

The Correlation between Leg Muscle Power and Shooting Ability At Barona's SSB (Football Academy) From The Age Of 13 To 15 In Banda Aceh

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Abstract

SSB Barona is one of the football academies located in Banda Aceh, which was formed in 2011 under the guidance of Muhammad Yani. SSB Barona has the vision to create quality players both in Banda Aceh and in all Aceh areas. Football requires skill from the players. These basic skills or techniques are the most important things that must be mastered by football players. This study aims to determine the correlation between leg muscle power and shooting ability in SSB Barona from the age of 13 to 15 in Banda Aceh city. This study uses a descriptive method with a correlational approach. The population in this study were SSB Barona Students with the total 20 samples. The sampling technique was total sampling. The data collection technique was carried out through (1) testing the ability of leg muscle power (Standing Broad Jump) (2) shooting test. The data analysis technique used correlation analysis. Based on the results of data analysis, the findings showed that there is a positive and significant correlation between leg muscle power and ball shooting with the score ($r = 17.14$) so that leg muscle explosive power contributes 29.37% to ball shooting ability. In conclusion, the results of hypothesis testing indicate that leg muscle power (x) provides a significant contribution to the ball shooting ability (y) of SSB Barona students aged 13 to 15 years in Banda Aceh City.

Keywords: *correlation, leg power, shooting, football.*

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I. Introduction

Football is a game played by a team, each team consisting of a goalkeeper, back, midfielder and forward. According to Sucipto (2000) "football is a team game, where each team consists of eleven players, one of them is a goalkeeper, all players use their feet except the goalkeeper who may use his hands in the goal area". The basic techniques that must be mastered to be a skilled football player are able to kick, pass and control the ball. All these techniques are very necessary to get the optimal achievements. There are many skilled that must be mastered in the football game to achieve maximum results. Luxbacher (2001) says that "The main elements in the football game are flexibility, agility, endurance as well as strength". There are also some factors that can affect achievement in sports aspects, those are need to be considered and trained carefully by athletes. Charlim, et al. (2010) state that to achieve a success in football game, the players must have a great character physically, technically, mentally and maturity.

The researchers saw some problems when SSB Barona play the game, the players rarely shoot to the goal, and their shooting power is not strong. It resulted to lose the moments to get opportunities to create goals. If leg muscle power is not in a good performance, many kicks miss the target goal, this is clearly a significant problem for a player, both amateur and professional. Harsono (1988) states that power is more needed in football and all branches of sport. Based on the above opinion it is clear that a football player does not only have to master the techniques in the game but also needs to have the good leg muscle power, which includes, strength, speed, and balance, to support the success of performing skills in football. This is what encourages the

researcher to study the research entitled the Relationship between Leg Muscle Strength and Shooting Ability at Barona's SSB (Football Academy) Ages 13-15 Years in Banda Aceh City".

II. Research Methodology

This research used a descriptive method with a correlational approach. Winamo (2011) says that this type of descriptive research aims to describe events in the present. The description of the event was carried out systematically which emphasized the disclosure of data based on the facts obtained from the field by measuring and recording the results of leg muscle power and shooting ability in football. Correlation is used to see and reveal the relationship between variables. The variables in this study were leg muscle power and shooting ability in football.

III. Results And Discussions

1. Result

The research data consisted of (1) leg muscle power and (2) shooting. To facilitate the data processing, the data is tabulated into a table. The results of the leg muscle power test were obtained using the long jump test without the standing broad jump. The results of the shooting ability test at SSB Barona from the age of 13 to 15 in Banda Aceh City are presented as follows:

Table 1. Recapitulation of Raw Data from Research Results on SSB Barona from the Age of 13 to 15 in Banda Aceh City.

