

Contribution of arm explosive power hand reaction speed to badminton smash ability

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ABSTRACT

This research aims to discover these problems, (1) Is there a contribution of arm power explosive to the smash ability of UM Palopo badminton athletes (UKM). (2) Is there any contribution of hand reaction speed to the smash hitting ability strength of UM Palopo badminton athletes (UKM). (3) Is there any contribution of arm explosive power to hand reaction speed to the smash ability of UM Palopo badminton athletes (UKM). Two independent variables and one dependent variable form this research. It is a descriptive research Sample and population are athletes from UKM Badminton UM Palopo, by random sampling, 40 people were obtained. The data analysis technique used is Regression-Test (R). (1) Arm explosive power makes a sizable contribution to the smash hitting ability of badminton Where the obtained value = 0.512 ($p < 0.05$), with a contribution or contribution of 57.80% (2). There is a significant contribution of hand reaction speed to the ability of smash in badminton. The value = -0.461 ($P < 0.05$), with a contribution or contribution of 54.20 % (3). There is a significant contribution of explosive power, arm reaction speed, to the smash ability of badminton. Where the value of $R_o = 0.854$ ($P < 0.05$), with a contribution or contribution of 72.90%.

Keywords: Arm Explosive Power; Hand Reaction Speed; Smash Ability

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INTRODUCTION

Badminton is a sport that is favored by people all over the world, including in Indonesia. This can be seen by the large number of people who join in every badminton sports activity, both in the competitions at the national level to the world level, such as the Thomas and Uber Cup or the Sea Games (Sitorus, 2021). Badminton can be played by children to adults. Many people engage in badminton for various purposes, such as recreation and entertainment, maintaining their health and fitness, and improving their physical performance (Himawanto, 2010).

Badminton is an individual game, and can be done one person against one person, or two people against two people. This game uses a racket as a bat and the shuttlecock as the hit object. Badminton can be played on the closed or open court in the form of a flat court made of concrete, wood, or carpet floors marked with a line as a boundary the court and is limited by the net in the middle area (Ahmad et al., 2017) to be able to play badminton is mostly

determined by physical ability, technical and mental mastery. To become a good badminton player, not only master the hitting technique, but must master the basic techniques in the badminton game.

This sport consists of: basic techniques, hitting techniques and patterns as well as the elements of a good badminton player and to achieve high achievements are required to understand and master one of the basic components, which is the badminton basic techniques (Wicaksono, 2013). This game requires It is a passionate action that requires a variety of physical abilities, including strength, speed, flexibility, endurance, strength, reaction, and cooperation, and the player must be able to perform quick moves such as: jumping, running, and stepping forward. back, turn left and right (Daniel & Widodo, 2021). (Hera et al., 2021) Concerning the dynamic and explosive muscle power and speed contractions and maximal Strength in a short time. In general, explosive power is one of the physical components that are needed in various sports, explosive power is a combination of muscle strength and speed to be deployed together in overcoming load resistance in a relatively short time (Nurjamal et al., 2019).

Explosive power is an important element for a person to be said to have excellent physical abilities, because explosive power is very important and needed for daily physical activities that require explosive energy such as jumping, sprinting, hitting, kicking, lifting, throwing, etc. (Rais, 2018). Explosive power of arm muscles is one of the factors in performing a smash, which what is meant by Explosive power of arm muscles here is a combination of power and speed (Arini et al., 2021). Hirmanto, (2019), it is said that an individual who has power is a person who has: a) high level of strength, b) with a high level of speed, and c) advanced skills that combine speed and strength. Arm power is a component of physical condition that has a role to support the ability to exercise, especially to achieve optimal smash ability in badminton. Arm power is the ability to integrate strength and speed in an integrated movement pattern such as hitting the shuttlecock quickly and strongly when doing a smash. Explosive power is more needed and can be said for all sports, therefore in explosive power there are physical elements, namely strength and speed (Arisman et al., 2018).

