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Effects Concentration, Arm Muscle Strength, And Wrist Flexibility On The Accuracy Of Forehand Drives And Backhand Drives

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Abstract— This study aims to obtain a structural equation model of the direct and indirect effects between psychological and physical factors, namely concentration, arm muscle strength, and wrist flexibility on the accuracy of forehand drives and backhand drives on table tennis extracurricular activities at Al Falah Deltasari Middle School in Sidoarjo Regency. This study uses quantitative research with non-experimental design research, using correlational methods. The subjects of this study were students who followed table tennis extracurricular aged 12-15 years consisting of twenty-eight students. Data were analyzed by descriptive statistics using the SPSS 22.0 program. Testing with hypotheses is done by correlation test, and multiple correlation. Based on the results of the correlation test in this study X1 concentration and accuracy of forehand drive with a value of r count 0.406> r table 0.367, X2 arm muscle strength and forehand drive accuracy r counts 0.370> r table 0.367, X3 wrist flexibility and forehand drive accuracy 0.381> r table 0. 367. Then the second variable X2 concentration r counted 0.374> rtanel 0.367, arm muscle strength r counted 4.21> rtable 0.367, wrist flexion counted 0.379> rtable 0.367. Next, the multiple correlation test is X1 concentration, X2 arm muscle strength X2, X3 Wrist Strength to the accuracy of the forehand drive with R value is 0.374, then the significance of F is 1,300 with R Square 14%. Furthermore, for X1 concentration, X2 arm muscle strength X2, X3 Wrist Determination of backhand drive accuracy with R value is 0.911, then the significance of F is 1.442 with R Square 15.3%.

Keywords— concentration, arm muscle strength, wrist flexibility, accuracy.

I. INTRODUCTION

PJOK learning material for small ball games in table tennis, in its learning refers to the content of educational goals to develop self-management skills in an effort to develop and maintain physical fitness and a healthy lifestyle through various physical and sports activities selected. [1] Based on the description above it can be assumed that the PJOK learning through the table tennis branch is intended to develop movement skills and physical fitness maintenance.

According to [2] physical, technical and mental readiness, theoretically a player has a greater chance of achievement. Physical readiness that needs to be well prepared includes strength, explosive power, speed, flexibility, durability, agility, accuracy, reaction time, balance, and coordination.

Physical condition is a unity of components that cannot be separated just like that, both improvement and maintenance [3].

Factors that support the skills of table tennis players that are the focus of this study relating to physical factors, including strength, flexibility and accuracy. According to [4] table tennis game skills include: grip, attitude or playing position, types of punches and leg movements.

Table tennis games require the right punch to the target because it is very important to place the ball in a direction that is difficult to hit the opponent. This can be seen from the students' movements in hitting the ball during training. These conditions can occur errors in the accuracy of the blow, which ultimately leads to poor performance and low performance [5] Such emotional mental conditions ultimately disrupt their focus and reduce their concentration on physical and technical playing table tennis. The intended concentration is a person's ability to focus the mind on a particular thing in a certain period of time [6]

When going to do a punch it requires good concentration, so that the accuracy of the punch can get points during the match [7]. A forehand drive blow is a blow technique that is carried out by the movement of a bet from the bottom of the upward spike and the clipping attitude, with the bet on the right front of the hitter. While the backhand drive is a punch technique that is carried out by the movement of a bet from the bottom of the upward trunk and the attitude of the bet clip, with the bet on the left front of the hitter. The blow was one of the most effective attacking weapons in table tennis. The accuracy of the forehand drive and the backhand drive on the predetermined target. Because in the table tennis game to get a score, then a player tries to place the ball on the target accuracy with a fast ball speed that is far from the opponent's range, so that it will have difficulty returning the ball [8].

