

Analysis Of Physical Components in Wrestling Freestyle

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Abstract The purpose of this study was to determine the effect of arm power, agility and eye-hand and foot coordination in performing arm slamming skills in wrestling athletes in West Java Province. The population that was reached in this study were all wrestling athletes in the West Java area, which consisted of 30 freestyle wrestling athletes. Determination of the sample using a saturated sample, meaning that the entire affordable population is used as a research sample. The data analysis technique used is descriptive analysis and path analysis with the help of SPSS version 21 computer program with a significant level of 95% or $\alpha = 0.05$. The results showed that: The direct effect given by the arm power variable (X_1) on the eye, hand and foot coordination variable (X_3) was -0.414. Then the direct effect given by the agility variable (X_2) on the eye, hand and foot coordination variable (X_3) is -0.357. Then the direct effect given by the arm power variable (X_1) on the arm swing skill variable (Y) is 0.546. Then the direct effect given by the agility variable (X_2) on the arm swing skill variable (Y) is 0.638. And lastly, the direct effect given by the eye, hand and foot coordination variable (X_3) on the arm slamming skill variable (Y) is 0.351. Sobel test calculations (Sobel Test) obtained that the value of one-tailed probability (One-tailed probability) of 0.029 < 0.05 . So it can be concluded that the arm power variable (X_1) has an indirect effect through eye coordination, hands and feet (X_3) against arm slam skills (Y). Then the results of the Sobel test calculation (Sobel Test) obtained that the one-tailed probability value is 0.0730 > 0.05 . So it can be concluded that the agility variable (X_2) has no indirect effect through eye, hand and foot coordination (X_3) on arm slamming skills (Y).

Keywords: Arm Power, Agility, Eye, Hand and Foot Coordination, Arm Kick Skills, Wrestling



INTRODUCTION

Martial arts in Indonesia are very diverse, one of which is wrestling, which is quite developed in Indonesia. (Septian et al., 2020) argues that Wrestling is a physical contact sport between two people, in which one of the wrestlers must take down or control their enemy. In wrestling matches there are several skills that are often used by freestyle or Greek-roman athletes that are used to knock down opponents or create a point. Freestyle wrestling or freestyle wrestling which in the rules of the match a wrestler is allowed to use his entire body to carry out attacks such as arm slams, waist slams, head slams, foot catches, locks and tackles.

Freestyle wrestlers have several skills that often fail to do during matches, namely arm slamming skills. According to (Sembiring et al., 2018) said "the arm slam technique is that wrestlers face each other in a standing position, wrestlers rotate in front of the opponent when the wrestler has control of the opponent, both of the wrestler's knees are bent and the right shoulder is under the opponent and is ready to make a lift to knock the opponent down and onto the mat." In

the rules of wrestling matches, when a player makes a perfect throw attack, he will get four points and if the throw is not perfect then the player gets two points. In contrast to a wrestling player when he fails to do an arm slam, it is considered no point or not getting points.

Based on these problems, the authors analyze several physical components that have direct and indirect effects when doing wrestling arm slams. According to (Arjuna, 2019) There are several basic physical components which include: (1) strength, (2) muscle endurance (3) speed (4) agility (5) flexibility (6) power and (6) basic endurance (cardiovascular). The physical components studied are arm power, agility and eye-hand-foot coordination which have a direct or indirect influence on the freestyle wrestling athlete's arm throw skills.

Wrestling is a sport that is dominant in slamming its opponent to get points and some people argue that wrestling uses power as the main weapon. Power is one of the components of physical condition that

is needed by almost all sports to achieve maximum performance.

Power is one of the most important biomotor components for an athlete, especially in the context that we speak today, which is wrestling. According to (Margono et al., 2018) Power is the ability of a person's muscles to do a job with maximum strength in the fastest time. Power will appear if the two conditions are maximum strength and are carried out as quickly as possible, so when a wrestler performs an arm slam skill, it must be done quickly. In addition to avoiding counter attacks from the opponent, this movement will cause a hard slam against the opponent.

