regional Training Center PON XXI/2024. The subjects in this research were 18 people taken using total sampling technique. Subjects will have a pulse test and then be given a test of wrestling technique parameters. Then the subject will carry out a pulse test after testing the parameters of the wrestling technique to see the level of quality of recovery or recovery from the origin of the pulse. The instruments in this research were wrestling technique parameter tests and pulse tests.

Data collection will begin by taking pulse data for each subject. Next, the subject will be given a Wrestling Technique test. Each subject who has completed the Wrestling Technique test will then be given an active recovery time of 5 minutes, then the pulse will be measured again to see the quality of recovery. The design for implementing this research can be seen in the formula (1).

X----------->Y

(1)

Information:

X: Wrestling Technique Performance Test

Y: Measurement of Recovery Quality (pulse) after 5 minutes

The data obtained as individual scores are then processed using statistical procedures to prove whether the hypothesis proposed in this research can be accepted or rejected. Data that has been collected from the pulse results before carrying out the wrestling technique test and the pulse after carrying out the wrestling technique test will be analyzed using the SPSS program.

Data analysis is organizing data. Data obtained from test results of wrestling technique performance and recovery, it can be seen in formula (3) and (4). To see what the average results of the wrestling technique and recovery performance tests are, you need to calculate the mean. It can be seen in formula (2). The mean is a number obtained by dividing the number of values by the number of individuals.

a. Mean = $\frac{\sum X}{N}$ (2)

Information:

M = Mean or average

$\sum x$ = Total number of statement values

N = Number of individuals

b. Standard deviation

$$SD = \frac{\sqrt{\sum(X-X)^2}}{N-1} \quad (3)$$

Information:

SD = standard deviation

X = sample mean

n = number of samples

c. Product Moment

$$r = \frac{n.\sum XY - \sum X.\sum Y}{\{(N.\sum X^2 - (\sum X)^2)(N.\sum Y^2 - (\sum Y)^2)\}} \quad (4)$$

r = Pearson product moment correlation coefficient

N = number of respondents

X = variable X score

Y = variable Y score

3 Result and Discussion

Table 1. Statistical Description Table

	Teknik	Recovery
N	18	18
Mean	79.7167	122.0556
Std. Deviation	5.17849	8.96052
Minimun	70.00	110.00
Maximum	88.30	141.00

Based on the statistical description table above, it shows the minimum value, maximum value, average and standard deviation of technical performance and recovery quality of long-term regional training wrestling athletes for PON XXI/2024. In the table above the technical performance variable has a mean value of 79.7167 and a standard deviation of 5.17849. The recovery variable has a mean value of 122.0556 and a standard deviation of 8.96052. This means that the mean is greater than the standard deviation, thus indicating that it has very good results. Because standard deviation is a reflection of deviation.

Table 2. Statistical Correlation Table

		TEKNIK	RECOVERY
Pearson correlation	TEKNIK	1.000	-865
	RECOVERY	-865	1.000
Sig. (1-tailed)	TEKNIK	.	.000
	RECOVERY	.000	.
N	TEKNIK	18	18
	RECOVERY	18	18

Source: Output SPSS 25

Based on the table above, a relationship is not equal to 0, which means there is a very strong relationship. From the Pearson correlation above, it was found that the wrestler's performance technique was related to a recovery rate of -0.865 (r = -0.865).

The next interpretation is to review the relationship between two variables based on the numbers produced from calculations with the provisions above. This interpretation will show whether the two variables have a significant relationship or not.

For the significance test, the significance level (α) is 0.01 or 99%. The level of testing criteria:

a. If the significance level < α, then h0 is rejected and h1 is accepted

b. If the significance level is > α, then h0 is accepted and h1 is rejected

Where h0 indicates the null hypothesis which represents that there is no relationship between the wrestler's performance technique and the level of recovery and H1 or the working hypothesis represents that there is a significant relationship between the performance technique and the recovery level of the XXI/2024 PON wrestling athletes.

From the calculation results, a significance value of 0.000 is obtained, which means it is less than the significance level or α (0.000 < 0.01), so the working hypothesis h0 is rejected and h1 is accepted. This means that there is a significant relationship between performance techniques in PON XXI/2024 wrestling athletes and the level of recovery.

According to Arikunto (2010), a negative result (-) means that this indicates an inverse correlation or opposite direction. This means that the higher the performance technique of PON XXI/2024 wrestling athletes, the less time it takes to recover from maximum point to normal again.

4 Conclusion

Based on the results of research from the analysis of performance techniques and the recovery level of PON XXI/2024 wrestling athletes, the following conclusions can be obtained, from the results of the performance technique test for PON XXI/2024 wrestling athletes, totaling 18 athletes, there were 11 athletes or 61.1% who had good performance techniques and 7 athletes

or 38.8% who had moderate performance techniques. From the recovery test results of PON XXI/2024 wrestling athletes, totaling 18 athletes, there were 11 athletes or 61.1% who had a stable pulse after recovery, there were 3 athletes or 16.6% who had a high pulse after recovery and there were 4 athletes or 22.2% had a moderate pulse after recovery. There is a significant relationship between performance techniques and the recovery level of PON XXI/2024 wrestling athletes. This means that the higher the performance technique of PON XXI/2024 wrestling athletes, the less time it takes to recover from maximum point to normal again.

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