The Effect of Dumbbell Exercises on Smash Ability in Table Tennis Sports in Men's Students Class VII SMP Negeri 3 Duhiada'a

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Abstract. Risna Podungge M.Pd., Muhammad Faisal Lutfi Amri, M.Pd., Taufik Bumulo. The Effect of Dumbbell Exercises on Smash Ability in Table Tennis Sports in Men's Students Class VII SMP Negeri 3 Duhiadaa. Undergraduate Study Program of Physical Education, Health and Recreation, Department of Sports Education, Faculty of Sports and Health, Gorontalo State University. The formulation of the problem in this study is "is there an influence on smash ability in the sport of table tennis through dumbbell exercises in men's students of class VII of Duhiadaa State Junior High School 3?". The purpose of this study is to find out how much influence dumbbell exercises have on smash ability in the sport of table tennis in men's students of class VII of State Junior High School 3 Duhiadaa. The test result obtained $t_{count} = 11{,}896$ t_{table} values at $a = 0.05$; dk n-1 (0.05;30–1 = 29) obtained a price of 1.669. Thus t_{count} is greater than ttabel ($t_{count} = 11{,}896 >$ ttabel = 1,669). Based on the test criteria that receive Ha: if $t_{count} > t_{table}$ at $a = 0.05$; n-1, therefore the alternative hypothesis or Ha is acceptable, so it can be stated that there is an influence of dumbbell exercises on the ability of smashes in the sport of table tennis in students of class VII of Duhiadaa State Junior High School 3. Based on the results of the experiments that have been conducted, awarding students significantly in smash ability in the sport of table tennis after the implementation of the experiment. Thus it can be concluded that the author's hypothesis that reads "if dumbbell exercises are applied, then the ability of smash in the sport of table tennis in students of class VII of State Junior High School 3 Duhiadaa will have an effect" is acceptable.

Keywords: Dumbbel Exercises · Smash · Table Tennis

1 Introduction

Table tennis or ping pong, is a racquet sport played with two people (for singles) or two pairs (for doubles) and opposites. The game uses a racket made of rubber-covered wooden boards called bets, a ping pong ball and a table-shaped game. And separated by the net.

Dumbbell exercises are an important part of the routine, with exercise properly and correctly you can increase strength and muscle mass. It can even be used to maximize muscle strength. Being an effective device for balancing the strength of the limbs.

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Punching technique is one of the main basic techniques and also one of the most important factors that must be mastered in the game of table tennis, without excluding other techniques.

The smash technique in table tennis games is used to deflect lob punches used by co-stars. The main purpose of using smash is to attack the opponent's attacks hard and and quickly. In doing the smash technique is not as easy as imagined, players must ensure that the ball does not shoot from the target they want to aim for.

Based on the background description above, the researcher raised the title "The effect of Dumbbell Training on the ability of smash punches in table tennis in grade VII male students of SMP Negeri 3 Duhiada'a".

2 Research Methods

2.1 Research Design

Research is an experimental study, which aims to find cause-effect relationships. Then continued by dividing into experimental groups using pre-experimental design techniques with *a one-group pretest and post-test design* model, namely one experimental group measured its dependent variables (pre-test), then given treatment, and re-measured the dependent variables (post-test), without any comparison group. The research design can be described as follows:

$The_1 \rightarrow X \rightarrow The_2$(Sugiyono, 2020:114).

Information:

O_1: Pretest value (before being given *dumbbell* exercises).

X: Treatment.

O_2: Posttest value (after being given *dumbbell* exercises).

This research was conducted at SMP Negeri 3 Duhidaa, located in Buntulia Barat Village, Pohuwato Regency, Gorontalo Province. The research time was carried out from Monday, April 11, 2022, to May 31, 2022 (Fig. 1).

The technique carried out in this data collection is the Test technique. The steps are implemented in the following way:

1. Conduct an initial test to determine students' ability to perform smash punches
2. After doing exercises with *dumbbells* for 16 treatments, the final test was carried out to determine the ability of students' smash punches

Implementation:

1. Students are in the game area or table to do a smash, the opportunity to do as much as 5 times.
2. Balls that come out of the table or do not bounce on the table are considered invalid
3. To measure the ability of smash punches is done by recording the incoming balls on the numbers.