How great a person's ability to do various punches is, it will not be perfect if it is not equipped with arm explosive power and a good smash. Someone who can smash well is supported by good technique mastery factor, physical and mental condition ability, and stable emotion. Of ability, the physical conditions needed to perform a smash include the strength and explosive power and speed of arm muscles and reactions, coordination of movements,

endurance, body flexibility, movement accuracy, eye-hand coordination and wrist flexibility as well as the strength of the leg muscles when the smash is done with jump (Nofrizal, 2019). The performance of a person or athlete in a match or Four factors primarily determine competition, namely: physical condition, technique, tactics, and mental (psychic) factors. In an effort to develop badminton, of course, the first thing to develop is basic skills, one of which is smash because it is very significant in killing the opponent's game and getting points (Kahar et al., 2021).

Smash in badminton requires a very fast tempo, so the swinging time requires a fast hand reaction, in the shortest time (Pratiwi et al., 2021). The smash hit is a hard and sharp blow, aiming to kill the opponent as soon as possible (Junanda et al., 2016). Smash is a must-have for every player, especially in matches, to win the match a player must have good smash skills. To improve smash ability in badminton, it is necessary Provides a form of physical weight preparing for improve arm muscular performance strength to support success in hitting smashes (Sudiadharma & Ishak, 2020). Smash is a key hit to kill the game and the opponent's movement, it is further explained that other strokes can be said to be meaningless if they are not equipped with maximum smash abilities (Prasojo & Yahya, 2017). Other blows are generally used to lure the opponent, disrupt the opponent's position, open the opponent's defense area, as for the smash to end a rally on the opponent's playing fields (Alsaudi, 2016).

Because of this sport's popularity that almost every corner of space in the court has a badminton court even in a very simple form (Kamaruddin, 2019). In Student activity units (UKM) Badminton UM Palopo, achievements from the athletes are not satisfying if compared to several universities in South Sulawesi. This is shown from several championships or competitions, where athletes who joined the championship often failed to achieve satisfactory results. The situation as stated is a problem that must be solved, and one of the efforts is through research.

Therefore, through this research, it becomes a medium for writers who are expected to support the improvement of badminton performance. Therefore, the smash technique is very important for a player because the player who has great smash skills has a great opportunity to win a match. As well as the accuracy and accuracy of the movement can only be done if the player has a good reaction speed. Players with good coordination reflect high technical skills (Hermansyah et al., 2017). Based on several opinions that have been previously described, the author is of interest to the conclusion that the arm explosive power and the reaction speed of the hand are needed in supporting elements in performing a smash in

badminton. The use of arm explosive power when performing a smash in badminton requires a very fast tempo, so the time to swing the hand requires a fast hand reaction, in the shortest possible time to hit the ball quickly and purposefully (Pratiwi et al., 2021). In line with that, the reality that occurs in the field, especially in the UM Palopo Badminton Student Activity Unit (UKM).

Based on observations made athletes, (UKM) Badminton UM Palopo has not been able to give good achievements from the competition that they played, both in district and provincial levels. Athletes do not have good smash skills, when they practice, their smashes are not good as expected. This can be seen when the athlete performing smashes, it can be easily returned by the opponent and sometimes the shuttlecock is out of the court. This means that the smash by the player is not hard and sharp, or their badminton smash ability is still low. As for the involvement of the muscles in power explosive of the arm, reaction the speed offhand the smash. Even though the badminton smash is an initial attack that can generate numbers or points in obtaining victory in a game. The factors that influence the athlete's lack of badminton smash ability are arm explosive power and hand reaction speed, and when he wants to smash the ball that is hit is often flat or bounces on the net, he doesn't have a good smash ability. If the elements of physical condition, especially arm muscle explosive power and hand reaction speed, are not increased, it will be difficult for badminton players to improve their smash skills. If this happens, the badminton athlete's performance will continue to decline. Based on the description above, the authors are interested in conducting research on the Contribution of Arm Muscle Explosive Power and Hand Reaction Speed to the Smash Ability of UM Palopo Badminton UKM Athletes.

