



THE RELATIONSHIP BETWEEN ARM POWER AND EYE-HAND COORDINATION WITH TABLE TENNIS FOREHAND ACCURACY IN MALE ATHLETES FROM RIAU PPLP

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Abstract

The purpose of this study was to determine the relationship between arm power and eye-hand coordination with table tennis forehand accuracy in male PPLP Riau athletes. This type of research is multiple correlation research. The population in this study were 10 PPLP Riau athletes. The sampling technique was purposive sampling with the number of samples being 8 men. The research instrument used was a seated medicine ball throw test, a tennis ball throwing test, and a table tennis forehand accuracy test. Based on the calculation results obtained = 0.06, the value = 0.38, and the multiple correlation value is = 0.40. The conclusions of this study are: (1) there is no relationship between arm power and table tennis forehand accuracy in male PPLP Riau athletes. (2) there is no relationship between eye-hand coordination and the accuracy of table tennis forehand strokes in male PPLP Riau athletes. (3) there is no relationship between arm power and eye-hand coordination with table tennis forehand accuracy in male PPLP Riau athletes. r_{x_1y} r_{x_2y} $r_{x_1x_2y}$

Keyword:

arm power, eye-hand coordination, forehand accuracy, table tennis.

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Introduction

Sport is a community activity that is often done or done a lot. Sport is a process of body activity to move. Exercise can also make us healthy. In life, the basic function of sport is to improve physical and spiritual health and is also an achievement sport for the perpetrators which is quite proud. This achievement can be seen from the contribution given by athletes in Indonesia to the development of today's sport. From the development of this sport, it can form quality human resources and more and more young people and women who excel in achievement sports.

From the above explanation based on the National Sports System Law No. 3 of 2005 chapter VI in article 20 explains that "Achievement sports are carried out through a planned, tiered, and sustainable coaching and development process with the support of sports science and technology". Through coaching and development as well as this technology is able to increase the contribution of athletes who pursue these sports achievements. So athletes are greatly helped by the existence of coaching, development and technology to achieve a maximum achievement.

Table tennis was introduced in Indonesia in 1930. In that year it was only played in Dutch meeting halls as a recreational game. In the meeting hall, only certain groups

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of people used to play it like the natives. In 1939 before World War II broke out, table tennis figures founded an organization, namely PPPSI (Indonesian Ping-Pong Association). In 1958, Surakarta was changed to PTMSI (Indonesian Table Tennis Association) and became a member of TTFA (Table Tennis Federation of Asia).

Table tennis is a game played by 2 and a maximum of 4 people. This game is played in a closed room. In this game the equipment used is a bat that is covered with live rubber (rough) which is black and red. The basic techniques are forehand, backhand, spin, service, smash, and so on.

forehand is a blow that is done with the hand position from the outside swing in. In the above sense it is explained that the forehand is swung from the bottom up. Therefore, forehand strokes are important for table tennis athletes because these forehand strokes are dominantly deadly to opponents when competing. According to (Saputro, 2017) To be able to do forehand well there are physical components, namely agility, speed, accuracy, coordination, and power. The physical components most often used in this technique are arm power and coordination.

The athletes in question are male PPLP Riau athletes, many of which have not achieved maximum performance in the national arena. Because arm power training and eye-hand coordination have not yet developed, it's still time to watch. In practice, especially in PPLP, the infrastructure should be better and have its own table tennis GOR. Here they practice in GOR hall A basketball. The place is also cramped and there is a section of glare during training during the day.

From the results of observations made at PPLP, it was found that the forehand strokes made by the male athletes were still not optimal. At the time of making a chop, there is still a wrist that is not yet strong, for example, when the chop ball is unstable, sometimes the athlete's chop is heavy, sometimes the chop is not heavy. Then when doing free ball training there are athletes who lack reflexes or their reaction speed is not maximized. In this exercise, there are also athletes who are still not maximal with arm power when doing forehand strokes. There are also these athletes when doing a forehand the ball gets stuck in the net or out, because the athlete's level of accuracy has not been maximized. So eye-hand coordination is needed when doing the forehand.

Based on the theory and data above, the researcher intends to examine the relationship between arm power and eye-hand coordination with the accuracy of table tennis forehand strokes in male PPLP Riau athletes.