Based on the theoretical basis of the game table tennis is needed a concentration, arm muscle strength, contributing wrist flexibility will do the forehand drive and backhand drive so that the accuracy of the punch can produce points in the table tennis game

II. METHOD, PARTICIPANTS AND PROCEDURE

This study uses quantitave research approach with non-experimental research design (non-experimental design) which means that no treatment is given to the subject of the study which allows a special impact on certain variables. [2] The method used in this study is correlational namely research that aims to find logical relationship between independent and bound variables. The arrangement of causal relationships tested by the model in this study is the relationship between the variables predicted to be involved in influencing the accuracy of the forehand drive and backhand drive of a research subject.

This study was carried out on students who took part in table tennis extracurricular, totaling 28 students at Al-Falah Deltasari Middle School. Address Jl. Anggerk VI No. 40. Kureksari, Sidoarjo Regency, East Java 61256. Implementation time from June to August.

Research instrument is a tool used by researchers to collect research data by making measurements [9]. Based on the explanation above, this study describes several types of tests, as follows :
1. Concentration is taken by means of tests and measurements using a grid consenteration exersice test to measure concentration, the equipment used at the time of research is stopwatch, stationery. The following are the steps: [10].
2. Arm muscle strength test pushes the shoulder muscles using the tool and shoulder. Arm muscle strength is stretched using push ups for men, carried out for 30 seconds and then counted several times to be able to do push ups.
3. Measurement of wrist flexibility. Objective: To determine the level of wrist flexibility. Equipment: Giniometer,
4. Instrument forehand drive accuracy and table tennis backhand drive

Data analysis technique
1. Description of data
This descriptive data discusses the average, standard deviation, variant. maximum and minimum values, as well as the percentage increase in concentration test results, arm muscle strength and wrist flexibility at the forehand drive and backhand drive accuracy. Then use descriptive static techniques. Then the test results will be recorded and calculated based on the group and the type of training applied. Data description uses Statistical Product and Solution (SPSS) series 22.0.

Data Prerequisite Test
1. Data normality test is performed to find out whether or not the normal data will be analyzed. Test the normality of the data using the Shapiro Wilk test or columnogorov-smirnov test. Take the greatest value between the differences, if Lo is less than L table, it can be stated that the data obtained is normally distributed. By using the SPSS program, if the significance value is greater than 0.05, the data is normal. 2. Linearity Test Linear test is intended as an effort to ensure the linearity of the available data. This test is needed especially on regression / correlation analysis which is causal. [6]

2. Hypothesis Test
3. Correlation analysis. Correlation is a statistical analysis technique used to find relationships (correlations) between two or more variables. [2]. 4. Multiple correlation analysis. A correlation analysis that connects between a group of independent variables (can be 2 or more, for example X1 and X2) with 1 dependent variable (Y).

III. RESULTS

The description of the results of this study discusses the mean and standard deviations obtained from the results of the tests performed on each group. The test results will be calculated and recorded by group. And it will be analyzed the results of treatment of the treatment from the 5 groups, namely the concentration group, arm muscle strength, wrist flexibility, forehand drive accuracy and backhand drive accuracy. The results of the analysis using the SPSS program version 22.0 calculation, then the description of the data from the research results can be described as follows :
Results Description of statistical data that data concentration with mean 13.3571, range 18.00, std. deviation 4.9382, minimum 6.00, maximum 24.00, and sum 374.00, arm muscle strength means 13,000, std. deviation 3.8682, minimum 6.00, maximum 22.00, and sum 364.00, wrist flexibility mean 96.964, range 36.00, std. deviation 9.9460, minimum 78.00, maximum 114.00 and sum 2715.00 then for the accuracy of the forehand drive data mean 30.8461, std. deviation 5.1668, minimum 21.00, maximum 41.00, and sum 863.69 and backhand drive accuracy with a mean value of 48.066, std. deviation 5.5242, minimum 12.33, maximum 33.67, and sum 669.33.