METHODS

This research is a correlational study. Correlational research is research conducted to determine whether there is a contribution between two or several variables. Based on this, this research aims to find explosive power and arm contributions hand reaction speed to the smash hitting ability of Badminton UM Palopo athletes (UKM). To find out whether there is a relationship using the correlational method. In this study, the researcher wanted to examine the contribution of arm explosive power (X1), hand reaction speed (X2), to smash hitting ability (Y). Data collection was carried out from February to March 2022, at the research location of UM Palopo Badminton SME. The sample collection technique used is random sampling technique with athlete requirements. So, the sample in this study were all UM Palopo badminton athletes (UKM) totaling 40 people.

Data collection techniques using test instruments (Abdurrojak & Imanudin, 2016). The test used by the researcher to collect data was the arm explosive power test using a Medicine Ball, while the aim was to measure the explosive power of the arm, the implementation of the test was: the athlete sat on a bench or chair with his back against the back of the chair while holding the medicine ball, then the athlete pushed the medicine ball with all his might. his strength to get the furthest distance, the opportunity is given twice the farthest result will be the result of throwing a medicine ball. and the hand reaction speed test, the implementation of the test is that the athlete sits and puts his hand on the table with one hand in an open palm position ready to catch the bar, the results recorded are how many numbers are listed on the scale or ruler that are successfully clamped, the opportunity twice given.

The implementation of the smash hit ability test: the tester makes a pass, then the athlete hits the smash. If the shuttlecock is smashed by the athlete, it is calculated if the shuttlecock passes between the net and the rope installed above the net which is stretched as high as 30cm. And if the smashed shuttlecock is considered valid, it will get a value of 3, the opportunity is given 10 times. The data analysis method used is descriptive and inferential analysis. Descriptive analysis to describe the data as it is. While the inferential analysis Regression analysis, both simple and multiple, is used to test the hypothesis. Before using the formula. Then first, normality analysis was performed using the Kolmogorov Smirnov (KS) technique.



Figure 1. Execution of arm explosive power test hand reaction speed smash hit ability

RESULTS AND DISCUSSION

Test results and measurements are available as examples of empirical data collected in the field. Consisting of arm flexing power, hand reaction speed, and smash hitting ability on athletes from the UM Palopo Badminton Student Activity Unit (UKM). first, data tabulation was held to facilitate further testing. Analysis of the data used in this study was analyzed by

statistical techniques. Descriptive data analysis is intended to provide an overview of the data, including mean, maximum, and minimum data, standard deviation, and variance. Offer Chart and table of frequencies. Next, the analysis requirements test is carried out, namely the normality test of the data. To test the hypothesis using regression test.

Descriptive analysis of data is planned to get an overview of research data. Descriptive analysis was carried out for arm explosive power, hand reaction speed and smash hitting ability in Badminton UM Palopo athletes (UKM) so that it was easier to interpret the results of the data analysis. Descriptive data is intended to be able to interpret and give meaning to the data for each of these variables successively as can be seen in the following table.

Table 1. Summary of the results of descriptive analysis of arm explosive power, hand reaction speed and smash hitting ability

Statistics	N	Average	SD	Minimum	Maximum	Range
DLL	40	3.75	0.34	3.00	4.50	1.50
KRT	40	18.55	1.79	15.00	23.00	8.00
KPS	40	15.67	4.53	9.00	24.00	15.00

Table 2. Summary of normality test results for arm explosive power, hand reaction speed and smash hitting ability

Variable	Absolute	Positive	Negative	KS-Z	Prob.	Note.
DLL	0.093	0.078	-0.093	0.590	0.878	Normal
KRT	0.145	0.145	-0.105	0.919	0.368	Normal
KPS	0.141	0.141	-0.121	0.894	0.401	Normal

The explosive power of the arm contributes significantly to the smash ability of the UM Palopo Badminton Athletes (UKM).

Table 3. Summary of arm explosive power regression analysis result's smash ability

Variable	β	to	p	Information
DLL (X1)	0.512	5.047	0.000	Significant
KPS (Y)				

There is a significant contribution of hand reaction speed to the smash hitting ability of UM Palopo badminton athletes (UKM).

Table 4. Summary of the results of the regression analysis of hand reaction speed on the ability to hit smash

Variable	β	to	p	Information
KRT (X2)	-0.461	-4.543	0.000	Significant
KPS (Y)				

There is a jointly significant contribution of explosive power, arm reaction speed, on the smash hitting ability of UM Palopo badminton athletes (UKM).