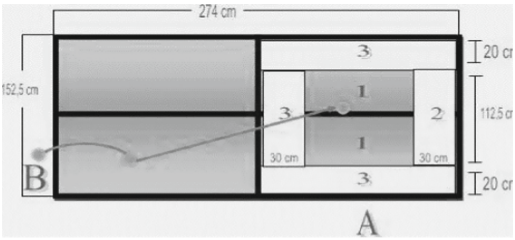

Fig. 1. Data collection instrument (Source:verducci,1980).

3 Description of Research Results and Discussion

3.1 Description of Research Data

From the results of the study on the initial test and the final test for the accuracy of smash in the sport of table tennis, in this case the difference between the Initial Test and the Final Test can be obtained as can be seen in the table (Table 1):

3.2 Final Test Data

Based on the table, the average value can be calculated using the average formula:

$$\bar{x} = \frac{\Sigma x}{N}$$

$$\bar{x} = \frac{311}{30}$$

$$\bar{x} = 10.37$$

So the calculation results above for the average score in doing *a smash*in the sport of table tennis final test are: $= 10.37.\bar{x}$

To test the similarity of the variance or homogeneity of the population taken into a sample, the following formula is used:

$$S^2 = \frac{\Sigma(X_1 - \bar{x})^2}{n-1}$$

$$S^2 = \frac{100.97}{30-1}$$

$$S^2 = \frac{100.97}{29}$$

$$S^2 = \sqrt{3.482} \text{ (Variance)}$$

$$S = 1.866 \text{ (Standard Deviation)}$$

Table 1. List of Variance Calculations And Standard Deviations

No	Final Test (X_2)	$\bar{x}$	X_1 -$\bar{x}$	(X_1 -)$\bar{x}$ 2
1	6	10.37	-4.37	19.097
2	7	10.37	-3.37	11.357
3	8	10.37	-2.37	5.6169
4	9	10.37	-1.37	1.8769
5	9	10.37	-1.37	1.8769
6	9	10.37	-1.37	1.8769
7	9	10.37	-1.37	1.8769
8	9	10.37	-1.37	1.8769
9	9	10.37	-1.37	1.8769
10	9	10.37	-1.37	1.8769
11	9	10.37	-1.37	1.8769
12	10	10.37	-0.37	0.1369
13	10	10.37	-0.37	0.1369
14	10	10.37	-0.37	0.1369
15	10	10.37	-0.37	0.1369
16	11	10.37	0.63	0.3969
17	11	10.37	0.63	0.3969
18	11	10.37	0.63	0.3969
19	11	10.37	0.63	0.3969
20	11	10.37	0.63	0.3969
21	11	10.37	0.63	0.3969
22	11	10.37	0.63	0.3969
23	11	10.37	0.63	0.3969
24	12	10.37	1.63	2.6569
25	12	10.37	1.63	2.6569
26	13	10.37	2.63	6.9169
27	13	10.37	2.63	6.9169
28	13	10.37	2.63	6.9169
29	13	10.37	2.63	6.9169
30	14	10.37	3.63	13.177
	311			100.97

So the results of the above calculation show that the variance in the test data final accuracy of smash in table tennis 3,482 and the standard deviation 1,866.

Testing the normality of the data, carried out using the Liliefors test with the following steps:

1. First step: Determine the testing hypothesis
2. Ha = normally distributed data
3. Ho = data not normally distributed
4. Second rare: determining the test criteria
5. Accept Ha: if $L_{counts} < L_{table}$ at a = 0.05; n = 30
6. Reject Ha: if $L_{counts} > L_{table}$ at a = 0.05; n = 30
7. Third rare: counting Zi, F(Zi), S(Zi) as a step in the data normality tester.
8. Fourth rare Conclusion of data normality test results X_2

1) From the calculations in the table, the difference value (F(zi) - S(zi)) or L_{count} (L_h) is 0.187 and L_{table} (L_t) = a 0.05; n = 30 based on the table of critical values L liliefors test determined L_{table} or (L_t) which is 0.160. So L_h is smaller than L_t (L_{count} = 0.134 L_{table} = 0.160). On the test criteria states that if $L_{counts} < L_{of\ the\ table}$ at a = 0.05; n = 30, then Ho is accepted. Thus this normality test can be concluded that the research sample is accurate smash in the sport of table tennis from a normally distributed population.