a. Normality test.
The purpose of the normality test is to find out whether the data obtained from each variable analyzed actually follows a normal distribution pattern or not. The variable normality test is done using the Shapiro-Wilk formula. The rules used to find out whether or not a normal distribution is $p > 0.05$ are declared normal, and if $p < 0.05$ the distribution is not normal. The summary of the results of the normality test can be seen in the following table:

TABLE I. NORMALITY TEST RESULTS

Variabel	P	Sig	Description
Concentration	0.415		Normal
arm muscle strength	0.870		Normal
Wrist Flexibility	0.495	0.05	Normal
Accuracy Forehand Drives	0.958		Normal
Accuracy *backhand drive*	0.553		Normal

2. Correlation Test
Before testing the hypothesis that is looking for the relationship of the independent variable with the dependent variable, first look for the relationship between the independent variable and the dependent variable, then do simple and multiple regression analysis, as follows:

TABLE II. RESULTS OF EACH VARIABLE CORRELATION TEST

Correlation	r_{hiutng}	r_{tabel} (df 27)	Desciption
$X_1 Y_1$	0,406	0,367	Signifikan
$X_2 Y_1$	0,370	0,367	Signifikan
$X_3 Y_1$	0,381	0,367	Signifikan
$X_1 Y_2$	0,374	0,367	Signifikan
$X_2 Y_2$	0,421	0,367	Signifikan
$X_3 Y_2$	0,379	0,367	Signifikan

3. Multiple Correlation Test

Multiple correlation test is a correlation analysis that connects between a group of independent variables that can be more than two variables with one dependent variable.

TABLE III. MULTIPLE CORRELATION RESULTS

Variable	R	F	R Square
$X_1 X_2 X_3 Y_1$	0.374	1.300	14 %
$X_1 X_2 X_3 Y_2$	0.911	1.442	15, 3 %

IV. DISCUSSION AND CONCLUSION

The psychological factor determines the accuracy of punching the forehand drive accuracy. A person's ability to focus attention or concentrate on certain cues that are in accordance with his duties will provide optimal results for his tasks. So, from psychological factors, one of which is high concentration is very necessary because every movement carried out will determine the accuracy of a player's punch in a table tennis match. According to [11] There are three barriers that prevent the concentration of players during the competition so that they distract them, namely silence at the initial mistake, focus too much on the results of the competition and focus too much on the mechanical body and movement. The motion of the arm that is carried out by the arm consists of several muscles, including: The base arm muscle consists of: 1) m. biceps brachi, 2) m. brachialis, 3) m. kurako brachialis, 4) m. triceps brachi [12]. The most important strength in table tennis is what is called dynamic power (explosive strength and endurance - repetitive strength). The goal of arm muscle strength is to allow table tennis players to overcome resistance from their own weight and bet.

The good arm muscle strength can be trained by using ball exercises towards the wall and also by doing exercises in pairs, it will improve the basic abilities of table tennis games [13]. This opinion is in accordance with the training done at school. Flexibility is very important for the quality of training and playing and as protection from injury. This is the fact that optimal flexibility is needed for good techniques. Flexibility can be defined as the ability of a person to perform movements with greater samplitudo possible" [14]. The significance of flexibility is increased due to the fact that it has a positive effect on strength, speed, coordination and endurance. The most critical age for development of flexibility is around the age of 14 years (period of sudden growth). At this age it is recommended that exercise for flexibility be carried out after strength training and every exercise table tennis. The development of flexibility can be divided into two phases, namely the special improvement phase of joint mobility, and the phase of maintaining joint mobility at the level achieved [15].

In this study, the relationship of concentration, arm muscle strength and wrist flexion had a significant effect on the accuracy of backhand drive and forehand punches in the game of table tennis. What is meant by accuracy here is the accuracy of a player trying to place the ball on the target accuracy with a fast ball speed that is far from the opponent's range, so that it will have difficulty returning the ball. This research was completed from research by [16] a dominant determinant of playing table tennis, namely physical condition factors namely agility, arm muscle power, hip flexibility, reaction time, and eye hand coordination.

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