Table 5. Summary of Multiple Regression Analysis Results Arm Explosive Power Hand Reaction Speed Against smash ability

Variable	R ₀	F ₀	p	Information
DLL(X1), KRT (X2), KPS(Y)	0.854	49,763	0.000	Signify

The results of the multiple regression data analysis obtained that the calculated R value = 0.854, after the significance test and regression test using the F test was obtained, the calculated F value = 49.763 ($P < 0.05$). So H₀ is rejected and H₁ is accepted, meaning that there is a significant contribution to the reaction speed of the hands, and the power explosive of the arms together to the smash hitting ability of the UM Palopo badminton athletes (UKM). The value of R squared is obtained = 0.729, this means that 72-90% of the smash ability can be explained by the two independent variables together, while the rest is explained by other variables not observed in this study of 27.10%.

The explosive power of the arms contributed significantly to the smash hitting ability of the UM Palopo badminton athletes. The outcomes of statistical analysis showed that the explosive power of the arm contributed significantly to the smash ability of the UM Palopo badminton athletes (UKM). The results of this study are associated with the theory and framework of the previous research. Explosive power has a strong correlation with each other arm muscle smash ability by contributing 40.28% to smash accuracy (Putra, 2019). So that the ability of the arm muscles to overcome resistance with very fast contractions, allows athletes to hit smashes with maximum strength, and can be seen in If the explosive power of the arm is analyzed from the reaction process involved, then the power explosive of the arm supports the smash hitting ability of the UM Palopo badminton athlete (UKM). The results of other studies also strengthen this study, where the results show there is indeed a significant and strong correlation between arm muscle ability backhand smash in the badminton game in athletes (Agusniar, 2019). In this case, the explosive power of the arm gave a significant contribution of 57.80% to the smash hit accurately without depending on the position where the student did the smash.

There is a significant contribution to the speed of hand reactions to the ability of smash in UM Palopo badminton athletes (UKM). The results of statistical analysis showed that there was a significant contribution between Statistical analysis shows that there is a significant contribution between the speed of hand reactions to the ability to hit smash in the badminton game of UM Palopo athletes (UKM). The outcomes of this study are associated with theories and frameworks, so basically the results of this study. supported and strengthened by the theory and the results of previous research. Eye and hand coordination play a role in the

ability to forehand smash (Yusuf, 2015). That is, the athlete has good quality and fast hand reactions, the speed of hand reactions is analyzed from the reaction processes involved in it, then the physical components of speed and hand reactions support the ability to hit smashes in badminton. Analysis of the role of hand reaction speed is very visible at 54.20% when hitting a smash.

A significant contribution of power explosive of the arm and hand reaction speed to the smash hitting ability of badminton UM Palopo athletes (UKM). According to the findings of the statistical analysis, there is a contribution. Arm explosive power, hand reaction speed, on the ability of smash hits in the badminton game for UM Palopo Athletes (UKM). The results of this study are related to the theory and research framework and are supported and refined by existing theories. There is a connection between smash skills, eye-hand coordination, arm muscle explosive power, and reaction speed (Murniati, 2018). The results of other studies also strengthen this research, explosive power leg muscles and coordination The eye of the hand has a significant relationship with the results of jumping shots forehand smash (Syafri et al., 2016). If the badminton athlete has an element of arm explosive power, and the reaction speed of the hands together is in good condition, they will be able to perform the entire series of smashes in badminton by 72.90%.

CONCLUSION

Based on data analysis with statistical calculations and test results hypothesis as well as from the discussion, then the results that can be concluded, Arm explosive power makes a sizable contribution to the smash hitting ability of badminton UM Palopo athletes (UKM).by 57.80%. And the analysis of the role of the reaction speed of the hand on the ability to hit the smash is very visible at 54.20%. arm explosive power, and hand reaction speed together in good condition, able to perform a whole series of smash executions in badminton games by 72.90%. This study did not analyze in depth the effect of arm explosive power and hand reaction speed on smash hitting ability. For this reason, more complex further research must be carried out so that it is useful in the development of athletes' sports achievement in Indonesia, especially badminton.

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