

Relationship between Aerobic Endurance and Movement Coordination with Single Kick Skills

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Abstract

This study used a correlational approach, aiming to see the relationship between aerobic endurance and movement coordination with the single kick skills of pencak silat athletes. The population of the study were Indonesian young warrior martial arts (SMI) athletes in Pariaman City, totaling 20 people (17 boys and 3 girls). The sample was determined only by male athletes 17 people, with purposive sampling technique. To measure the aerobic endurance variable, the bleep test instrument was used, to measure the movement coordination variable, the soccer wall volley test instrument was used and the single kick skill variable was measured through a single kick skill test by the judges.

The data analysis technique uses product moment correlation analysis from Pearson with $\alpha=0.05$. The results of the study: (1) There is a significant relationship between aerobic endurance and single kick skills of young Indonesian martial arts athletes (SMI) Kota Pariaman, ($t_h=2.29 > t_t=1.75$). (2) There is a significant relationship between movement coordination and single kick skills of Indonesian young warrior pencak silat athletes (SMI) Kota Pariaman, ($t_h=2.48 > t_t=1.75$). (3) There is a significant relationship between aerobic endurance and movement coordination together with the single kick skills of young Indonesian martial arts athletes (SMI) Kota Pariaman, ($F_h=8.23 > F_t=3.74$).

Keywords: Aerobic Endurance, Movement Coordination, Single Kick, Pencak Silat

1. Introduction

Sport is an important and strategic element in the nation and state development process. National development is an effort carried out by the Indonesian nation with the aim of realizing a society that is advanced and independent as well as physically and mentally prosperous, which is directed at achieving a just and prosperous society [1].

According to the 2008 UNP Pencak Silat Team [2] the single category is a category of pencak silat matches [3] in which a fighter [4] demonstrates his skills in a single standard move correctly, precisely

and firmly, full of enthusiasm, with bare hands and armed and according to the rules and regulations, applicable.

Where we know that a single move is a complex form of skill consisting of various kinds of movements and moves, both bare hands and weapons that have been standardized in IPSI. Single kick is a form of complex skills [5], [6] consisting of various kinds of moves and moves. The purpose of the single jutsu is to standardize the basic technical movements and to display the cultural values contained in pencak silat [7], [8], where each region or country has its own characteristics. The single kick itself consists of several series of moves totaling 100 movements which must be performed for 3 (three) minutes according to the stipulated conditions. In a standard single moment, there are seven empty-hand moves, three machete moves, and four stick weapon moves with a three-minute performance time. From the beginning of the gong to the sound of the final gong, the fighter must perform a series of movements in accordance with the provisions of [9].

Aerobic endurance is a biometric component that is needed in physical activity and an important component in single kick skills. Single kicks are performed for quite a long time and with lots of movements, so single kick movements must be performed with high intensity, so good aerobic endurance is needed to slow down the occurrence of fatigue.

In a single stance coordination of motion is also needed, because the athlete must make successive movements in the shortest possible time without experiencing body balance disturbances. Movement coordination is needed when moving from one stance to another in order to be able to carry out well-coordinated movements.

Based on the explanation above, it is very much related to the single-defence athlete of the Indonesian young warrior martial arts (SMI). That single kick athletes are often tired or tired when performing single kicks within 3 (three) minutes so that the movements are not well coordinated or lose

balance, all of which are caused by a lack of endurance and good coordination of motion in single kick athletes [10], [11] research and see whether there is a relationship between aerobic endurance [12] and movement coordination with the single kick skills of young Indonesian martial arts athletes (SMI) Kota Pariaman.

Single move

According to Lubis [5] "A single move is a form of complex skill consisting of various kinds of movements and moves, both empty hands and weapons". In the rule book it is stated that: single category is pencak silat which displays a silat demonstrating his skills in a single standard stance correctly, precisely, and steadily, full of soul with bare hands and armed. Meanwhile, in single moves, the standard moves consist of 7 empty-hand moves, 3 machete moves, 4 stick moves, with a performance time of 3 minutes.

Aerobic Endurance

According to Boompa [13], [14] stated that aerobic endurance is a person's ability to do work in an aerobic atmosphere. This means that a person's ability to do sports activities in more than 2 minutes without significant fatigue. From this definition, this is very closely related to the single moment of pencak silat, because in demonstrating the movement of the single moment of pencak silat it takes 3 minutes [15].

Aerobic endurance is the ability to absorb maximum oxygen indicating the amount of oxygen (in liters or milliliters/kg body weight/minute). Endurance is measured using the Bleep test [16].