No	Participant Name	Measurement Results	
		Leg Muscle Power (X)	Shooting (Y)
1	2	3	4
1	Abu Bakar	2,58	33
2	Ahmad Khadafi	2,59	34
3	Aldiansyah	2,50	29
4	Aris Dzakwan	2,60	29
5	Farzan Haris Maulana	2,51	24
6	Imam Hidayat	2,63	29
7	Johan mustaqim	2,52	33
8	M. Dicky	2,52	32
9	M. Fathir Alsyah	2,56	23
10	M. Gilang Tanjung	2,51	29
11	M. Nazir Maulana	2,55	29
12	M. Rizha Rafa'in	2,53	20
13	Munawar	2,61	24
14	Riefky Andiva	2,51	33
15	Risky wanda	2,85	34
16	Sultan Revy	2,52	25
17	Taufiqul hafids	2,57	29
18	T. M Al-ghifari	2,59	28
19	T. Maulana Auliansyah	2,54	33
20	Wais Al-qurni	2,51	29
Total		51,3	550

1). Analysis of Mean and Standard Deviation

Based on the test results of leg muscle power and shooting ability at SSB Barona from the age of 13 to 15 in Banda Aceh City, as shown in Table 1, the average value and standard deviation can be calculated as follows:

$$\begin{aligned} \bar{x} &= \frac{\sum x}{N} \\ &= \frac{51,3}{20} \\ &= 2.56 \end{aligned}$$

$$\begin{aligned} \bar{y} &= \frac{\sum y}{N} \\ &= \frac{550}{20} \\ &= 27.5 \end{aligned}$$

Based on these calculations, it can be concluded that the average value of leg muscle power (X) variable is 2.56 meters. Meanwhile, the result of the shooting test (Y) variable is 27.5 meters.

2). Calculation of Standard Deviation Value

To calculate the value of the standard deviation of each research variable, the authors need to put it in table so that the value of each variable can be assigned according to the formula proposed by Nazir (2005, p. 386). The tables are as follows:

Table 2. Calculation Table of the Standard Deviation Value of Leg Muscle Power on Barona SSB from the age of 13 to 15 in Banda Aceh City.

No	Participant Name	Standard Deviation of Leg Muscle Power			
		X	\bar{X}	(x- \bar{x})	(x- \bar{x}) ²
1	Abu Bakar	2,58	2,56	0,02	0,0004
2	Ahmad Khadafi	2,59	2,56	0,03	0,0009
3	Aldiansyah	2,50	2,56	-0,06	0,0036
4	Aris Dzakwan	2,60	2,56	0,04	0,0016
5	Farzan Haris Maulana	2,51	2,56	-0,05	0,0025
6	Imam Hidayat	2,63	2,56	0,07	0,0049
7	Johan mustaqim	2,52	2,56	-0,04	0,0016
8	M. Dicky	2,52	2,56	-0,04	0,0016
9	M. Fathir Alsyah	2,56	2,56	0,00	0
10	M. Gilang Tanjung	2,51	2,56	-0,05	0,0025
11	M. Nazir Maulana	2,55	2,56	-0,01	0,0001
12	M. Rizha Rafa'in	2,53	2,56	-0,03	0,0009
13	Munawar	2,61	2,56	0,05	0,0025
14	Riefky Andiva	2,51	2,56	-0,05	0,0025
15	Risky wanda	2,85	2,56	0,29	0,0841
16	Sultan Revy	2,52	2,56	-0,04	0,0016
17	Taufiqul hafids	2,57	2,56	0,01	0,0001
18	T. M Al-ghifari	2,59	2,56	0,03	0,0009
19	T. Maulana Auliansyah	2,54	2,56	-0,02	0,0004
20	Wais Al-qurni	2,51	2,56	-0,04	0,0016
Total (Σ)		51,3		-0,07	0,1143

$$SD = \sqrt{\frac{\sum(x-\bar{x})^2}{N-1}}$$

$$= \sqrt{\frac{0,1143}{19}}$$

$$= 0,077$$

From the above calculations, it can be concluded that the standard deviation of leg muscle power on shooting ability at SSB Barona from the age of 13 to 15 in Banda Aceh City is 0.077.

Table 3. Standard Deviation Calculation of the shooting for SSB Barona from the age of 13 to 15 in Banda Aceh City.