Methods

This study is a correlational study that aims to determine the relationship between arm power (X1) and eye-hand coordination (X2) with table tennis forehand accuracy (Y). Survey with test and measurement data collection technique is the method used. The technique of collecting data with tests and measurements is carried out in order to determine whether there is a relationship between X1, X2 and Y, the magnitude of the relationship, and whether or not the relationship is meaningful. (Saputro, 2017).

Participant

Participant in this research are 8 male athletes, the PPLP Riau table tennis athletes will be examined.

Population & Sample

Population is a generalization area consisting of objects/subjects that have certain characteristics and qualities determined by the researcher and studied and then conclusions will be drawn. The meaning is the whole object that is the target of research (Subakti & Ikhsan, 2018). So the conclusion is a group of individuals (humans, animals, objects) which one day will be recognized as generalizations by the research results.

Based on the understanding and opinions above, there is a conclusion, then the center of the population in this study is the PPLP Riau table tennis athlete. After observation, it can be seen that the total population is 10 athletes.

The sampling technique is purposive sampling. Athletes sampled will be subject to a problem that will be investigated by researchers with the title "The relationship between arm power and eye-hand coordination with table tennis forehand accuracy in male PPLP Riau athletes".

Instrument

According to Ismaryati (2008) a test is an instrument or tool used to obtain information on an individual or object to be studied. The test must be specially designed so that the test activities run smoothly without any obstacles. This test usually covers the cognitive, affective, and psychomotor domains. And also this test can be in the form of written questions, interviews, observations about physical performance, checklists, and others. The test instruments used for research are as follows:

1. PowerArm

According to (Widiastuti & Pd, 2011) power is a series of work of several elements of muscle movement and produces explosive power if the two forces work simultaneously. In power this is done with maximum muscle strength in the fastest time by doing the right movements. The implementation of the power test is as follows.

- a. Test form :Seated Medicine Ball Throw.
- b. Objective: To measure the explosive power of the arm muscles.
- c. Assessment: The assessments that are assessed are:
 - 1) Distance is measured from the wall to the farthest throw distance.
 - 2) The value taken is the value furthest from the three experiments carried out.

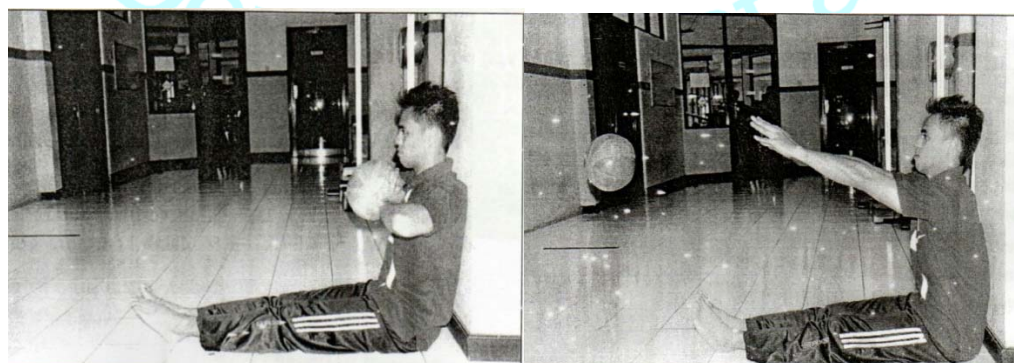


Fig 1. Arm power test
(Widiastuti & Pd, 2011)

2. Eye-Hand Coordination

According to Ismaryati (2008) coordination is defined as a harmonious relationship of mutual influence between muscle groups during work, which is shown by various levels of skills. The eye-hand coordination test is throwing and catching a tennis ball.

- a. Test form: Throw and catch a tennis ball or baseball.
- b. Purpose: To measure hand-eye coordination.
- c. Target: men aged 10 years and over.
- d. Equipment: Tennis ball or baseball, target wall.
- e. Assessment: The assessments given to the testees are as follows:
 - 1) Each throw that hits the target is scored one.

