Comparison Of The Effect Of Training Using Aid And Without Aid On The Speed Of 50-Meter Butterfly Stroke In Athletes Of Bina Tirta Swimming Club Medan

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Abstract

This research also aims to find out how much influence training using equipment has on butterfly swimming speed in Bina Tirta Swimming Club swimming athletes, to find out how much influence training without aids has on butterfly swimming speed in Bina Tirta Swimming Club athletes. club, and to find out which form of training has a greater influence between training using aids and without aids on butterfly swimming speed in Bina Tirta Swimming Club swimming athletes. This research is experimental research. The data collection technique uses a 50 meter butterfly swimming test. The subjects of this research were 20 Bina Tirta Swimming Club athletes who were selected using purposive sampling techniques. This research was carried out for 6 weeks, 18 meetings with a frequency of exercise carried out 3 times a week. The data analysis technique uses inferential statistics with the t test. The results of research on the hypothesis show that 1) data on swimming speed using treatment using assistive devices obtained a calculated t value of 7.489 so it has an influence. 2) swimming speed data using treatment without using assistive devices obtained a value of 9.725 so it has an influence. 3) The results of the parametric test on the independent sample T-Test, obtained a significance (2-tailed) of 0.712 > 0.05 (no significant effect), so it can be concluded that training using fins aids and paddles , did not have a better effect compared to training without aids on swimming speed of 50 meters butterfly style in Bina Tirta Swimming Club Medan athletes The conclusion of this research is that the results of data analysis, hypothesis testing and discussion show that training without using assistive devices provides a more significant increase compared to assistive equipment in the 50 meter butterfly swimming speed of Bina Tirta Swimming Club Medan swimming athletes.

Keywords : Using tools, without tools, speed, butterfly style

INTRODUCTION

Nowadays, swimming has undergone many developments according to its respective goals, whether to maintain health and fitness, for recreation, or for achievement purposes. Swimming is a different sport compared to other sports in general. Swimming is done in water, so the earth's gravity factor is influenced by the upward pressure of the water. Under normal conditions (on land) the human body can move freely under the influence of gravity, while in water we must learn to adjust our movements to the water. This gives rise to movements that look strange, then the movement is created which is considered the most advantageous. These movements then become styles in swimming (Roeswan and Soekarno, 1979:37). Swimming is an effort to move (float or lift) all parts of the body above the surface of the water. According to Budiningsih (2010:17) there are several styles in swimming, including freestyle, backstroke, breaststroke, and butterfly.

Butterfly style is swimming that is done by swinging the arms simultaneously forward starting from both arms straight parallel to the body in the water, then bending both elbows so that both elbows come out of the surface of the water then swinging both arms straight simultaneously both backs almost touching, both palms facing out while moving the waist by going up and down to the shoulders while both legs move upwards to the surface of the water then doing a dolphin or downward whipping movement (like the movement of a dolphin) and so on. Compared to other swimming styles, swimming butterfly style requires great strength from the swimmer. According to (Ilham, 2018) "The speed of butterfly swimming comes from the swing of both arms simultaneously, combined with the simultaneous push of the legs. As for (Cholis et al., 2016: 87) "The butterfly style is the most difficult swimming style because both arms move to recover to the surface of the water simultaneously". From the quote above, it can be concluded that butterfly swimming is a difficult style, especially from the movement of both arms. In addition to having good technique, athletes must also have good physical condition as well. In swimming training, aids are very necessary to support the

training process in order to achieve maximum results and be able to achieve the desired goals. As explained by (Wicaksono et al., 2021: 153) "The media does not only communicate the relationship between teachers and students but more than that, the media is an integral part that is interconnected between one component and another component that interacts and influences each other." Training aids play a crucial role in the training process. They can be used to vary training and provide optimal results when used appropriately and according to needs. Butterfly swimming speed training also involves training with equipment. The equipment used in this study was fins and paddles.