Opinions about power expressed by (Suharti, 2020) which mentions self-strength is the ability of muscles to generate tension against a resistance. When performing arm swings, the opponent's load becomes a resistance which causes the wrestler to respond to the muscles to generate tension. Thus, it can be concluded that power is the ability to withstand loads that are carried out with maximum muscle contraction and carried out quickly in a motion.

The physical component that is analyzed apart from arm power is agility. Agility is one of the physical components needed for sports achievements that are used to support skills or techniques during training or matches so that they are maximal and in accordance with the needs of certain sports achievements. Some skills in the sport of wrestling require agility that aims to maximize the skills performed.

According to (Rizkiyanto et al., 2018) says Agility is one component of motoric freshness that is necessary for all activities that require the speed of changes in body position. Agility is one of the components of motor freshness that is needed for all activities that require the speed of changing body position. When doing arm slams, it is necessary to change the direction of the body from the initial position facing the opponent to the position with your back to the opponent. The speed with which the body changes direction is necessary for the perfection of the movement and the success of the wrestler in performing the arm slam.

According to Widiastuti quoted from (Al Farisi, 2018) agility is the ability to change the direction or position of the body quickly done

together with others. Agility is the ability to change the direction or position of the body quickly done together with other people. Others in the context of this study are the sparring or training opponents of freestyle wrestlers. From some of the opinions above, it can be concluded that Agility is the ability to change direction quickly with other movements without disturbing the balance of the body when performing certain movements.

Another physical component required in performing arm swing skills is coordination. According to (Edy et al., 2020) Coordination is the combination of the functions of several muscles in a precise and balanced manner into a single movement pattern. The coordination referred to in this arm slam skill is the coordination between the eyes, hands and feet. The eyes are used to see the position of the opponent's arm and the distance between the wrestler and the opponent, the hands are used to catch the opponent's arm and the legs are used to change the direction of the wrestler's body. Other opinions expressed (Ikbal, 2019) which says that coordination is a person's ability to combine several

elements of motion into one movement that is in harmony with its purpose.

According to Bompa quoted in the journal (Ramli, 2020) Factors that influence this coordination component are: 1) Intelligence, 2) Sensitivity of sensory organs, 3) Motor experience, 4) Level of development of biomotor abilities. Each athlete has a different level of movement coordination, ranging from easy, simple to complex, regulated and ordered from the central nervous system that has been stored in memory in advance. So to be able to carry out correct coordination movements, it is also necessary to coordinate the nervous system which includes the central nervous system and the peripheral nervous system with muscles, bones and joints. The terms of the motion component in the coordination that are conveyed (Margono et al., 2018) (Margono et al., 2018) is "motion that consists of energy, contraction of muscles, nerves, bones and joints is neuromuscular coordination. Based on the above understanding, it can be concluded that eye, hand and foot coordination is the ability to display motion between the three organs of motion, namely the organs of vision, limbs from elbows to

fingertips and limbs used to move or move in a series of movements that can adapt to certain skills.

METHOD

The research method used in this study is a quantitative method with measurements and tests, while the analysis technique uses a path analysis approach, namely research that will examine or analyze the relationship between research variables and measure the direct and indirect effects of one variable on the other variables.

According to Land (Caraka & Sugiarto, 2017) explained that Path Analysis is a technique to analyze causal relationships that occur in multiple regression if the independent variables affect the dependent variable not only directly but also indirectly.

Population This study uses a total sampling technique or all of the population is sampled. In order for the data to be generalized, it is necessary to have the same characteristics, namely to be registered as wrestling athletes in every area of West Java 2020. The samples taken were 30 wrestling athletes in the Bekasi City, Bekasi Regency, Karawang Regency and Bandung City areas.. The variables used consist of three independent variables

and one dependent variable. The independent variables consist of arm power (X_1), agility (X_2), and eye, hand and foot coordination (X_3) and arm slam skills as (Y).

The research instrument used in this study uses a new instrument that has been tested for validity with expert judgment from one expert in wrestling and two experts in sports tests and measurements. The four instruments have been tested for reliability with reliable results from the results of the test and retest instrument.

The first instrument is the Rope Power Gauge to measure arm power with the WH C-100 component as a digital indicator. The operation is done by sitting with both legs straight and both arms pulling the rope on the device quickly and firmly.