3.3 Data Homogeneity Test

To test the similarity of vanans or homogeneity and the population taken1 into a sample using the following formula

$$F = \frac{variansterbesar}{variansterkecil}$$

This test is carried out with the following steps:

1. The first step of determining the homogeneity of the test
2. Accept Ha: homogeneous variance.
3. Reject Ha: inhomogeneous variance
4. The second step determines the test criteria
5. Accept Ha if $F_{counts} < F_{of\ the\ table}$ at a = 0.05,dk denominator 29 and et al. numerator 29
6. Reject Ha if $F_{counts} > F_{of\ the\ table}$ at a = 0.05,et al. denominator 29 and et al. numerator 29
7. The third step of testing the similarity of variance

It is known that the value variance between the initial test and the final test is:

$$S_1^2 = 5.661$$

$$S_2^2 = 3.482$$

Table 2. Calculation of Post-Test Data Normality Test

No	X	Day	Fzi	Hi	Fzi-Si
1	6	-2.34	0.0096	0.03	0.024
2	7	-1.81	0.0351	0.07	0.032
3	8	-1.27	0.1038	0.10	0.004
4	9	-0.73	0.2327	0.37	0.134
5	9	-0.73			
6	9	-0.73			
7	9	-0.73			
8	9	-0.73			
9	9	-0.73			
10	9	-0.73			
11	9	-0.73			
12	10	-0.20	0.4207	0.50	0.079
13	10	-0.20			
14	10	-0.20			
15	10	-0.20			
16	11	0.34	0.6331	0.77	0.134
17	11	0.34			
18	11	0.34			
19	11	0.34			
20	11	0.34			
21	11	0.34			
22	11	0.34			
23	11	0.34			
24	12	0.87	0.8078	0.83	0.026
25	12	0.87			
26	13	1.41	0.9207	0.97	0.046
27	13	1.41			
28	13	1.41			
29	13	1.41			
30	14	1.95	0.9744	1.00	0.026

By determining the variance value between the Initial Test and the Final Test, the test can be carried out with the following steps:

$$F = \frac{variansterbesar}{variansterkecil}$$

$$F = \frac{5.661}{3.482}$$

$$F = 1.626$$

From the above calculations obtained a nilate F_{count} of 1.626 and F_{table} at a = 0.05, et al denominator 29 found a value of 1.85 so F_{count} is less than F_{table} ($F_{count} = 1.626 \leq F_{table} = 1.85$) On the test criteria states that if $F_{counts} \leq F_{the\ table}$, then Ha is welcome. Thus it can be concluded that the data on the accuracy of smashes in the sport of table tennis have similarities in variance or come from a **homogeneous** population.

3.4 T Test

To test the hypothesis that says that there is an effect of *dumbbell* training on the accuracy of smashes in table tennis sports in grade VII male students of SMP Negeri3 Duhiadaa, this is analyzed by testing the variance analysis of two averages using the following formula (t test) (Table 3):

From the table, hypothesis calculations can be carried out as follows:

$$t = \frac{Md}{\sqrt{\frac{\Sigma Xd^2}{n(n-1)}}}$$

Information:

Md=Average score of the difference between the initial test and the final test

Xd=Deviation of each subject (d-Md)