Research purposes

The objectives of this research are as follows

1. To determine the effect of training using fins & paddles on the speed of the 50-meter butterfly stroke in athletes from the Bina Tirta Swimming Club Medan.
2. To determine the effect of training without using aids on the speed of the 50 meter butterfly stroke in athletes from the Bina Tirta Swimming Club Medan.
3. To find out how big the comparison of the influence of using fins & paddles and without them is. using aids *on* the speed of butterfly swimming in athletes from the Bina Tirta Swimming Club Medan.

Benefits of research

This research is expected to provide benefits, both theoretically and practically.

Theoretical Benefits

Theoretically, the results of this study are expected to be useful in increasing the knowledge of comparing the effects of using and without assistive devices on the butterfly swimming speed of athletes from the Bina Tirta Swimming Club Medan.

Practical Benefits

a. For researchers, this research can provide new experiences to find out whether there is an effect of using assistive devices on the speed of the 50-meter butterfly swimming stroke.
b. For coaches and trainers, this research is very helpful in improving and developing training models using tools and is useful for improving athlete performance.
c. For clubs, this research is to provide information to clubs that the use of assistive devices can influence an athlete's performance.
d. For athletes, this research helps swimmers to know the benefits of using training buoyancy aids to improve performance in the 50-meter butterfly stroke, especially speed.

METHOD

Research methods are strategies used by researchers to collect research data (Arikunto, 2006:160). The presence of methods plays a crucial role in conducting research because it provides precise guidance and establishes correct requirements. The goal is to ensure that research results are appropriate and can be scientifically recognized. The determination of research methods is influenced by the research object. Therefore, the method applied in this study is an experiment as the research object. According to Arikunto (2010:9), the experimental method can be defined as an approach to discovering causal relationships (causal relationships) between two factors intentionally by the researcher by eliminating, reducing, or eliminating other factors that may be interfering. The selection of scientific research as a research methodology must be carried out carefully and in accordance with the research objectives, so that the results obtained align with the research intent. The use of research methods is an absolute requirement in a study, and the quality of the research depends on accountability for the research methodology. Therefore, it is crucial that the research method used is appropriate and relevant to the research objectives. Through the use of this method, researchers can assess differences in results between treatment and observation in pre-test and post-test designs. The specifications of the research design are explained as follows:

The experimental group was divided based on their 50-meter butterfly swimming performance in the initial test. After ranking the initial test results and grouping them using

ordinal pairing, subjects with comparable performance were then paired into group A (experimental) and group B (control). Thus, before receiving the treatment, the two groups were considered balanced. If differences were found, they were attributed to the impact of the treatment. By using this approach, the study was able to assess the comparison of results between treatment and observation in a pre-test and post-test design. The details of the research design are described as follows:

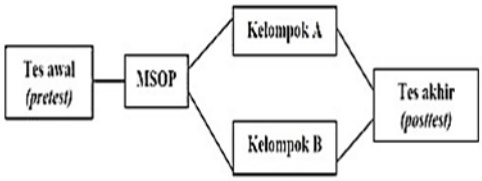

Figure 1 Two Groups Pretest-Posttest Design
(Source: Devy Citra, et al. 2022)

Information:
Pretest : Initial test of butterfly stroke speed time
MSOP : *Matched Subject Ordinal Pairing*
Group A : Treatment (*treatment*) with the method using *aids*
Group B : Conduct (*treatment*) with the method without *any tools*
Posttest : final test of butterfly stroke speed time taking

The technique for dividing groups using ordinal pairing is as follows:

Group A

This group will follow a training program with portions equivalent to group B, and the type of training will be using aids.

Group B

This group will follow a training program with portions equivalent to group A, and the type of training will be without aids.

(group A) (group B)
1 — 2
4 — 3
5 — 6
8 — 7
9 — 10

Figure 2. Ordinal Pairing Group Sampling Technique
(Source: Sutrisno Hadi 1995)

Research Design

This study aims to evaluate whether there is a difference in the impact between training using assistive devices and without assistive devices on the butterfly swimming speed of Bina Tirta swimming athletes on *Swimming Club* Medan. With this aim, the design used in this study is the Pretest Posttest Design. In this design structure, two groups are selected using the ordinal pairing method and then given treatment (*treatment*) between the pretest and posttest periods. The use of pretest and posttest in this design aims to evaluate the effect of training with and without assistive devices on butterfly swimming speed.