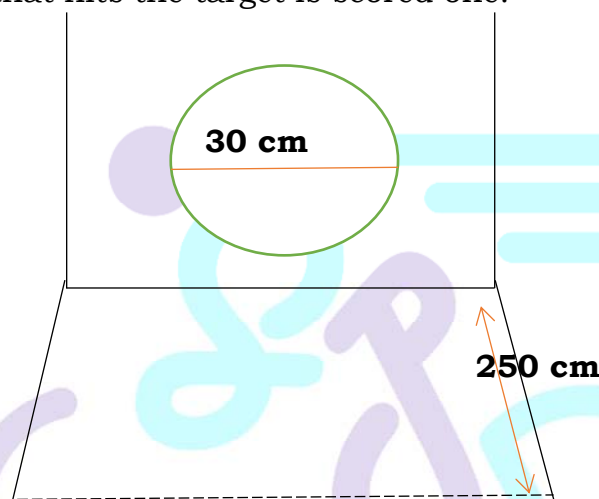
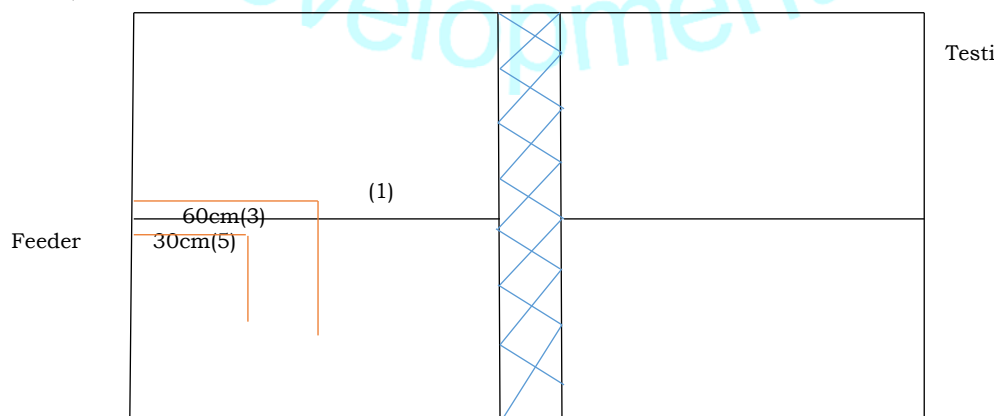


Fig 2. Eye-Hand Coordination Test.
(Saputro, 2017)

3. Accuracy Forehand

Accuracy in the forehand stroke is needed, because in the table tennis game the accuracy component is very important. So if the athlete has good accuracy, then when he hits he can direct the blow he wants. The accuracy test in table tennis forehand strokes is as follows: (Tomoliyus, 2012).

- a. The form of the test is a table tennis forehand accuracy test.
- b. Objective: To measure the accuracy (accuracy) forehand strokes.
- c. Tools and facilities: Ball, bet, table, and score sheet.
- d. Table tennis sign: The mark for the target to the left of the first testicle is 30 cm x 30 cm, the second is 60 cm x 60 cm.



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Fig 3. Table tennis accuracy forehand skill test
(Tomoliyus, 2012)

Procedure

A. Research design

The implementation of the research consists of several stages, namely as follows:

1. Preparation phase

At this stage is the first step to conduct research. begins with the preparation of a proposal consisting of a research design. in making this proposal is guided by a supervisor. After this proposal was approved, the researcher chose PPLP athletes to be the respondents/sample in this study. The athlete was subjected to various tests related to the title studied by the researcher. Therefore, before carrying out it must prepare a research permit from the relevant agency for the smooth running of the research.

2. Implementation Stage

At this stage is the stage where the test is carried out for PPLP athletes who are used as samples which are approved by the supervisor to conduct research. With the guidelines contained in the book, the researchers gave tests for these athletes. After the data is collected, data analysis will be carried out.

3. Reporting Stage

In this report, the writer conducts checking and checking the data obtained. This stage is also carried out whether there is a relationship between the results of observations and the tests carried out. After compiling this report, the results of research in compiling reports were then compiled systematically based on procedures.

Data Analysis

A. Hypothesis testing

This hypothesis test aims to test the relationship between the independent variable and the dependent variable using the person product moment formula. The formula used is as follows:

$$r_{xy} = \frac{N \cdot \sum XY - (\sum X) (\sum Y)}{\sqrt{\{N \cdot \sum X^2 - (\sum X)^2\} \{N \cdot \sum Y^2 - (\sum Y)^2\}}}$$

According to Julia (2019:41) to test the hypothesis between and to Y, the F statistic is used through the multiple correlation model, between and with the formula: $X_1 X_2 X_1 X_2$

$$r_{x_1 x_2} = \frac{n \sum X_1 X_2 - (\sum X_1) (\sum X_2)}{\sqrt{\{n \sum X_1^2 - (\sum X_1)^2\} \{n \sum X_2^2 - (\sum X_2)^2\}}}$$

