



The Effect of Exercise Using A Float And Leg Length On The Results Of The 50 M Breaststroke Swimming Speed

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Info Artikel

Article History:

Received 23 February 2022

Approved 07 July 2022

Published 12 July 2022

Keywords:

Buoys, Leg Length, Breaststroke Swimming Speed

Abstract

The purpose of this study was to determine the effect of using a buoy on the results of the 50-meter breaststroke swimming exercise, to determine the difference in the effect of high, medium and low leg length on the results of the 50-meter breaststroke swimming exercise for beginners KU IV Club Spectrum Semarang. This research method is experimental with a 3x3 design sample of 29 novice athletes for the pretest. The highest and lowest results were omitted, so a sample of 27 KU IV novice athletes was taken by purposive sampling. The instrument for the test is to provide exercise treatment using a pull buoy, fishing net and board. Associated with the length of the category of leg length are high, medium and low. The results showed (1) There was a significant difference in the effect of the results for students who used a pull buoy, fishing net, or board in the 50-meter breaststroke swimming exercise (2) There was a significant difference in results for students with high, medium, and long leg lengths. low in the 50-meter breaststroke. (3) There is no interaction between the legs' length and the buoy type in determining the 50-meter breaststroke swimming exercise results. Conclusion: The fishing net buoy results are more significant than using the board buoy and pull buoy; it can be seen that the average result is 56.67 seconds, compared to the pull buoy 72.33 seconds and the board buoy 72.33 seconds. Leg length in the high category has more significant results than in the medium and low leg length category; there is no interaction between leg length and the type of buoy in the 50-meter breaststroke swimming speed results.

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INTRODUCTION

The community mainly carries out sport; its existence is no longer underestimated

but has become part of people's lives (Prakoso & Sugiyanto, 2017). Sports activity in its various forms is an activity that is very familiar in our daily lives. In Indonesia, many

people do sports in villages and big cities (Trisnowiyanto, 2015). This water sport also launches vital organs such as the heart and lungs until they are trained according to their performance. Because swimming makes the chest and lung muscles expand and make the capacity bigger (Febrianta, 2016; Henjilito, 2011). Swimming is a community sport every one of all ages can do to achieve these four goals (Arif et al., 2019; Khairunnisa & Pitriani, 2019).

Breaststroke swimming is a style that is easy and fast to learn. However, in terms of speed, this style is the slowest force. (Ali Muhammad., 2012). In this study, swimming is meant to move the body across the water with the help of a buoy. Swimming is an outstanding sport for young children; Drowning is a multifaceted and complex phenomenon which essentially has an entrance where humans interact with their aquatic environment (Moran & Stanley, 2006). In swimming, all movements are coordinated, starting from the feet and hands and taking the breath. (Aziz and Donie, 2017) suggest that movement in every sport is significant for developing innate abilities and helps develop other sports.

In swimming the breaststroke, the length of the legs is very influential, but the truth of the style, from the movement of the arms, breathtaking, and movement of the legs is the main factor; some have long legs, but when swimming, the movement is still wrong, it also dramatically affects the results of their speed. also. (Putra, 2017) expressed his

opinion that "Swimming sports are divided according to their needs, namely achievement swimming, educational swimming for schools, recreational swimming which is usually in rivers, lakes, beaches or the sea and health swimming".

To increase the speed results in breaststroke swimming, the researchers wanted to know by linking it to the training medium with a pull buoy and a fishing net buoy. Pullbuoy is a type of swimming equipment that is a floating aid often used for training children (Mujika, I., & Crowley, E. (2019).

The function of the pull buoy is almost the same as the kickboard, but the buoyancy of the pull buoy is much smaller, so it is suitable for athletes who are experts in swimming or not for people who are just learning. The function of the pull buoy is to increase the strength and endurance of the swimmer's hand. Increase the strength and endurance of the swimmer's legs and train the body to stay on a streamlined line when swimming (Priana, 2019; Sartono, 2018). The fishing net buoy is commonly used for swimming practice in a swimming club; this buoy is also quite familiar and is often used for program training during swimming drills. Its use is almost the same as a pull buoy.

The connection between these three buoys can increase speed results, and namely, for the first time, this pull buoy has the function of being able to train the arms and the legs in breaststroke swimming; these two fishing net buoys have almost the same shape

as the pull buoy. This fishing net buoy can train the arms and the legs in breaststroke swimming, but for this fishing net buoy to sandwich between the two thighs, this buoy is more compact than the pull buoy, which is rather large or wide. Third, for using this board float only as a control group.

After this research is completed, the results obtained are theoretical, providing scientific contributions to sports, especially swimming. In particular, this research is also expected to contribute to one of the Physical Education learning models.