Xd^2=Sum of squares of deviations

n=Number of samples

So:

$$t = \frac{3.20}{\sqrt{\frac{62.8}{30(30-1)}}}$$

$$t = \frac{3.20}{\sqrt{\frac{62.8}{870}}}$$

$$t = \frac{3.20}{\sqrt{0.072}}$$

$$t = \frac{3.20}{0.269}$$

$$t = 11.896$$

The test results obtained t_{count} = 11,896 t values of$_{the\ table}$ at a = 0.05; et al. = n-1 (0.05; 30–1 = 29) obtained t_{table} by 1,669. Thus t_{count} is greater than t_{table}(t_{count} = 11,896

Table 3. Hypotheses Of Preliminary Test And Final Test Data Hypotheses

No.	Initial Test	Final Test	D	Md	Xd (d-Md)	Xd^2
1	4	6	2	3.20	-1.20	1.44
2	7	8	1	3.20	-2.20	4.84
3	4	7	3	3.20	-0.20	0.04
4	6	9	3	3.20	-0.20	0.04
5	4	9	5	3.20	1.80	3.24
6	8	9	1	3.20	-2.20	4.84
7	11	13	2	3.20	-1.20	1.44
8	5	10	5	3.20	1.80	3.24
9	10	13	3	3.20	-0.20	0.04
10	7	9	2	3.20	-1.20	1.44
11	6	11	5	3.20	1.80	3.24
12	4	10	6	3.20	2.80	7.84
13	8	11	3	3.20	-0.20	0.04
14	5	11	6	3.20	2.80	7.84
15	11	12	1	3.20	-2.20	4.84
16	7	10	3	3.20	-0.20	0.04
17	5	11	6	3.20	2.80	7.84
18	8	11	3	3.20	-0.20	0.04
19	6	9	3	3.20	-0.20	0.04
20	6	9	3	3.20	-0.20	0.04
21	9	13	4	3.20	0.80	0.64
22	12	14	2	3.20	-1.20	1.44
23	10	13	3	3.20	-0.20	0.04
24	7	10	3	3.20	-0.20	0.04
25	9	11	2	3.20	-1.20	1.44
26	5	9	4	3.20	0.80	0.64
27	8	11	3	3.20	-0.20	0.04
28	9	11	2	3.20	-1.20	1.44
29	10	12	2	3.20	-1.20	1.44
30	4	9	5	3.20	1.80	3.24
Sum	215	311	96			62.8
Mean	7.17	10.37	3.20			

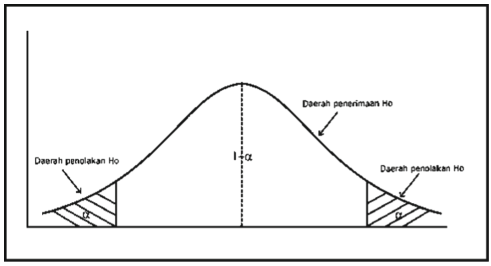

Fig. 2. Hypothesis Acceptance and Rejection Curve

$>$ t_{table} = 1,669). Based on the test kritenia hahwa accept Ha: if $t_{counts} > t_{table}$ at a = 0.05;n-1, therefore the alternative hypothesis or Ha is acceptable, so it can be stated that there is an effect of *dumbbell* practice on the accuracy of smashes in the sport of table tennis in the male students of grade VII of SMP Negeri 3 Duhiadaa.

3.5 Testing Criteria

In general, two hypotheses are known, namely the Nil Hypothesis (Ho) and the Alternative Hypothesis (Ha). The following are the results of the hypothesis testing criteria in this study (Fig. 2).

Ha: no influence on smash accuracy.

Ho: there is an influence on the accuracy of the smash.

So:

Accept Ha if tcount $>$ ttable.

Reject Ha if $t_{count} < t_{table}$.

The curve image gives an idea that the t_{count} is beyond Ho's acceptance, so Ho is rejected and Ha is accepted, which means there is an increase in the frequency of smash accuracyin the sport of table tennis.

And thus the hypothesis that reads "if *dummbell* exercises are applied, then the precision of smashesin the sport of table tennis in grade VII students of SMP Negeri3 Duhiadaa will be influential".