Once calculated, it is calculated with the double correlation formula. The formula used for this multiple correlation is as follows:

$$R_{yx_1 x_2} = \sqrt{\frac{r^2 yx_1 + r^2 yx_2 - 2(r yx_1)(r yx_2)(r x_1 x_2)}{1 - r^2 x_1 x_2}}$$

Result

A. Data Description

Based on the tests and measurements that the researchers conducted on 8 male PPLP Riau athletes, there were 1 or 12.5% frequency, the data were 337, 468, 474,

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497, 503, and 513. While the data with a frequency of 2 or a percentage of 25%, namely data with value 513. The tables and graphs are as follows:

Table 1. Frequency Distribution of Arm Power Test Test Data on Male Athletes PPLP Riau

NO	X	Frequency	Percentage
1	337	1	12.5%
2	387	2	25%
3	468	1	12.5%
4	474	1	12.5%
5	497	1	12.5%
6	503	1	12.5%
7	513	1	12.5%
Amount		8	100%

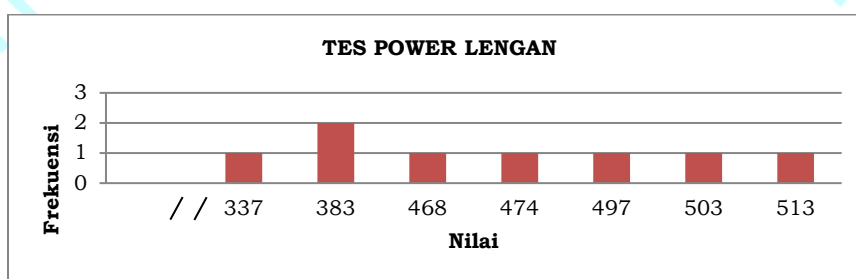


Fig 4. Frequency Distribution of Arm Power Test Test Data

Based on the test and measurement data, there are scores obtained from 8 PPLP male athletes on the eye-hand coordination test at a frequency of 1 or a percentage of 12.5% with values 7, 9, 11, 12, 15, and 19, while at a frequency of 2 or a percentage of 25% with a value of 14. The tables and graphs are as follows:

Table 2. Frequency Distribution of Testing Data for Eye-Hand Coordination Tests on Male Athletes of PPLP Riau

No	X	Frequency	Percentage
1	7	1	12.5%
2	9	1	12.5%
3	11	1	12.5%
4	12	1	12.5%
5	14	2	25%
6	15	1	12.5%
7	19	1	12.5%
Amount		8	100%

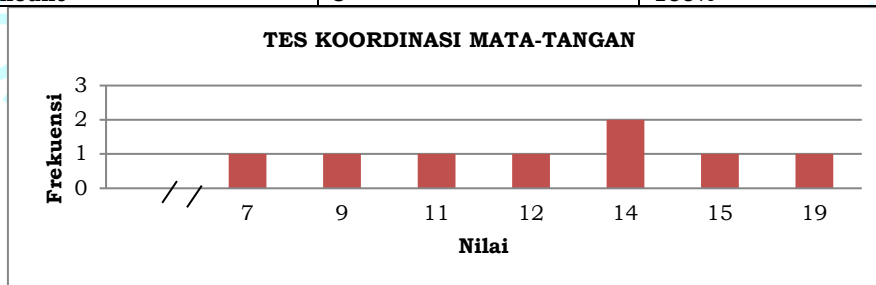


Fig 5. Frequency Distribution of Testing Data for Eye-Hand Coordination Test

Based on the test scores for the accuracy test of forehand strokes carried out on 8 male PPLP Riau athletes, the frequency value was 1 or the percentage of 12.5% was 86, 162, 170, 176, 180, 190. Then the frequency value was 2 or the percentage was only 25%. 1 with a value of 181. The tables and graphs are as follows:

Table 3. Frequency Distribution of Table Tennis Accuracy Test Test Data for Male Athletes PPLP Riau



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No	X	Frequency	Percentage
1	86	1	12.5%
2	162	1	12.5%
3	170	1	12.5%
4	176	1	12.5%
5	180	1	12.5%
6	181	2	25%
7	190	1	12.5%
Amount		8	100%