Irawadi [9] suggests several factors that affect endurance, including:

Central Nervous System (SPS)

The central nervous system is a source of controlling activities through the role given by the nerves. The better the role of the central nervous system in carrying out or coordinating orders for an activity, the better the results of the movements should be, and vice versa.

Power struggle

In training or competing, it is not uncommon for an athlete to feel unbelievably tired or tired, hot weather, pouring rain, and so on. To overcome this problem requires high enthusiasm and will.

Aerobic Capacity

Aerobic capacity is defined as the ability of the respiratory system. It is understood that the energy required for an activity comes from the breakdown of ATP-PC on the one hand, and the results of combustion through oxygen (O₂) on the other [17], [18].

Anaerobic Capacity

Anaerobic capacity is defined as the body's ability to produce energy through the anaerobic system (breakdown of ATP-PC) or without oxygen.

Movement Coordination

According to Kiram's hang out "Movement coordination is a reciprocal relationship between the central nervous system and the locomotors in regulating and controlling the input of energy and muscle work as well as the motor processes that occur for the execution

of movements".

According to Kiram (2000: 86) the notion of motion coordination is seen from several points of view:

1. Movement coordination seen from a physiological point of view.

Coordination is the regulation of motor processes, especially the work of the muscles which are regulated through the nervous system or known as intra-muscular coordination. The conclusion that we can draw from the definition above is that the coordination of motion includes the coordination of the work of the muscles regulated in such a way by the central nervous system.

2. Movement coordination from a biomechanical point of view.

Movement coordination [19] is the adjustment between the giving of force impulses to a muscle or group of muscles with the needs of each motion execution. From the above point of view, it can be concluded that movement coordination is a reciprocal relationship between the central nervous system and the locomotors [20] in regulating and controlling energy impulses and muscle work and motor processes that occur for the execution of movements.

In demonstrating single moves [21], not only the soul but every movement of the jutsu must be done well and must be powerful so that each of these movements looks agile, powerful and harmonious and steady.

Coordination is influenced by several factors including:

1. Thinking

Athletes with extraordinary abilities can not only display excellent and superior skills or extraordinary biomotor abilities, but also with thoughts and ways of solving complex problems as well as motor problems and tactics that arise suddenly.

2. Proficiency and accuracy of the five senses.

The better the function of the five senses, the better the response of each element of movement, such as nerves and muscles, which are responsible for carrying out the movement. In the end will improve the coordination of motion.

3. Motor experience

The more trained the motor is in carrying out certain movements, the easier it will be for it to perform these movements.

4. Biomotor ability

The better the biomotor abilities such as strength, endurance and flexibility, the better the coordination of movements will usually be.

From various opinions regarding the notion of movement coordination, we can conclude that coordination is the ability to complete motor tasks quickly and in a directed manner determined by the processes of controlling and regulating movement as well as the cooperation of the central nervous system. Coordination of motion is a reciprocal relationship between the central nervous system and the organ of movement in regulating.

2. Materials and Methods

Based on what has been stated, this study aims to determine how much the relationship between aerobic endurance and movement coordination has to do with single kick skills [22]. So in this study aerobic endurance and movement coordination as independent variables will be the main influence on single kick skills. Meanwhile, the dependent variable is the single kick skills of the Indonesian young warrior pencak silat athletes (SMI). For more details, the framework of thinking in this study can be described in the following scheme:

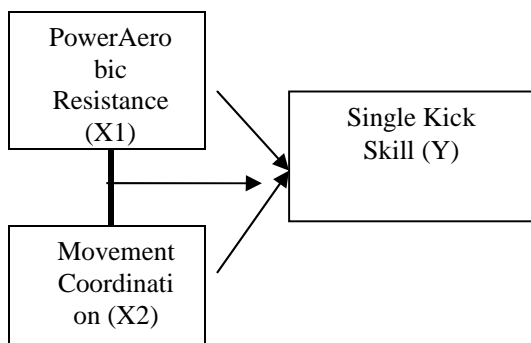


Figure 1. Conceptual framework chart

The type of research used is correlational research. The population in this study were single-stroke athletes of the Indonesian young warrior martial arts (SMI) in the city of Pariaman. Based on information obtained from the secretariat of the young Indonesian warrior martial arts, Pariaman City, there were 20 single athlete athletes (17 boys and 3 girls). Where the sample used was only 17 male athletes. The data analysis used in this research is statistical analysis. According to [23] the data obtained from the three tests were analyzed using simple correlation and multiple correlation techniques.