No	Participant Name	Standard Deviation of Leg Muscle Power			
		Y	\bar{Y}	(Y- \bar{Y})	(Y- \bar{Y}) ²
1	Abu Bakar	33	27,5	5,5	30,25
2	Ahmad Khadafi	34	27,5	6,5	42,25
3	Aldiansyah	29	27,5	1,5	2,25
4	Aris Dzakwan	29	27,5	1,5	2,25
5	Farzan Haris Maulana	24	27,5	-3,5	12,25
6	Imam Hidayat	29	27,5	1,5	2,25
7	Johan mustaqim	33	27,5	5,5	30,25
8	M. Dicky	32	27,5	4,5	20,25
9	M. Fathir Alsyah	23	27,5	-4,5	20,25
10	M. Gilang Tanjung	29	27,5	1,5	2,25
11	M. Nazir Maulana	29	27,5	1,5	2,25
12	M. Rizha Rafa'in	20	27,5	-7,5	56,25
13	Munawar	24	27,5	-3,5	12,25
14	Riefky Andiva	33	27,5	5,5	30,25

15	Risky wanda	34	27,5	6,5	42,25
16	Sultan Revy	25	27,5	-2,5	6,25
17	Taufiqul hafids	29	27,5	1,5	2,25
18	T. M Al-ghifari	28	27,5	0,5	0,25
19	T. Maulana Auliansyah	33	27,5	5,5	30,25
20	Wais Al-qurni	29	27,5	1,5	2,25
Total (Σ)		579		27,5	346,75

$$Sd = \sqrt{\frac{\sum(x-\bar{x})^2}{N-1}}$$

$$= \sqrt{\frac{346,75}{19}}$$

$$= 4,27$$

From the above calculations, it can be concluded that the standard deviation of leg muscle power on shooting ability at SSB Barona from the age of 13 to 15 in Banda Aceh City is 4.27.

3). Calculation of T-Score

Based on the results of the analysis of the average and standard deviation above, it can be determined the T-Score value for each variable using the formula proposed by Sugiyono (2009, p. 176) as follows:

$$T\text{- Score} = 50 + 10 \left(\frac{x-\bar{x}}{SD} \right)$$

Information:

T = T-Score

X = Raw data

\bar{x} = Mean (Average)

SD = Standard Deviation

Table 4. Recapitulation of raw data t-score leg muscle power (x) with shooting (Y) at SSB from the age of 13 to 15 in Banda Aceh City.

No	Participant Name	Raw Score (X)	T-Score (X)	Raw Score (Y)	T-Score (Y)
1	Abu Bakar	2,58	52,5	33	62,8
2	Ahmad Khadafi	2,59	53,8	34	65,2
3	Aldiansyah	2,50	42,3	29	53,5
4	Aris Dzakwan	2,60	55,1	29	53,5
5	Farzan Haris Maulana	2,51	43,6	24	41,9
6	Imam Hidayat	2,63	59,0	29	53,5
7	Johan mustaqim	2,52	44,9	33	62,8
8	M. Dicky	2,52	44,9	32	60,5
9	M. Fathir Alsyah	2,56	0	23	39,5
10	M. Gilang Tanjung	2,51	43,6	29	53,5
11	M. Nazir Maulana	2,55	48,8	29	53,5
12	M. Rizha Rafa'in	2,53	46,2	20	32,5
13	Munawar	2,61	56,4	24	41,9
14	Riefky Andiva	2,51	43,6	33	62,8
15	Risky wanda	2,85	87,6	34	65,2
16	Sultan Revy	2,52	44,9	25	44,2
17	Taufiqul hafids	2,57	51,2	29	53,5
18	T. M Al-ghifari	2,59	53,8	28	51,1
19	T. Maulana Auliansyah	2,54	47,5	33	62,8
20	Wais Al-qurni	2,51	44,9	29	53,5
Total (Σ)		51,3	964,6	579	1.067,7

4). Calculation of Correlation Coefficient

These data were then analyzed using the correlation coefficient formula to obtain a conclusion about the correlation between leg muscle power and shooting ability in Barona SSB from the age of 13 to 15 in Banda Aceh City. To calculate the correlation value, the table is needed. The table is as listed below:

Table 5. The correlation between leg muscle power (X) and shooting (Y) in Barona SSB from the age of 13 to 15 in Banda Aceh City.

