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THE EFFECT OF EXPLOSIVE MUSCLE POWER IN THE ARMS AND LEGS ON FREE-THROW OUTCOMES IN BASKETBALL PLAYERS

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ABSTRACT

The game of basketball is fast and requires a variety of balance and physical alignment, as well as very complex techniques. This study aims to determine the effect of the explosive power of the arm and leg muscles on the results of free throws in basketball players. The sample in this study were all male students who take part in basketball extracurricular activities of SMA Negeri 5 Soppeng, with a total of 30 students. The data analysis techniques used are descriptive analysis, data normality testing, data linearity testing, and regression analysis using the SPSS program. The findings revealed that, first, there was a 75.6% effect of explosive power of the arm muscles on the results of free throws in basketball games for SMA Negeri 5 Soppeng students; second, there was a 77% effect of explosive power of the leg muscles on the results of free throws in basketball games for high school students SMA Negeri 5 Soppeng; and third, there is an effect of explosive power of the arm muscles and explosive power of the leg muscles there was a 85,3%%. Further research needs to be done to obtain more optimal results when taking free throws. It is necessary to study other variables that can affect the results of free throws, such as mental conditions and other psychological aspects of basketball players when making free throws.

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INTRODUCTION

Based on observations so far, it can be stated that basketball players from SMA Negeri 5 Soppeng still have many shortcomings in terms of basic basketball playing techniques, which lead to defeats when playing. The basic technique that has many mistakes when competing is the basic shooting technique in basketball games. This basic technique often makes mistakes, starting with the position of the body and also when taking steps before shooting. To be able to shoot basketball perfectly, of course, the ability of physical components is needed to support the improvement of shooting skills, such as agility, balance, coordination, flexibility, reaction, and so on. From the various physical

components listed above, in this thesis the author wants to try to examine two physical components, namely the explosive power of the leg muscles and leg muscles, which are expected to have an influence on and contribute to improving shooting skills in basketball games.

Basketball training has different aspects and is adapted to the training category (Sofyan & Budiman, 2022). Leg explosive power is one of the physical components that are needed by basketball players. Without explosive leg power, a player's jump will not be optimal. With a high jump, a player will make it easier to put the ball into the opponent's ring because it will be closer to the ring. However, if the player has strong leg explosive power, he will be able to shoot easily. The explosive power of the arm muscles also has a significant impact on the outcome of the shot or shooting that is performed, because when shooting or shooting, one must have a good arm so that the results of the shot taken can reach the basketball hoop.

Sports achievements have shown rapid progress, especially in recent years. Achievements in the last few years were difficult to imagine, but they are now possible. A number of athletes are able to provide optimal performance in certain sports. Sport as a model of human creation is a form of physical activity that has very complex dimensions. The link between sports activities and human existence is something that cannot be separated. Sport is movement, and movement is human nature. According to Sahabuddin (2019) state that, physical, sports, and health education are forms of education that pay attention to teaching knowledge, attitudes, and human movement skills and are among the subjects presented in schools. These subjects have different characteristics compared to other subjects.

It has been realized that the role of sport is getting higher and higher; almost all regions pay great attention to sports activities themselves. Sport does not only play a role in improving physical fitness but also makes the athlete proud and gives the area he is playing in a name. The goals of humans in carrying out sports activities vary, such as: first, they carry out sports activities only for recreation, to fill their spare time, which is carried out with joy and is done in a relaxed and informal manner, where both places, facilities, and regulations are not bound. Second, they do sports for educational purposes, which are carried out formally, with all activities based on the curriculum that has been prepared. Third, those who carry out sports activities with the aim of achieving a certain level of physical fitness; and fourth, those who do sports to achieve achievements.

In South Sulawesi, basketball is a sport that has started to attract students, university students, and the community. This can be seen from the fact that almost every school, tertiary institution, and region has basketball court facilities and infrastructure, but in terms of competition between students, university students, and clubs, things are still not running smoothly, which has an impact on the very slow development of achievements. This is a problem, especially for coaches and basketball coaches in South Sulawesi. Thus, the best solution is the need to carry out scientific research on various things that support increased achievement, such as the existence of physical components, techniques, body structure, and psychology that can be involved in improving technical abilities and skills in sports, including basketball.