3.6 Discussion

In this study, the authors conducted experiments with *dumbbell* exercises, namely conveying goals and preparing students, demonstrating knowledge and skills, guiding training, checking understanding and providing feedback and providing opportunities for further exercises. It is intended to measure and obtain an idea of the learning that is felt to be most effective in influencing the accuracy of smashes in the sport of table tennis. This experiment was conducted on grade VII students of SMP Negeri3 Duhiadaa.

Based on the results of experiments that have been carried out, it significantly affects students' ability to smash accuracy in the sport of table tennis after the implementation of experiments. Thus it can be concluded that the author's hypothesis that reads: "if *dummbell* exercises are applied, then the accuracy of smashesin the sport of table tennis

in students of grade VII of Duhiadaa State Junior High School3 will have an effect" is acceptable.

The method of training by using *dumbbell* exercises is applied, then the accuracy of smash in the sport of table tennis, begins with the following steps conveying the purpose and preparing students, demonstrating knowledge and skills, guiding training, checking understanding and providing feedback as well as providing opportunities for further practice.

After that the student performs the exercise in a good and correct way as exemplified. Based on the results of the initial test assessment, the accuracy of smash in the sport of table tennis obtained showed the highest score of 12 and the lowest score of 4. After the analysis, an average value of 7.17 was obtained, a variance of 5,661, a standard deviation of 2,379.

Meanwhile, the final test research results showed the highest score of 14 and the lowest score of 6. After the analysis, an average value of 10.37 was obtained, a variance of 3,482, a standard deviation of 1,866. For testing the homogeneity of data between the results of pretest and posttest studies, all variables have homogeneous population variances and have a normally distributed population. For the purposes of hypothesis testing in ini research, then in hypothesis assessment, an anâlysis test of experimental research data is used. To analyze experimental data using initial tests and one*group design* final test.

4 Conclusion

The data obtained through the measurement of the initial test is the result of the accuracy of the smash in the sport of table tennis. From the data obtained, it shows the highest score of 12 and the lowest score of 4. After the analysis, an average value of 7.17 was obtained, a variance of 5,661, a standard deviation of 2,379. Furthermore, the data obtained through the measurement of the final test is the hasil of the ability of smash accuracy in the sport of table tennis. From the data obtained, it shows the highest score of 14 and the lowest score of 6. After the analysis, an average value of 10.37 was obtained, a variance of 3,482, a standard deviation of 1,866.

The test results obtained $t_{count} = 11{,}896$ t values of $_{the\ table}$ at $a = 0.05$; et al.-1 (0.05; 30–1 = 29) obtained a price of 1.66 9. Thus $t_{count\ is}$ greater than t of$_{the\ table}$ ($t_{count} = 11.896 > t_{of\ the\ table} = 1.669$). Based on the test criteria that accept H_a: if $t_{counts} > t_{table}$ at $a = 0.05$;n-1, therefore the hypothesis of alternatif or Ha is acceptable, so it can be stated that there is an effect of *dumbbell* practice on the accuracy of smashes in table tennis sports in grade VII students of SMP Negeri3 Duhiadaa.

Based on the results of experiments that have been carried out, it significantly affects the ability of students in the accuracy of smashes in the sport of table tennis after the implementation of the experiment. Thus it can be concluded that the hypotesis of the author which reads "if *dummbell* exercises are applied, then the accuracy of smashesin the sport of table tennis in students of grade VII of SMP Negeri3 Duhiadaa will have an effect" is acceptable.

5 Suggestion

With the results of the discussion and conclusions above, several suggestions are put forward as follows:

1. In an effort to spur students' ability to do *smashes*in the sport of table tennis, *dumbbell exercises are* used.
2. The development of interests and talents possessed by children, especially in the sport of table tennis, namely *smash*, basically does not depend solely on the guidance of teachers and coaches, but is also largely determined by the support and motivasi and parents, therefore parents are expected to provide motives for each child to carry out training activities outside of school hours.
3. All children who have an interest and talent in table tennis games are expected to be able to practice freely outside the established schedule both at school and outside of school by applying the theories of exercises obtained through the teaching and learning process.

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