Not only in theoretical terms but in practical terms as well. Such as for trainers to compile and develop training programs and materials according to the needs of students so that children's achievements can be optimal. For PJOK teachers, as a reference in the teaching process or developing fundamental exercises for variations in swimming learning. For athletes or students, the use of learning media from various media is essential for the training of the practitioners to be more optimal in practising and playing.

In addition to the benefits, this research also has research objectives. The objectives of this research are 1) To find out whether there is an effect between the training model using a buoy on the results of the 50 m breaststroke swimming speed for Semarang Spectrum athletes; 2) To find out whether there is an effect between high, medium and low leg length categories on the results of the 50 m breaststroke swimming speed for Semarang Spectrum athletes; 3) The interaction between

the effect of the exercise model using a buoy and leg length on the results of the 50 m breaststroke swimming speed for Semarang Spectrum athletes.

METHODS

This research is a quasi-experimental research with a 3x3 factorial research design (Ramadan & Juniarti, 2020). The first group: the breaststroke swimming exercise using a pull buoy, the second group the breaststroke swimming exercise using a fishing net buoy, and the third group the control group, namely the breaststroke swimming exercise using a board buoy. The data in this study were arranged in a research design framework with a 3x3 factorial design. This study uses three manipulative independent variables: pull buoys, fishing net buoys and board buoys. Moreover, the moderator group is divided into three based on the high, medium and low leg length categories. In this research, the informant is concerned (research ethics) that the sample has signed that it is willing to be used as a sample. In this study, the inclusion criteria, namely informed consent (research etiquette), are that the sample is willing to be the research subject. Moreover, the exclusion criteria, namely the sample that did not fully perform at the time of the study, but in this study all fully followed all research from beginning to end. The data in this study are arranged in a research design framework with a 3x3 factorial design which can be described as follows:

Table 1 Research Design

Category Leg Length	Exercise Model		
	Pull Buoys (A1)	Fishing Net Buoy (A2)	Board float (A3)
Height (B1)	A1B1	A2B1	A3B1
Medium (B2)	A1B2	A2B2	A3B2
Low (B3)	A1B3	A2B3	A3B3

The sample in this study was PR SPECTRUM SEMARANG swimming athletes, totalling 27 KU IV novice athletes. The sampling technique in this study was purposive sampling with a sample of 15 males and 12 females. Determination of the sample is a beginner athlete KU IV, not sick or injured. Of the 27 athletes, the measurement of

leg length using an antropometer was carried out; the aim was to find out which athletes had high, medium and low levels of leg length categories, then ranked and the athletes who had moderate levels of leg length categories were not carried out in the research group. However, used for the control group.

Table 2 Characteristics of Data

Classification	Long Range
Low	76 – 78
Currently	79 – 81
Tall	82 – 85

Anthropometer is an instrument consisting of a pipe 2000 mm long, four slides up or down, and a steady handle. A needle can be inserted in each of these handles, allowing measurements to be made. The pipe has a scale with an accuracy of 1 mm. Anthropometers are used to measure lengths such as height and pipe bone length but are not infrequently used to measure body width to replace large curved callipers.

makes the hips and legs float, so it can help athletes in the arm stroke technique without moving the legs. Pullbuoy is a swimming learning aid that helps buoyancy, making it easier for students to master basic swimming techniques (Apriliyanto, 2017). For how to use it, this buoy is squeezed between the two thighs. It can be used to train the arms.

Pullbuoy buoys, Pullbuoys are used to help feet that often sink, so with this tool, the feet can be lifted above the water surface (Nani Kurniawati, 2014:16). The Pullbuoy is an excellent training device, developing endurance and upper body strength. This tool

The fishing net buoy is commonly used for swimming practice in a swimming club; this buoy is also quite familiar and is often used for program training during swimming drills. Its use is almost the same as a pull buoy. The way to use this float is to squeeze it between the two thighs.



Figure 1 Measuring Tool

This board buoy is a tool commonly used for swimming training. This buoy is usually used as a tool for limb movement exercises in swimming. This buoy has several colours, from blue, green, red, yellow and so on. Weighing 1000 grams and dimensions 44x28x5 cm, this board float is made of thick plastic, so it is not easy to break and is safe for children. The operational use of this board is to hold it with the hand in front; this buoy is used to help your buoyancy while exercising. The focus of this board buoy is that it can be used to train the legs when swimming.

Using a stopwatch, calculate the results of the 50-meter breaststroke swimming speed. A stopwatch is a tool to measure the time/duration that is needed or has passed. The primary function of this stopwatch has a central function as a timer. In this study, a

digital stopwatch was used. This digital stopwatch has an accuracy limit of 0.01 seconds.