The object of the large ball sport known as basketball is to put as many balls into the opponent's basket as you can while doing your best to protect your own (Sofyan et al., 2020). The game of basketball as a sport has certain basic techniques, such as dribbling, passing, shooting, and others. These basic techniques must be mastered by a player to be able to play a game with a high level of skill in accordance with the unity of the game of basketball. The development of the physical conditions needed in the game of basketball

is a requirement that must be owned by every player. Good physical condition will make it easier to master the basic techniques of playing basketball, such as dribbling, passing, and shooting. Dribling is the skill of carrying the ball by bouncing it on the floor, aiming at the opponent's ring. Passing is the skill of giving the ball to a friend by throwing it to him or passing the ball to a friend, while shooting is the skill of putting the ball into the opponent's ring. If all of these skills can be mastered by players, then it is very possible for them to play basketball. Of the various basketball game techniques, this thesis will only discuss ball shooting techniques.

Purnawan et al. (2012) stated that the game of basketball is a sport that is played by two teams, each consisting of five players. According to Oliver (2003), the type of game or match played depends on the equipment available, the skill level of the players, and the number of participants. Meanwhile, according to Muhajir (2004), basketball is a team game that contains elements of fun, where players can perform various movement skills to answer the stimulus they get. According to Brittenham (2002), feeling fit is not only important from a health standpoint, but the following components are just as important for basketball players: heart-respiratory system fitness, muscle strength, muscle endurance, flexibility, and body composition. According to Prusak (2005), the types of shots that must be learned are layups, free throws, shooting in place, jump shots, and so on. Sandika (2018) states that a free throw is a shot that is awarded to a player to get a point as a result of being violently disturbed by an opposing player during an attempted field shot. According to Amber (2012), this shooting movement is not just throwing the ball; it also includes directing and trying to make the ball fall right on the target.

A free throw is one of the decisive shots in a match between two teams that are evenly matched. Victory is mostly determined by the number of points achieved by free throws. Free throws have special characteristics that distinguish them from field shots, namely that the shot is taken from behind the free throw line inside the semi-circle line without being hindered. This gives an advantage to the team that gets the free throw because doing so is easier than other guesses. Based on the existing problems, we ask several research questions, including:

1. RQ1: Is there an effect of the explosive power of the arm muscles on the results of the ability to make free throws in basketball games?
2. RQ2: Is there any effect of the explosive power of the leg muscles on the results of the ability to make free throws in the basketball game?
3. RQ3: Is there any influence between the explosive power of the arm muscles and the explosive power of the leg muscles on the results of the ability to make free throws in basketball games?

METHOD

The method used in this study is the regression method supported by a quantitative approach, in accordance with the problems studied, namely those regarding ongoing events or events. This is in line with the opinion of Sukmadinata (2011), who states that regression research is aimed at knowing the relationship of a variable with other variables, which is expressed by the magnitude of the correlation coefficient and statistical significance (significance).

A design or description used as a guide when performing a study is known as a research design. Descriptive research is the kind of study that this is. Figure 1 below shows the research design model that was applied in a straightforward manner. The sample used in this study all male students who take part in basketball extracurricular

activities of SMA Negeri 5 Soppeng as many as 30 students, with the sampling technique being the total sampling. Data collection was carried out to obtain empirical data as material for testing the truth of the hypothesis. The data collected in this study included: arm muscle explosive power tests; leg muscle explosive power tests; and basketball free throw results tests.

The collected data needs to be analyzed statistically, descriptively, and inferentially for the purpose of testing the research hypothesis. The collected data needs to be analyzed statistically, descriptively, and inferentially for the purpose of testing the research hypothesis. Descriptive data analysis is intended to get an overview of the data, which includes the average, standard deviation, minimum value, and maximum value. Inferential analysis is used to test research hypotheses using correlation and regression tests.