The second instrument is One Rope Back Steep to measure agility. This instrument uses a rope that is tied to a pole, then the wrestler performs a reverse movement and both hands grab the rope like the position of catching the opponent's arm. This agility instrument is performed for 30 seconds.

The third instrument is the Visual Display Coordination Test to measure hand and foot eye

coordination. This instrument uses a tool made using lights and buttons that are used for touch and footing. 20 video slideshows stimulate the wrestlers to touch and step according to the colors that appear.

The last instrument is the half pie slap test to measure arm swing skills. Each wrestler performs one slam towards the mat that has been marked, namely the shape of a half circle which is divided into three parts. The slam of the arm that is carried out is the slam of the right arm. The points obtained if the model falls in the middle will get 3 points, 2 points for the right side and 1 points for the left side.

RESULTS AND DISCUSSION

1. Descriptive Data

Descriptions of variables in descriptive statistics used in this study include the minimum, maximum, mean and standard deviation of the research variables. Descriptive statistics describe the character of the sample used in this study. The complete descriptive statistics in this study are shown in table 1 below:

Table 1.
Descriptive statistics of research variables

Descriptive Statistics

	N	Minimum	Maximum	mean	Std. Deviation
X1	30	20.75	53.50	38.3033	8.41468
X2	30	13	26	19.23	2,635
X3	30	12	20	15.53	2,515
Y	30	1	3	2.50	.572
Valid N (listwise)	30				

The data used in this study amounted to 30 samples. Based on table 1, it is obtained that the variable *power* arm (X₁) the lowest value is 20.75 and the highest is 53.50. As for the average *power* arm of 38.3033 with a standard deviation of 8.41468. On variable agility (X₂) the lowest value is 13 and the highest is 26. The average agility of 19.23 with a standard deviation of 2.635. On variable eye, hand and foot coordination (X₃) the lowest value is 12 and the highest is 20. The average eye, hand and foot coordination of 15.53 with a standard deviation of 2.515. And on the variable arm slam skill (Y) the lowest value is 1 and the highest is 3. The average is arm slam skill of 2.50 with a standard deviation of 0.572.

2. Testing Requirements Analysis

Table 2.
Kolmogorov smirnov . test results

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		30
Normal Parameters, b	mean	.00
		00000
	Std. Deviation	.43
		380024

Most Extreme Differences	Absolute	.10
	Positive	.10
	negative	.077
Test Statistics		.10
asymp. Sig. (2-tailed)		.20
		0c,d

Based on the Kolmogorov Smirnov test above, it is found that the value of Asymp Sig value. (0.200) is greater than (0.05) so it can be concluded that the model used is normally distributed.

As for the homogeneity test, it is as follows.

Table 3.

Homogeneity test results

Coefficientsa

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1 (Constant)	.870	.711			1.223	.232
X1	-.004	.006	-.136		-.640	.528
X2	-.023	.019	-.254		-1.223	.232
X3	.005	.021	.056		.260	.797

a. Dependent Variable: Reabs

Based on table 3 the homogeneity test was obtained that the variable *power arm* (X₁), agility (X₂), and eye, hand and foot coordination (X₃) has a value of Sig. greater than 0.05 so it can be concluded that the independent variables in the model do not experience symptoms of heteroscedasticity or homogeneous variables.

3. Hypothesis test

The t-test in this study aims to test whether or not the relationship

between the independent variables is significant *power arm* (X₁) and agility (X₂) with dependent variable eye hand and foot coordination (X₃). The results of the t-test in this study can be seen in table 4 below :

Table 4.

Partial test results (t test) equation 1

Coefficientsa

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1 (Constant)	26,824	4.123			.506	.000
X1	-.124	.052	-.414		2.394	.024
X2	-.340	.165	-.357		2.062	.049

a. Dependent Variable: X3

Based on table 4. the results of the t-test in this study can be explained as follows:

1) Variable *power arm* (X₁)

On variable *power arm* (X₁) with a significance level of 95 % (α = 0.05). The significance number (P Value) is 0.024 < 0.05. On the basis of this comparison, then H₀ is rejected or means that the variable *power arm* has a significant effect on the variable eye, hand and foot coordination (X₃).