This research procedure is the pull buoy group, fishing nets and board buoys. Each held four weekly meetings; the first did a pretest, and the last did a posttest after the treatment. In this study, they have divided into three groups for treatment: the 1st group used a pull buoy, the second experimental group used a fishing net buoy, and in group 3, the control group used a board buoy. Moreover, they participated in the treatment using pulley buoys, fishing nets and board buoys for the high, medium and low categories of limb length.

The prerequisite test in this study used normality and homogeneity tests. The normality test is one of the prerequisites for the analysis because the use of parametric

statistics in research is based on the assumption that the data for each variable forms a normal distribution. The data must be normally distributed in order to be adequately analysed. The normality test was conducted using the IBM Statistics application with histogram graph output showing the normality plot. Interpretation is made by observing the data distribution plot. If the plot is spread close to the standard line, then the variable data can be said to be normally distributed. At the same time, the data plot away from the standard line is considered data that is not normally distributed. In addition, the normality of the data can also be tested using the Kolmogorov Smirnov test of each variable. If a p-value > 0.05 is obtained, it can be concluded that the data is usually distributed; otherwise, if the p-value is < 0.05, it can be said that the data is not normally distributed.

The homogeneity test, to explain the condition of the group, can also be based on the variation in the data that occurs in the group. Please find out the level of variation of the data group; it can be done by looking at the range of data and the standard deviation of the data group. Measurement results using the SPSS application.

Furthermore, the homogeneity of decision-making is seen from the sig value. If sig is higher than 0.05, then the data is considered homogeneous, and vice versa. If seen in the column above, it can be concluded that the data variance of the pretest and posttest variables is homogeneous.

The data analysis technique used for testing this research's hypothesis is a two-way analysis of variance (Two Way Anova). According to Arikunto (2006), Two-way Analysis of Variance (ANOVA) is a research data analysis technique with a two-factor factorial design. The conclusion of whether H_0 is accepted or rejected is obtained by interpreting the significant value in the test of the between-subject effect table from the variance analysis results through the SPSS 19.0 for the windows program. The criteria used in making conclusions are if the probability of error is $p < 0.05$, then H_0 is rejected, and H_1 are accepted.

FINDINGS AND DISCUSSION

Findings

The study "The Effect of Exercise Using Buoys and Leg Length on Results of 50 M Breaststroke Swimming Speed for beginner swimmers KU IV SPECTRUM Semarang.

Table 3. Two-way ANOVA Test Results

Descriptive Statistics				
Category	Buoy Type	Mean	Std. Deviation	N
Leg Length	High	65,33	2,517	3
	Fishing nets	56,67	7,506	3
	Board	71,00	1,732	3

	Total	64,33	7,450	9
Currently	Pullboy	72,33	2,082	3
	Fishing nets	66,67	2,309	3
	Board	73,33	1,528	3
	Total	70,78	3,563	9
Low	Pullboy	69,67	2,887	3
	Fishing nets	66,00	3,464	3
	Board	75,67	,577	3
	Total	70,44	4,799	9
Total	Pullboy	69,11	3,756	9
	Fishing nets	63,11	6,470	9
	Board	73,33	2,345	9
	Total	68,52	6,098	27

The table above shows the average results of measuring the duration taken by respondents in the 50-meter breaststroke swimming. The lower the duration number, the better the training results because 50

meters of breaststroke swimming can be reached in a short time. The average duration of breaststroke swimming is divided into types of buoys in each leg length group.

Table 4 Prerequisite Test

NO	Name	Sig value	<i>p</i>
1	Validity	0,845	> 0,367
2	Reliability	0,916	> 0,70.
3	Normality		
	Pretest	0,2	> 0,05
	Posttest	0,54	> 0,05
4	Homogeneity		
	Pretest	0,873	> 0,05
	Posttest	0,898	> 0,05

Before conducting research, several prerequisite tests must be met to use the instrument for research. There are several test requirements, namely validity test, to determine whether the instrument used is valid or not, reliability test is used to determine whether the data used is reliable, normality test is a test used to determine the normality of the data and the last is the homogeneity prerequisite test, which is used to determine

the normality of the data. Determine whether the data is homogeneous or not.

Discussion

The discussion is by the findings of the data above; in general, it can be concluded that the best average results were achieved by the high leg group using the Fish Net buoy exercise method with an average of 56.67 seconds, while the lowest results were achieved in the low leg group with the exercise method. Boards with an average of