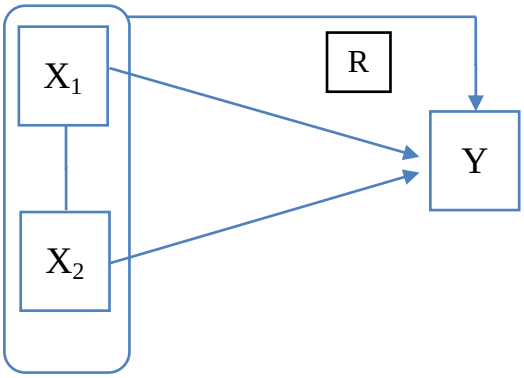

Figure 1. Research design model
Source: Sugiyono (2015)

RESULTS

Descriptive data analysis is intended to get an overview of research data. Descriptive analysis was carried out on the explosive power of the arm muscles, the explosive power of the leg muscles, and the results of free throws in basketball games for students of SMA Negeri 5 Soppeng. Descriptive analysis includes total value, average, standard deviation, range, maximum, and minimum. From these statistical values, it is expected to provide an overview of the state of the explosive power of the arm muscles, the explosive power of the leg muscles, and the results of free throws in basketball games. The results of the descriptive analysis of each research variable can be seen in Table 1.

Table 1. The results of the descriptive analysis of each variable

	N	Sum	Mean	Stdv	Variance	Range	Min.	Max.
Arm muscle power	30	105,10	3,5033	0,34289	0,118	1,40	2,70	4,10
Leg muscle explosive power	30	1149,00	38,3000	3,21795	10,355	14,00	32,00	46,00
Free throw results	30	176,00	5,8667	1,73669	3,016	7,00	2,00	9,00

Source: author/personal data

The results of Table 1 above are an illustration of the explosive power of the arm muscles, the explosive power of the leg muscles, and the results of free throws in basketball games. First, for the explosive power of the arm muscles of SMA Negeri 5 Soppeng students, out of 30 samples, a total value of 105.10 m was obtained, and the average obtained was 3.50 m with a standard deviation of 0.34289 and a variance value of 0.118 from a data range of 1.40 m between the minimum value of 2.70 m and the maximum value of 4.10 m.

Second, for leg muscle explosive power data on SMA Negeri 5 Soppeng students, out of 30 samples, a total value of 1149.00 was obtained, and the average obtained was 38.3000 with a standard deviation of 3.21795 and a variance value of 10.355 from a data range of 14.00 between the minimum value of 32.00 and 46.00 for the maximum value. Third, for the free throw data in the basketball game for SMA Negeri 5 Soppeng students, out of 30 samples, a total value of 176.00 was obtained, and the average obtained was 5.8667 with a standard deviation of 1.73669 and a variance value of 3.016 from the data range. 7.00 between the minimum value of 2.00 and 9.00 for the maximum value.

The results of the analysis of the descriptive data above are only a description of the explosive power of the arm muscles, the explosive power of the leg muscles, and the results of free throws in basketball games. The data above does not describe the relationship or mutual influence between the independent variables, consisting of the explosive power of the arm muscles and the explosive power of the leg muscles, and the dependent variable in the form of free throws in a basketball game. To prove whether there is a significant contribution of the independent variable to the dependent variable, further testing is required, namely by conducting a data normality test to determine whether to use parametric or non-parametric analysis and a linearity test to determine whether there is a relationship between the independent variable and the dependent variable.

The hypothesis proposed in this study needs to be tested and proven through empirical data obtained in the field through tests and measurements of the variables studied, and then the data will be processed statistically. Because the research data follows a normal distribution, parametric statistical analysis is used to test the research hypothesis.