No	Participant Name	(X)	(Y)	(X ²)	(Y ²)	(XY)
1	Abu Bakar	52,5	62,8	2.756,25	3.943,84	3.297
2	Ahmad Khadafi	53,8	65,2	2.894,44	4.251,04	3.507,76
3	Aldiansyah	42,3	53,5	1.789,29	2.862,25	2.263,05
4	Aris Dzakwan	55,1	53,5	3.036,01	2.862,25	2.947,85
5	Farzan Haris Maulana	43,6	41,9	1.900,96	1.755,61	1.826,84
6	Imam Hidayat	59,0	53,5	3.481	2.862,25	3.127
7	Johan mustaqim	44,9	62,8	2.016,01	3.943,84	2.819,72
8	M. Dicky	44,9	60,5	2.016,01	3.660,25	2.716,45
9	M. Fathir Alsyah	0	39,5	0	1.560,25	0
10	M. Gilang Tanjung	43,6	53,5	1.900,96	2.862,25	2.332,6
11	M. Nazir Maulana	48,8	53,5	2.381,44	2.862,25	2.610,8
12	M. Rizha Rafa'in	46,2	32,5	2.134,44	1.056,25	1.501,5
13	Munawar	56,4	41,9	3.180,96	1.755,61	2.363,16
14	Riefky Andiva	43,6	62,8	1.900,96	3.943,84	2.738,08
15	Risky wanda	87,6	65,2	7.673,76	4.251,04	5.711,52
16	Sultan Revy	44,9	44,2	2.016,01	1.953,64	1.984,58
17	Taufiqul hafids	51,2	53,5	2.621,44	2.862,25	2.739,2
18	T. M Al-ghifari	53,8	51,1	2.894,44	2.611,21	2.749,18
19	T. Maulana Auliansyah	47,5	62,8	2.256,25	3.943,84	2.983
20	Wais Al-qurni	44,9	53,5	2.016,01	2.862,25	2.402,15
Total (Σ)		964,6	1.067,7	50.866,64	58.666,01	52.621,42

Based on Table 5 above, the correlation coefficient value between leg muscle power (X) and shooting ability (Y) is calculated at SSB Barona from the age of 13 to 15 in Banda Aceh City. The values obtained are (X) = 49,196.35 and (Y) = 1,133,2 (X²) = 50,866.64 (Y²) = 58,666.01 (XY) = 52,621,42. Furthermore, to determine the magnitude of the correlation between variable X and variable Y, the product moment correlation formula of person is used as proposed by Arikunto (2010, p. 213) as follows:

$$\begin{aligned}
 r_{xy} &= \frac{Nxy - (\sum x)(\sum y)}{\sqrt{\{N\sum x^2 - (\sum x)^2\} \{N\sum y^2 - (\sum y)^2\}}} \\
 &= \frac{20(52.621,42) - (964,6)(1.067,7)}{\sqrt{\{20(50.866,64) - (964,6)^2\} \{20(58.666,01) - (1.067,7)^2\}}} \\
 &= \frac{1.052.428,4 - 1.029.903,42}{\sqrt{(1.017.332,8 - 930.453,16)(1.173.320,2 - 1.139.983,29)}} \\
 &= \frac{922.524,98}{\sqrt{(2.896.298.739,51)}} \\
 &= \frac{922.524,98}{53.817,27} \\
 &= 17,14
 \end{aligned}$$

Based on the data analysis above, it shows that the correlation coefficient value of r Power of leg muscles (variable X) to shooting (variable Y) is r = 17.14. Based on table 3.3 regarding the correlation coefficient of the value of r in chapter 3, the results of r = 17.14 indicate a strong level of correlation. This shows that the leg muscle power (variable X) against shooting (variable Y) in SSB Barona from the age of 13 to 15 in Banda Aceh City has a strong level of correlation.