75.67 seconds. In other words, it is a breaststroke swimming exercise using a pull buoy. Fishing nets and boards are influential. However, the fishing net buoy results are more significant than using the board buoy and pull buoy; it can be seen that the average result is 56.67 seconds, compared to 72.33 seconds for the pull buoy and 72.33 seconds for the board buoy. The significance test was carried out by comparing the calculated r-value with the r table. The tables of the validity test of each of the variables above show the pretest and post-test scores of 0.845, with all r count > 0.367. So it can be concluded that the research instrument is valid and can be used as a means of measurement. From the results of the SPSS output above, it was found that the Cronbach Alpha scores for the pretest and posttest scores showed 0.916 above 0.70. Therefore, based on the interpretation criteria, it can be said to be reliable and used as a measurement. In addition, the normality of the data can also be tested using the Kolmogorov Smirnov test of each variable. If the p-value > 0.05, it can be concluded that the data is usually distributed; otherwise, if the p-value is < 0.05, it can be said that the data is not normally distributed. In the findings above, it can be seen that the tiny dots move in line with the straight diagonal lines. This shows that the data can be said to be normally distributed. The following is a plot of the results of calculating the normality test of research data using the SPSS application.

Based on the test results above, it can be seen that the Asymp Sig value of each data is

0.2 and 0.54 greater than 0.05, which can be concluded that the data is usually distributed. Explain the state of the group; it can also be based on the level of variation in the data that occurs in the group. Please find out the level of variation of the data group; it can be done by looking at the range of data and the standard deviation of the data group. The measurement results using the SPSS application produce the following table. The range value is the difference between the minimum and maximum values. A range value that is not too far away for each variable shows no extreme data in the data group. Then, one technique to explain group homogeneity is to measure the variance, which is the sum of the squares of all deviations of individual values to the group mean. Then the result of the root of the variance is the standard deviation (std deviation). In the absence of extreme data, the standard deviation can be sensitive and suitable for measuring data distribution.

Furthermore, the homogeneity of decision-making is seen from the sig value. If sig is higher than 0.05, then the data is considered homogeneous, and vice versa. If seen in the column above, it can be concluded that the data variance of the pretest and posttest variables is homogeneous. Hypothesis 1 states the effect of exercise using pull buoys and fishing net buoys on the 50 m breaststroke swimming speed results for Semarang Spectrum athletes. The model line "Category of Types of Buoys" can be seen F count = 21.736 and a significance level of 0.000.

Meanwhile, for F_{table} with a significance level of 5% and df numerator two and df denominator 26, the value of $F_{table} = 3.369$ is obtained. So because $F_{count} F_{table}$ is 21.736 3.369 and the significance level 0.05 is 0.000 0.05, then H_0 is rejected, and H_1 is accepted, it can be concluded that there is a significant effect of the type of buoy on the results of the 50-meter breaststroke swimming exercise. The second hypothesis states a significant effect on the results for students with high, medium, and low leg lengths in the 50-meter breaststroke swimming exercise. In the model line "Leg Length Category", $F_{count} = 10,844$ and a significance level of 0.001. Meanwhile, for F_{table} with a significance level of 5% and df numerator two and df denominator 26, the value of $F_{table} = 3.369$ is obtained. So because $F_{count} F_{table}$ is 10,844 3.369 and the significance level 0.05 is 0.001 0.05, then H_0 is rejected, and H_1 is accepted, it can be concluded that there is a significant effect of leg length on the results of the 50-meter breaststroke swimming exercise. The third hypothesis states that there is no interaction between the length of the legs and the type of buoy in determining the results of the 50-meter breaststroke swimming exercise. In the model line, "Leg Length*Type of Buoy" $F_{count} = 1.331$, and the significance level is 0.297. Meanwhile, for F_{table} with a significance level of 5% and df numerator two and df denominator 26, the value of $F_{table} = 3.369$ is obtained. So because $F_{count} F_{table}$ is 1.331 3.369 and the significance level 0.05 is 0.297 0.05, then H_0 is accepted, and H_1 is rejected

so that it can be concluded that there is no interaction between leg length and type of buoy in influencing test results in a 50-meter breaststroke swimming exercise. Previous research conducted by M. Faradise Lekso in 2013, "The Influence of Exercise Methods and Leg Power Muscles on 50 Meter Breaststroke Swimming Speed Athletes Age Group IV Semarang Spectrum Swimming Association", that 1) There is a difference in the effect of breaststroke leg exercise with the body prone position with supine body position against a swimming speed of 50 meters breaststroke. 2) There is a difference in the effect of leg power in the high and low categories on the 50-meter breaststroke swimming speed results. 3) There is no interaction between the swimming exercise method and leg power in the 50-meter breaststroke swimming speed results.

CONCLUSION

To determine whether there is an effect between the training model using a buoy on the results of the 50 m breaststroke swimming speed for Semarang Spectrum athletes. This study aimed to determine whether there was an influence between the high, medium and low categories of leg length on the results of the 50 m breaststroke swimming speed for Semarang Spectrum athletes. This study aims to determine the interaction between the effect of the exercise model using a buoy and leg length on the results of the 50 m breaststroke swimming speed for athletes of the Semarang spectrum.

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