This study involved two groups, namely experimental group A and experimental group B. Experimental group A will receive treatment in the form of a training model using assistive devices, while experimental group B will receive treatment in the form of a training model without assistive devices. This research design can be presented in tabular form.

Table 1. *Pretest – Posttest* Research *design*

Group	*Pretest*	*Treatment*	*Posttest*
Experimental Group A	THE_1	X_1	THE_2
Experimental Group B	THE_1	X_2	THE_2

Source: Sugiyono, (2023: 114)

Information:
O1 : Initial Test (Pretest)
O2 : Final Test (Posttest)
X I : Training using aids
X 2 : Training without aids

The design was chosen because it considered control over factors that could affect internal validity. Internal validity involves asking whether the experimental results are entirely due to the treatment and not influenced by other factors. Thus, the results of this study were only influenced by the applied training model, while other factors that could

influence the results were kept constant or controlled, thus minimizing bias in the results. Furthermore, this study also considered external validity, which relates to the extent to which the results can be generalized. Therefore, the selection of the experimental group in this study took into account the sample using a purposive sampling technique within the study population.

Data Analysis Techniques

The data analysis method is the most crucial part of the research. Therefore, it determines whether the hypothesis proposed by the author above is appropriate or not. The collected data is selected using quantitative descriptive techniques. After the collected data is selected, technical analysis steps are necessary. Before testing the hypothesis, prerequisite tests are necessary. Testing the measurement data related to the research results aims to improve the analysis. Therefore, in this study, normality and homogeneity tests will be carried out.

Prerequisite Test

The statistical test in this study is included in parametric statistics, namely a statistical test that requires prerequisite tests. The prerequisite tests used in this study are:

a. Normality Test

The normality test is nothing more than conducting a test on whether the data to be analyzed is normal or not. The test is carried out depending on the variables to be processed. The normality test for data distribution uses the Shapiro-Wilk Test with the help of SPSS 23. The criteria used to determine whether a distribution is normal or not is if p > 0.05 (5%) the distribution is declared normal and if p < 0.05 (5%) the distribution is said to be abnormal.

b. Homogeneity Test

The homogeneity test is used to determine whether the data is homogeneous or not. This test is conducted using SPSS 23, using the One-Way ANOVA formula. The criteria used to determine whether a distribution is homogeneous are: if p > 0.05 (5%), the distribution is considered homogeneous, and if p < 0.05 (5%), the distribution is considered non-homogeneous.

c. Hypothesis Testing

To answer the first and second hypothesis questions, namely knowing the difference between the pretest and posttest in each group, the Paired Sample T-Test formula can be used with the help of SPSS 23. The criteria used to find out if there are significant changes in each group.

To answer the third hypothesis question, namely knowing the existence of a significant difference between the pretest of group A and the pretest of group B, posttest of group A and posttest of group B, the Independent Sample T-Test formula can be used with the help of SPSS 23. The criteria used to find out whether there is a significant difference in each group. The criteria used to find out whether the first and second hypotheses are significant are if p <0.05 (5%) and the calculated t value> t table then it is stated that there is a significant change or Ha is accepted, whereas if p> 0.05 (5%) and the calculated t value <t table then it is stated that there is no significant change or Ha is rejected. The criteria used to find out whether the third hypothesis is significant are if p <0.05 (5%) and the calculated t value> t table then it is stated that there is a significant difference or Ha is accepted, whereas if p> 0.05 (5%) and the calculated t value <t table then it is stated that there is no significant difference or Ha is rejected.