5). Determination Calculation

The calculation of the determination value is used to state the magnitude of the influence of the variable leg muscle power (X) on shooting (Y) in a football game at SSB Barona from the age of 13 to 15 in Banda Aceh. The formula used to calculate the value of determination is as follows:

$$\begin{aligned}
 KP &= r^2 \times 100\% \\
 &= (17,14)^2 \times 100\% \\
 &= 29,37\%
 \end{aligned}$$

Based on the above calculations, the variable leg muscle power (X) at SSB Barona from the age of 13 to 15 in Banda Aceh City is influenced by shooting (Y) 29.37% and the remaining 70.63% is influenced by the other factors or physical components.

6). Hypothesis Testing

Furthermore, it can be determined by the correlation significance test using the t_{count} formula as follows:

$$\begin{aligned} T_{count} &= r \sqrt{\frac{n-2}{1-r^2}} \\ &= \frac{17,14 \sqrt{20-2}}{\sqrt{1-(17,14)^2}} \\ &= \frac{17,14 \sqrt{18}}{17,11} \\ &= \frac{72,67}{17,11} \\ &= 4.24 \end{aligned}$$

The value of t_{tabel} using the t table with the provisions of the significant level = 0.05 with $t_{tabel} = (dk = n-2)$ obtained $t_{tabel} = 1.73$

In Chapter I, the following hypothesis has been formulated, there is a significant correlation between leg muscle power and shooting in Barona SSB from the age of 13 to 15 in Banda Aceh City.

H_a = There is a significant correlation between leg muscle power and shooting ability in Barona SSB from the age of 13 to 15 in Banda Aceh City.

H_o = There is no significant relationship between leg muscle power and shooting ability in Barona SSB from the age of 13 to 15 in Banda Aceh City.

Examiner Criteria:

- a. If $T_{count} \geq T_{table}$ H_o is rejected, it is significant
- b. If $T_{count} \leq T_{table}$ H_o is accepted, it is not significant

Based on the above calculation, T_{count} is greater than T_{table} or $4.24 > 1.73$, then H_o is rejected, meaning that there is a significant correlation between leg muscle power and ball shooting ability at SSB Barona from the age of 13 to 15 in Banda Aceh City.

The description shows that the hypothesis formulated by the authors is accepted. It means that there is a significant correlation between leg muscle power and ball shooting ability at SSB Barona from the age of 13 to 15 in Banda Aceh City. Thus, it can be concluded that the hypothesis is accepted.

IV. Discussion

The results of the research showed that leg muscle power with shooting tests at SSB Barona from the age of 13 to 15 in Banda Aceh City consists of two test items that have obtained results as shown in hypothesis testing. The basic things that are very important to be mastered by football players are skills in playing such as a ball shooting. A ball shooting has a great influence on leg muscle power. After conducting the research, it proves that the results of the hypothesis testing show a significant correlation between ($r = 17.14$) and leg muscle power (29.37%) with shooting at SSB Barona from the age of 13 to 15 in Banda Aceh City and the remaining 70.63% can be influenced by other factors.

Regarding this research, Bucher (1964) and Harsono (1988, p. 199) stated that: "Power is the ability to release maximum force in the shortest period of time." It can be concluded that power is the result of force x velocity, where force is equivalent to strength, and velocity is equivalent to speed. There are many aspects contained in power including balance with Strength and speed. This is very useful for football game in doing shooting and so on. Thus, leg muscle power plays an important role and has a correlation with shooting in the football game.

V. Conclusions And Suggestions

1. Conclusion

Based on the descriptions in the previous chapters, the authors draw the conclusions and make some suggestions regarding the correlation between leg muscle power and shooting ability in Barona SSB from the age of 13 to 15 in Banda Aceh City. The conclusion is that there is a significant correlation between leg muscle power and soccer shooting ability at SSB Barona from the age of 13 to 15 in Banda Aceh City ($r = 17.14$) and ($T_{count} = 4.24$).

2. Suggestions

From the results of the study, some suggestions can be put forward as follows

- a. To get a good performance in the game of football, the coach must consistently train the physical condition of the leg muscle power, which plays an important role in the ability to kick the ball (shooting) in the game of football. To increase leg muscle power, the trainer can provide exercises such as squat jumps.
- b. As for suggestions for other researchers, I hope this research can be continued in a wider problem with a larger number of samples so that it can contribute ideas to coaches, as well as athletes who are trying to improve their research.

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