3. Results and Discussion

Aerobic Endurance

Based on the results of measuring the aerobic endurance variable using the bleep test instrument [24], various scores were obtained from the testees or research samples. Maximum score = 45.5 and minimum score = 29.9 mean score (mean) = 37.3 and standard deviation = 5.3.

Movement Coordination (X2)

Based on the results of the measurement of the movement coordination variable [25], various scores were obtained from the testees or research samples. Maximum score = 14 points and minimum score = 8 points, average score (mean) = 11.2 points and standard deviation = 1.9 points.

Single move

Based on the results of the measurement of the single kick skill variable of the Indonesian young warrior pencak silat athletes (SMI) Kota Pariaman conducted by the judges, various scores or values were obtained for each athlete. The difference in the acquisition of scores or values can be described in the frequency distribution table and histogram images. From the existing scores or values, a maximum score = 248 and a minimum score = 236, an

average score (mean) = 241.3 and a standard deviation = 3.9.

Table 1. Test Data Analysis Requirements

Variable	Lh	Lt	Ket
Aerobic Endurance	0.1163	0.2060	Normal
Movement Coordination	0.2030	0.2060	Normal

It is the same as the skill of the single kick of the young Indonesian warrior martial arts athlete (SMI) Kota Pariaman (Y). After carrying out a multiple correlation analysis, based on the data analysis that has been carried out, the results show that the three research hypotheses can be accepted empirically. The conclusion is, there is a significant relationship between aerobic endurance and movement coordination together with the single kick skills of young Indonesian martial arts athletes (SMI) Kota Pariaman.

4. Conclusion

Based on the data analysis, it can be concluded that there is a significant relationship between aerobic endurance and single kick skills of young Indonesian martial arts athletes[26] (SMI) Kota Pariaman, ($t_h = 2.29 > t_t = 1.75$).

From the data analysis, it was found that the correlation coefficient was calculated/ $R_h = 0.735 > r_t = 0.482$ and the coefficient of significance test was calculated/ $F_h = 8.23 > F_t = 3.74$.

Kick Skills Single	0.1587	0.2060	Normal
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Before the hypothesis testing analysis is carried out, the data analysis requirements test is first carried out, namely the data normality test. The data normality test was carried out using the Lilliefors test, with a significance level of $\alpha = 0.05$. The following shows a summary of the results of the normality test of the data.

Hypothesis testing

In this study, there are three research hypotheses that require empirical testing, including:

The hypothesis put forward is that there is a relationship between aerobic endurance (X1) and single kick skills of young Indonesian martial arts athletes (SMI) Kota Pariaman (Y). After analyzing the data on these two variables, the results show that there is a significant relationship between aerobic endurance and the single kick skills of Indonesian young warrior martial arts athletes (SMI) Kota Pariaman. From the data analysis, it was found that the correlation coefficient arithmetic/ $r_h = 0.510 > r_t = 0.482$ and the coefficient of significance test arithmetic/ $y_r = 2.29 > t_t = 1.75$. Based on these results, it can be interpreted that between aerobic endurance and single kick skills of Indonesian young warrior martial arts (SMI) athletes in Pariaman City there is a significant correlation.

The second hypothesis proposed is that there is a relationship between movement coordination (X2) and the single kick skills of young Indonesian martial arts

athletes (SMI) Kota Pariaman (Y). After analyzing the data on the two variables, the results obtained showed that there was a significant relationship between movement coordination and single kick skills of Indonesian young warrior martial arts athletes (SMI) Kota Pariaman. From the data analysis, it was found that the correlation coefficient arithmetic/rh=0.539 > rt=0.482 and the significance test coefficient arithmetic/yr= 2.48 > tt= 1.75. Based on this, it can be interpreted that there is a significant correlation between the coordination of movements and the skills of single moves of Indonesian young warrior martial arts (SMI) athletes in Pariaman City and the truth can be proven empirically.

The third hypothesis proposed, there is a significant relationship between aerobic endurance (X) and movement coordination (X) together, there is a significant relationship between movement coordination and single kick skills of young Indonesian martial arts athletes (SMI) Kota Pariaman, ($t_h = 2.48 > t_t = 1.75$).

There is a significant relationship between aerobic endurance and movement coordination together with the single kick skills of young Indonesian martial arts athletes (SMI) Kota Pariaman, ($F_h = 8.23 > F_t = 3.74$).

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