2) Variable agility (X₂)

On variable agility (X₂) with a significance level of 95% (α = 0.05).

The significance number (P Value) is $0.049 < 0.05$. On the basis of this comparison, then H_0 is rejected or means that the variable agility has a significant effect on the variable eye, hand and foot coordination (X_3).

Table 5.

Partial test results (t test) equation 2

Model	Coefficients ^a				
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-2.825	1.325		-2.132	.043
X1	.037	.011	.546	3.249	.003
X2	.139	.036	.638	3.887	.001
X3	.080	.039	.351	2.067	.049

a. Dependent Variable: Y

Based on table 5 the results of the t-test in this study can be explained as follows:

1) Variable *power* arm (X_1)

On variable *power* arm (X_1) with a significance level of 95 % ($\alpha = 0.05$). The significance number (P Value) is $0.003 < 0.05$. On the basis of this comparison, then H_0 is rejected or means that the variable *power* arm has a significant effect on the variable arm slam skill (Y).

2) Variable agility (X_2)

On variable agility(X_2) with a significance level of 95 % ($\alpha = 0.05$). The significance number (P Value) is $0.001 < 0.05$. On the basis of this

comparison, then H_0 is rejected or means that the variable agility has a significant effect on the variable arm slam skill (Y).

3) Variable eye, hand and foot coordination (X_3)

On variable eye, hand and foot coordination(X_3) with a significance level of 95% ($\alpha = 0.05$). The significance number (P Value) is $0.049 < 0.05$. On the basis of this comparison, then H_0 is rejected or means that the variable eye, hand and foot coordination has a significant effect on the variable arm slam skill (Y).

Path Analysis

The path diagram model is made based on the variables studied, meanwhile for the value of e_1 can be searched with the formula $e_1 = \sqrt{(1 - 0,233)} = 0.876$ while the value of $e_2 = = 0.758 \sqrt{(1 - 0,426)}$ in this study can be described as follows:

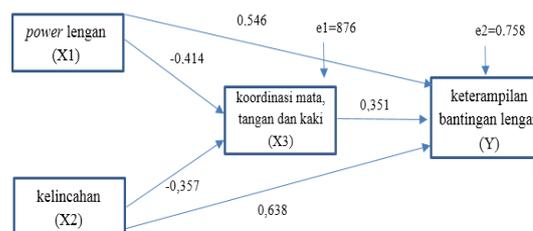


Figure 1. Path chart

a) Direct Effect

The effect of X1, X2 on X3 and of X3 on Y, or more simply is presented as follows.

$$DE_{X_3X_1} \quad X_1 \longrightarrow X_3; P_{X_3X_1} = -0.414$$

$$DE_{X_3X_2} \quad X_2 \longrightarrow X_3; P_{X_3X_2} = -0.357$$

$$DE_{YX_1} \quad X_1 \longrightarrow Y; P_{YX_1} = 0.546$$

$$DE_{YX_2} \quad X_2 \longrightarrow Y; P_{YX_2} = 0.638$$

$$DE_{YX_3} \quad X_3 \longrightarrow Y; P_{YX_3} = 0.351$$

The direct effect given by the variable *power arm* (X₁) to variable *eye, hand and foot coordination* (X₃) which is equal to -0.414. Then the direct effect given by the variable *agility* (X₂) to the variable *eye, hand and foot coordination* (X₃) which is -0.357. Then the direct effect given by the variable *power arm* (X₁) to variable *arm slam skill* (Y) that is equal to 0.546. Then the direct effect given by the variable *agility* (X₂) to the variable *arm slam skill* (Y) that is equal to 0.638. And lastly, the direct influence given by the variable *eye, hand and foot coordination* (X₃) to variable *arm slam skill* (Y) that is equal to 0.351. Based on the results of the above calculations, it can be concluded that the greatest direct influence is given to the influence of the variable *agility* (X₂) to the variable *arm slam skill* (Y).

b) Indirect Effect (Indirect Effect)

The indirect effect is from X1 to X₃ through Y and from X₂ to X₃ through Y or more simply as follows.