RESULTS AND DISCUSSION

Description of research data

Based on the results of research that has been conducted at the Bina Kartika swimming pool, with the title of the comparative research on the effect of training using and without aids on the speed of swimming 50 meters butterfly stroke in Bina Tirta Swimming Club Medan athletes, to find out in detail about the data in the research, in this chapter will be explained

about the things that have been carried out in the field in accordance with the research design that has been prepared previously.

The data obtained are the results of the pre-test and also the post-test from the 50-meter butterfly swimming test which was given to a sample of 20 people, the pre-test was carried out before the sample was given treatment, namely variations in training using aids and without aids in 50-meter swimming speed. After the results are obtained, they will be divided into two groups by ordinal ranking group A using aids and group B without aids. Post test was conducted after being given treatment for 18 meetings, In group A: 1. Highest pretest score: 32.05 (daffa) 2. Highest posttest score: 30.65 (daffa) 3. Lowest pretest score: 48.50 (yosia) 4. Lowest posttest score: 45.55 (yosia) and in group B: 1. Highest pretest score: 32.50 (m. Fairuzul) 2. Highest posttest score: 31.05 (m.fairuzul) 3. Lowest pretest score: 44.10 (faiz kamal) 4. Lowest posttest score: 42.32 (faiz kamal).

Description of research results regarding the speed of swimming 50 meters butterfly stroke through training by using and Without Assistive Devices is as follows.

Table 1. Pretest category group A men 50 Meter Butterfly Style using SPSS.

Statistics

PRETESTALKLK

N	Valid	8
	Missing	2
Mean		40,2438
Median		40,2750
Mode		32,05[a]
Std. Deviation		4,81623
Variance		23,196
Range		16,45
Minimum		32,05
Maximum		48,50
Sum		321,95

a. Multiple modes exist. The smallest value is shown

Table 3. Pretest Category for Group A Women's 50 Meter Butterfly Stroke using SPSS

Statistics

PRETESTAPR

N	Valid	2
	Missing	8
Mean		42,8300
Median		42,8300
Mode		42,20[a]
Std. Deviation		,89095
Variance		,794
Range		1,26
Minimum		42,20
Maximum		43,46
Sum		85,66

a. Multiple modes exist. The smallest value is shown

Table 4. Pretest category for group B, male 50 meter butterfly stroke using SPSS.

Statistics

PRETESTBLKLK

N	Valid	6
	Missing	4
Mean		40,2017
Median		40,8150
Mode		32,50[a]
Std. Deviation		4,34958
Variance		18,919
Range		11,60
Minimum		32,50

Maximum	44,10
Sum	241,21

a. Multiple modes exist. The smallest value is shown

Table 5. Pretest Category for Group B Women 50 Meter Butterfly Stroke using SPSS

Statistics

PRETESTBPR

N	Valid	4
	Missing	6
Mean		40,0800
Median		40,4800
Mode		36,26[a]
Std. Deviation		2,83047
Variance		8,012
Range		6,84
Minimum		36,26
Maximum		43,10
Sum		160,32

a. Multiple modes exist. The smallest value is shown

Table 6. Posttest category of Group A Boys after Treatment Using Aids on Speed of 50 Meter Butterfly Style using SPSS

Statistics

POSTTESTALKLK

N	Valid	8
	Missing	2
Mean		38,4375
Median		38,7250
Mode		30,65[a]
Std. Deviation		4,40460
Variance		19,401
Range		14,90
Minimum		30,65
Maximum		45,55
Sum		307,50

a. Multiple modes exist. The smallest value is shown

Table 7. Posttest category of Group A Women after using aids for 50 Meter Butterfly Style Speed using SPSS

Statistics

POSTTESTAPR

N	Valid	
	Missing	
Mean		
Median		
Mode		
Std. Deviation		
Variance		
Range		
Minimum		
Maximum		
Sum		

a. Multiple modes exist. The smallest value is shown

Data analysis

Data analysis was applied to address the hypotheses proposed in the previous chapter. The types of tests used included normality tests, homogeneity tests, and hypothesis tests (t-tests). The results of the normality tests, homogeneity tests, and t-tests are as follows:

Normality Test

The purpose of the normality test is to determine whether the data obtained from each analyzed variable follows a normal distribution pattern. The normality test for variables is performed using the Shapiro-Wilk formula. The criteria used to determine whether the distribution is normal are: if the p-value is > 0.05, then the distribution is considered normal, and if the p-value is < 0.05, then the distribution is considered abnormal. A summary of the normality test results can be found in the following table:

Table 8. Pretest Normality Test Using SPSS

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Say.	Statistic	df	Say.
Pretest before performing the treatment using aids	,170	10	,200*	,960	10	,790
Pretest before treatment without aids	,180	10	,200*	,912	10	,293

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

Table 9. Posttest Normality Test Using SPSS

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Say.	Statistic	df	Say.
Posttest after treatment using aids	,131	8	,200*	,985	8	,982
Posttest after treatment without aids	,212	8	,200*	,945	8	,656

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction

For Pretest data of the Shapiro-Wilk statistical value (0.920) is close to 1, the significance value (0.075) is greater than 0.05, Conclusion: The pretest data is statistically normally distributed (p > 0.05). In the posttest data, the Shapiro-Wilk statistical value (0.924) is close to 1, the significance value (0.092) is greater than 0.05, Conclusion: The posttest data is statistically normally distributed (p > 0.05).

Homogeneity Test

The purpose of the homogeneity test is to determine whether samples taken from a population have uniform variance. The decision-making criteria for the homogeneity test are: if the significance value is >0.05, then the variance of the two population data groups is considered uniform (homogeneous). However, if the significance value is <0.05, then the variance of the two population data groups is considered non-uniform (non-homogeneous). The results of the homogeneity test in this study can be found in the following table:

Table 10. Pretest and Posttest Homogeneity Test Using SPSS

ANOVA

PRETEST AND POSTTEST

	Sum of Squares	df	Mean Square	F	Say.
Between Groups	33,782	1	33,782	2,246	,142
Within Groups	571,550	38	15,041		
Total	605,332	39			

Based on the results of the homogeneity test presented in the table above, the data for the 50-meter butterfly swimming speed before...*treatment* using and without aids have homogeneous properties. Furthermore, based on the data, the speed of swimming in the 50-meter butterfly stroke with and without aids has homogeneous properties. The following is a description of the homogeneity test results:

Table 11. Description of Homogeneity Test Results

Test	Sig Value Results	Say	Information
50-meter butterfly swimming speed data before and after treatment using aids and without using aids	0,142	0,05	Homogeneous

Uji T

In this study, the analysis used the t-test (*paired sample t test*) with a significance level of 5%. The results of the t-test are presented in the table below:

Table 12. T-Test Using SPSS Tools

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
air 1	Pretest before carrying out treatment using aids - Posttest after treatment using aids	1,80625	,68214	,24117	1,23597	2,37653	7,489	7	,000

Table 13. T-Test Without Using Tools Using SPSS

Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pretest before treatment without aids - Posttest after treatment without aids	2,23100	,72542	,22940	1,71207	2,74993	9,725	9	,000

Table 14. Description of T-Test Results

Pretest-posttest	T Table	T count	Say	say 5%
Pretest before carrying out treatment using aids - Posttest after treatment using aids	3.646	7,489	0,000	0,05
Pretest before carrying out treatment without aids - Posttest after treatment without aids	3.646	9,725	0,000	0,05

Table 15. Descriptive Statistics Results of the post-test results for group A (Using aids) and group B (Not using aids)

Group Statistics

	CLASS	N	Mean	Std. Deviation	Std. Error Mean

50M Butterfly Swimming Results	Class A (Use Assistive Devices)	10	38,5420	3,94475	1,24744
	Class B (No Assistive Devices)	10	37,9220	3,42193	1,08211

Table 16. Results of the Independent Sample T-Test

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Say.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
50M BUTTERFLY SWIMMING RESULTS	Equal variances assumed	,072	,791	,375	18	,712	,62000	1,65138	-2,84943	4,08943
	Equal variances not assumed			,375	17,648	,712	,62000	1,65138	-2,85439	4,09439