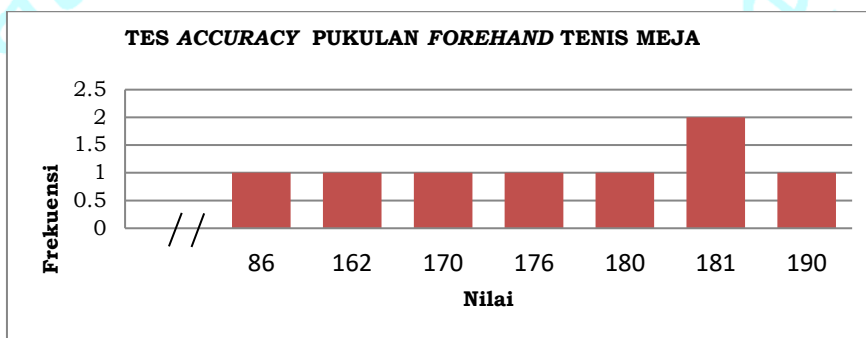


Fig 6. Frequency Distribution of Forehand Stroke Accuracy Test Test Data

B. Hypothesis testing

Table 4. Data Analysis of Correlation Between Variables X1 with Y

No	Variable	n	df	rcount	rtable	Ratio
1	PowerArm (X1)	8	6	0.06	0.707	rcount < rtable
2	AccuracyTable Tennis Forehand (Y)					
Conclusion: the hypothesis is rejected or there is no relationship						

Table 5. Data Analysis of Correlation Between Variables X2 with Y

No	Variable	n	df	rcount	rtable	Ratio
1	Eye-Hand Coordination (X2)	8	6	0.38	0.707	rcount < rtable
2	AccuracyTable Tennis Forehand (Y)					
Conclusion: the hypothesis is rejected or there is no relationship						

Table 6. Data Analysis of Multiple Correlation Between Variables X1X2 with Y

No	Variable	n	df	rcount	rtable	Ratio
1	PowerArm (X1)	8	6	0.40	0.707	rcount < rtable
2	Eye-Hand Coordination (X2)					
3	AccuracyTable Tennis Forehand (Y)					
Conclusion: the hypothesis is rejected or there is no relationship						

Discussion

Forehand strokes are very useful for every athlete. In the game of table tennis, the forehand is the most dominant to kill the ball or get points. Therefore, arm power in forehand strokes is very useful or important because if an athlete when making forehand strokes the power is present or large, the opponent will find it difficult to return the ball that was hit. Then if the athlete has good or strong arm power, for accuracy the forehand stroke can be directed to the ball in the desired place. The calculation results that have been obtained show that there is no relationship

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between arm power and the accuracy of table tennis forehand strokes for PPLP Riau athletes. The percentage of the relationship between arm power and table tennis forehand accuracy in male PPLP Riau athletes is 0.36%.

A forehand is a punch that is hit from behind to the front. In this forehand shot a lot of points in the match. Accurate forehand strokes will enable athletes to direct the ball as desired. Therefore, hand-eye coordination needs to be improved. Based on the results of the calculations, the researchers calculated that there was no relationship between eye-hand coordination and the accuracy of table tennis forehand strokes in male PPLP Riau athletes. The percentage of the relationship between eye-hand coordination and the accuracy of table tennis forehand strokes for male PPLP Riau athletes is 14.44%. The relationship level is low.

From the results of calculations using the double correlation formula that the percentage of the relationship between arm power and eye-hand coordination with the accuracy of table tennis forehand strokes in Riau PPLP athletes is 16%. The level of relationship obtained is moderate. Therefore, it is said that there is no relationship between arm power and eye-hand coordination with the accuracy of table tennis forehand strokes in PPLP Riau athletes.

In this study, researchers found several obstacles that hindered it. As for these obstacles, such as the poor placement of the ball, most of the balls entered in number 3. There were also athletes who during the accuracy test got a lot of 1. Therefore, the data obtained was not satisfactory. Then there are also those who come out of the ball because they focus on finding the highest points.

Conclusion

Based on data from research conducted by researchers on male table tennis athletes from PPLP Riau in the previous chapter, the following conclusions can be drawn:

1. There is no relationship between arm power and table tennis forehand accuracy in male PPLP Riau athletes with a percentage of 0.36%.
2. There is no relationship between eye-hand coordination and the accuracy of table tennis forehand strokes in male PPLP Riau athletes with a percentage of 14.44%.
3. There is no relationship between arm power and eye-hand coordination with table tennis forehand accuracy in male PPLP Riau athletes with a percentage of 16%.

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