$$IE_{YX_3X_1} : X_1 \longrightarrow X_3 \longrightarrow Y ; P_{X_3X_1} \cdot$$

$$P_{YX_3} = (-0.414) \cdot (0.351) = -0.145$$

$$IE_{YX_3X_2} : X_2 \longrightarrow X_3 \longrightarrow Y ; P_{X_3X_2} \cdot$$

$$P_{YX_3} = (-0.357) \cdot (0.351) = -0.125$$

Indirect effect given by variable *power arm* (X₁) to variable *arm slam skill* (Y) i.e. via variable *eye, hand and foot coordination* (X₃) which is -0.145. While the indirect effect given by the variable *agility* (X₂) to the variable *arm slam skill* (Y) i.e. via variable *eye, hand and foot coordination* (X₃) which is -0.125. Based on the results of the above calculations, it can be concluded that the largest indirect effect is given to the influence of the variable *agility* (X₂) to the variable *arm slam skill* (Y) i.e. via variable *eye, hand and foot coordination* (X₃).

c) Total Effect (Total Effect)

The Total Effect is the sum of DE and IE (DE + IE) as follows.

$$TE_{11} = DE_{YX_1} + IE_{YX_3X_1}$$

$$(0.546) + (-0.145) = 0.401$$

$$TE_{12} = DE_{YX_2} + IE_{YX_3X_2}$$

$$(0.638) + (-0.125) = 0.513$$

$$TE_{21} = DE_{YX_3} = 0.351$$

The total effect given by the variable *power arm* (X₁) to variable *arm*

slam skill (Y) that is equal to 0.401. While the total effect given by the variable agility (X_2) against arm slam skill (Y) that is equal to 0.513. And finally the total effect given by the variable eye, hand and foot coordination (X_3) against arm slam skill (Y) that is equal to 0.351. Based on the results of the above calculations, it can be concluded that the largest total effect is given to the influence of the variable agility (X_2) against arm slam skill (Y).

CONCLUSION

1. There is a direct influence between arm power (X_1) on hand-eye coordination (X_3) freestyle wrestling athletes. Based on the significance number (P Value) that is equal to $0.024 < 0.05$. This means that wrestling athletes need power when coordinating hand-eye coordination in performing arm slamming skills.
2. There is a direct influence between agility (X_2) on hand-eye coordination (X_3) for freestyle wrestling athletes. Based on the significance number (P Value) of $0.049 < 0.05$. This means that wrestling athletes need agility when coordinating hand-eye coordination in performing arm slamming skills.
3. There is a direct influence between arm power (X_1) on arm slamming skills (Y) of freestyle wrestling athletes. Based on the significance number (P Value) of $0.003 < 0.05$. This means that wrestling athletes need good arm power when performing arm throw skills. Arm power is needed to pull the opponent's arm so that the opponent can be slammed perfectly in order to get the perfect points.
4. There is a direct influence between agility (X_2) on arm slamming skills (Y). Based on the significance number (P Value) of $0.001 < 0.05$. This means that wrestling athletes need good agility in performing arm swing skills. Agility is used when making a rotation of the body that aims to turn its back to the opponent's body.
5. There is a direct influence between hand and foot eye coordination (X_3) on arm slamming skills. Based on the significance number (P Value) of $0.049 < 0.05$. This means that wrestling athletes need good eye-hand and foot coordination to perform arm swing skills.

Coordination is used to align the hand movements to grab the opponent's arm and slam, followed by foot movements in which the position of the two movements is followed by eye coordination to see the accuracy of the target movement.

6. The results of the calculation of the Sobel test (Sobel Test) obtained that the one-tailed probability value is $0.029 < 0.05$. So it can be concluded that the arm power variable (X_1) has an indirect effect through eye, hand and foot coordination (X_3) on arm slamming skills (Y). Because arm power is maximized by athletes, they do not have to use good coordination to perform arm swing skills.
7. The results of the calculation of the Sobel test (Sobel Test) obtained that the one-tailed probability value is $0.073 > 0.05$. So it can be concluded that the agility variable (X_2) has no indirect effect through eye, hand and foot coordination (X_3) on arm slamming skills (Y). Because the agility of a freestyle wrestling athlete when performing arm slam skills does not have to be with good coordination.

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