Table 17. Description of the Results of the Independent Sample T-Test Statistical Test

Pretest-posttest	Total time of the entire Pretest	Total time of the entire Posttest	Average overall time of Pretest	Average overall time of Posttest	Difference in increase
Group A (Using Assistive Devices)	407,61	385,42	40,76	38,54	2,22
Group B (Not Using Assistive Devices)	401,54	379,22	40,15	37,92	2,23

DISCUSSION

Based on the results of the hypothesis above, the following discussion was made:

1. The results of the analysis of swimming speed data using treatment using assistive devices show that the calculated t value (7.489) is greater than the t table (3.646), and the Sig value (0.000) is less than 0.05. This indicates that there is a significant difference between the calculated t value and the t table, and the significance value is less than 0.05. Thus, it can be concluded that training using assistive devices has a significant effect on the 50-meter butterfly swimming speed of Binatirta Swimming Club swimmers. In addition to the statistical analysis results showing a significant difference, the significant increase in swimming speed in group A using assistive devices can also be explained by several other factors. The use of assistive devices such as hand paddles specifically trains the strength and endurance of the arm muscles, which are important components of the butterfly stroke. Training focused on stroke technique using these assistive devices allows athletes to improve movement efficiency and generate a stronger thrust in the water. Individual factors such as age, gender, previous swimming experience, and motivation level can also influence the results of the study. Although this study showed a significant effect overall, it is

important to remember that individual responses to training can vary. Athletes with high levels of motivation and a strong commitment to training tend to experience greater improvements compared to those who are less motivated.

2. Based on the analysis of swimming speed data using treatment without assistive devices, the calculated t value was obtained (9.725) > from the t table (3.646), and the Sig value (0.000) < from 0.05. This finding indicates that there is a significant difference between the calculated t value and the t table, as well as a significance value of less than 0.05. Thus, it can be concluded that training without assistive devices has a significant effect on the speed of the 50-meter butterfly stroke in Bina Tirta Swimming Club swimming athletes. Although the use of assistive devices can provide certain benefits, the results of this study indicate that training without assistive devices can also result in a significant increase in swimming speed. Training without assistive devices can help athletes develop more balanced muscle strength and increase body awareness in the water. This can provide a strong foundation for the development of better swimming techniques in the long term. Psychological factors such as motivation, self-confidence, and concentration can also play an important role in improving swimming performance. Training without assistive devices can help athletes to focus more on the training process and develop a stronger mentality. By focusing on continuous self-improvement, athletes can reach their maximum potential.
3. Training using fins and paddles as aids does not have a better effect than training without aids on the speed of the 50 meter butterfly
4. swimming stroke in Bina Tirta athletes on *Swimming Club* Field because Training without aids allows athletes to focus more on improving basic techniques, Improved stroke techniques, pulls, and more efficient body rotations can increase speed without the aid of tools, Without the aid of tools, athletes are better able to feel and control body movements in the water This allows them to make corrections to technique more effectively, Without being fixated on the use of aids, coaches can provide a wider variety of exercises, this variety of exercises can help prevent boredom and increase athlete motivation. The existing data supports the hypothesis that training without aids has no worse effects than training with aids. However, it is important to remember that individual factors, study duration, training intensity, motivation, and psychological influences also need to be considered to get a more complete picture

CONCLUSION

1. Based on the analysis of the 50-meter butterfly speed data using training aids, it was concluded that there was an effect of training using aids on the 50-meter butterfly swimming speed of Bina Tirta Swimming Club athletes.
2. Based on the analysis of the 50-meter butterfly speed data for training without using aids, it was concluded that there was an effect of training without using aids on the 50-meter butterfly swimming speed of Binatirta Swimming Club athletes.
3. Based on the calculation results, it shows that the results of training using aids are not better than training without using aids on the speed of swimming 50 meters butterfly stroke for Binatirta Swimming Club athletes.

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