Hypothesis 1: The effect of arm muscle explosive power on the results of free throws in basketball games for SMA Negeri 5 Soppeng students

Table 2. The results of the regression analysis for the first hypothesis

Variable	N	R	R^2	F	T	P	α
Arm muscle explosive power (X1) Free throw result (Y)	30	0,756	0,756	86,654	9,309	0,000	0,05

Based on the results of this analysis, it can be seen that the t_{count} value is 9.309. It can be seen in the table above with a significant level of 0.000 < 0.05. Then H_o is rejected and H_1 is accepted, or the regression coefficient is significant, or the explosive power of the arm muscles has a significant effect on the results of free throws in basketball games for SMA Negeri 5 Soppeng students. Thus, there is an effect of the explosive power of the arm muscles on the results of free throws in basketball games for SMA Negeri 5 Soppeng students students (75.6%). The F value for the regression model is 96.654, with a significant value level of 0.000 < 0.05. This means that the results of free throws in basketball games can be explained significantly by the explosive power of the arm muscles in Soppeng 5 Public High School students.

Hypothesis 2: The effect of leg muscle explosive power on the results of free throws in basketball games for SMA Negeri 5 Soppeng students.

Table 3. The results of the regression analysis for the second hypothesis

Variable	N	R	R2	F	T	P	α
Arm muscle explosive power (X1) Free throw result (Y)	30	0,869	0,770	93,655	9,678	0,000	0,05

Based on the results of this analysis, it can be seen that the t_{count} value is 9.678. It can be seen in the table above with a significant level of 0.000 < 0.05. Then H_o is rejected and H_1 is accepted, or the regression coefficient is significant, or the explosive power of the leg muscles has a significant effect on the results of free throws in basketball games for SMA Negeri 5 Soppeng students. Thus, there is an effect of leg muscle explosive power on the results of free throws in basketball games for SMA Negeri 5 Soppeng students by 77%. The F value for the regression model is 93.655, with a significant value level of 0.000 0.05. This means that the results of free throws in basketball games can be explained significantly by the explosive power of the leg muscles in SMA Negeri 5 Soppeng students.

Hypothesis 3: Effect of arm muscle explosive power and leg muscle explosive power on the results of free throws in basketball games for SMA Negeri 5 Soppeng students.

Table 4. The results of the regression analysis for the third hypothesis

VARIABEL	N	R	R^2	F	P	α
Arm muscle explosive power (X1), and leg muscle explosive power (X2) Free throw result (Y)	30	0,923	0,853	78,073	0,000	0,05

Based on the results of testing the regression analysis of data on the explosive power of the arm muscles and the explosive power of the leg muscles on the results of free shots in basketball games for Soppeng 5 Public High School students in table 4.6, the regression value (Ro) is 0.923 with a significance level in the sig column equal to (0.000) 0.05 for the value of R square (coefficient of determination) 0.853. This means that 85.3% of the effect of the explosive power of the arm muscles and the explosive power of the leg muscles together on the results of free throws in basketball games is attributable to SMA Negeri 5 Soppeng students. while the rest (100% minus 85.3% = 14.7%) is caused by other factors not included in the study.

The F count is 78.073 with a significance level of 0.000 based on the Anova test or F test. Because the significance (0.000) is much smaller than 0.05, the regression model can be used to predict the explosive power of the arm muscles and the explosive power of the leg muscles on the results of free throws in basketball games for students of SMA Negeri 5 Soppeng (applicable to the population where the sample was taken).

DISCUSSION

The results of the statistical analysis showed that there was a significant effect of the explosive power of the arm muscles on the results of free throws in basketball games for SMA Negeri 5 Soppeng students. If the research results are related to the theory and framework that underlie them, then the results of this study basically support and strengthen existing theories and the results of previous studies. This proves that the results of free throws in basketball are strongly influenced by the explosive power of the arm muscles. The arm muscle explosive power of SMA Negeri 5 Soppeng students was categorized as good in achieving free throw results in basketball games. It can be understood that the explosive power of the arm muscles is a person's ability to combine maximum strength and speed when throwing a basketball.

The result of a free throw is a movement that must be mastered by a basketball player with an analysis of the movement, namely, a person standing right in the circle area then making a high jump followed by shooting the ball right into the basketball hoop. In improving the results of free throws in basketball games, the explosive power of the

arm muscles is needed, because the explosive power of the arm muscles plays a very important role in shooting a basketball into the basketball hoop. By having the explosive power of the arm, the student will easily shoot at the basketball hoop because of the strength and speed of the arm possessed by the student. If a basketball player does not have the explosive power of the arm muscles to make free throws in a basketball game, it will be difficult to make the shot. Thus, the explosive power of the arm muscles has a significant influence on the results of free throws in basketball games for SMA Negeri 5 Soppeng students.

The results of the statistical analysis showed that there was a significant effect of leg muscle explosive power on the results of free throws in basketball games for SMA Negeri 5 Soppeng students. If the findings of this study are related to the theory and framework that underpins them, then the findings of the study basically support and strengthen existing theories and the findings of previous studies. This demonstrates that the explosive power of the leg muscles is very helpful in executing free throws in basketball games. However, the students of SMA Negeri 5 Soppeng have leg muscle explosive power that is categorized as good for supporting free throw results in basketball games. Leg muscle explosive power is one of the factors that supports the achievement of free throw results in basketball games. Leg muscle explosive power is a person's ability to combine maximum strength and speed when making high jumps. The result of a free throw is a movement that must be mastered by a basketball player with an analysis of the movement, namely, a person standing right in the circle area then making a high jump followed by shooting the ball right into the basketball hoop. So, the function of the explosive power of the leg muscles when making a free throw in a basketball game is that when shooting, the player must jump first and then shoot at the basketball hoop. With a high jump, it will be difficult for the opponent to block the results of the shooting. If a student does not have strong leg explosive power, the opponent will easily block the shot. Thus, the explosive power of the leg muscles has a significant influence on the results of free throws in basketball games for SMA Negeri 5 Soppeng students.

The results of the statistical analysis showed that there was a significant effect of the explosive power of the arm muscles and the explosive power of the leg muscles on the results of free throws in basketball games for SMA Negeri 5 Soppeng students. If the results of this study are related to the underlying theory and framework, basically the results of this study support and strengthen existing theories. This proves that the two factors, namely the explosive power of the arm muscles and the explosive power of the leg muscles, influence each other in achieving and increasing the results of free throws in basketball. SMA Negeri 5 Soppeng students have explosive arm muscle power and leg muscle explosive power that are categorized as very good to support the achievement of free throw results in basketball games. It has been argued that the explosive power of the arm muscles is needed for a basketball player.

Good arm muscle explosive power will have an effective and efficient impact in shooting or shooting because it will make it easier to push the ball into the basketball hoop. Besides that, more optimal results can be obtained in the results of free throws in basketball games if students are able to master the explosive power of the leg muscles, because by having good leg muscle explosive power, players will easily make high jumps so that the opponent has difficulty in blocking shots or shooting results. which is conducted. Thus a student who has free throw results in a good basketball game has both physical components, namely the explosive power of the arm muscles and the explosive power of the leg muscles. However, it is not only these two physical components that are used as a benchmark or measure to produce free throw results in basketball games. Thus

the explosive power of the arm muscles and the explosive power of the leg muscles have a significant effect on the results of free throws in basketball games for students of SMA Negeri 5 Soppeng.

CONCLUSION

Based on the results of the research and discussion that have been put forward, a conclusion can be drawn, including that: the explosive power of the arm muscles has a significant effect on the results of free throws in basketball games; the explosive power of the leg muscles has a significant effect on the results of free throws in basketball games; and arm muscle explosive power and leg muscle explosive power have a significant effect on the results of free throws in basketball games for SMA Negeri 5 Soppeng student.

The study's limitations are unavoidable, such as the use of non-specific samples, such as professional basketball players, so that athletes are not a problem and we can focus on measuring the strength of which muscles are more dominant in making free throws. Further research needs to be done to obtain more optimal results when taking free throws. It is necessary to study other variables that can affect the results of free throws, such as mental conditions and other psychological aspects of basketball players when making free throws.

CONFLICT OF INTEREST

All authors state that there is no conflict of interest in this research.

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