
**LEVEL OF LEG STRENGTH, ARM STRENGTH, AND BREASTSTROKE SWIMMING
ABILITY IN STUDENTS OF SMP NEGERI 40 MAKASSAR**

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Authors' contribution:

A. Conception and design of the study; **B.** Acquisition of data;
C. Analysis and interpretation of data; **D.** Manuscript preparation; **E.** Obtaining funding

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ABSTRACT

This study aims to determine the level of leg strength, arm strength, and the relationship with breaststroke swimming ability in students of SMP Negeri 40 Makassar. This study is descriptive. The population and sample amounted to 20 people. The data analysis technique used the SPSS version 22 program at a significance level of $\alpha = 0.05$ (95%). The conclusion of the data obtained from the leg strength measurement test obtained from the half squat jump for 30 seconds is a very good classification (1) person (5%), good classification (9) people (45%), moderate classification (6) people (30%), poor classification as many as (2) people (10%), and very poor classification as many as (2) 0 people (10%). Thus, it can be concluded that the results of the half squat jump test for 30 seconds obtained in students of SMP Negeri 40 Makassar can be categorized as moderate with an average result of 38 (descriptive data results). The conclusion of the data obtained from the arm strength measurement test obtained from push-ups for 30 seconds is a very good classification of as many as (0) people (0%). Good classification of as many as (0) people (0%), Moderate classification of (12) people (60%), Less classification of as many as (5) people (25%), and Very Less classification of as many as (3) people (15%). Thus, it can be concluded that the push-up test results obtained by students of SMP Negeri 40 Makassar can be categorized as less with an average result of 31 (descriptive data results). And in the 50-meter breaststroke swimming ability test, the classification is very good as many as (0) people (0%). Good classification of as many as (2) people (10%), Moderate classification of (7) people (35%), Less classification of as many as (6) people (30%), and Very Less classification of as many as (5) people (25%). Thus, it can be concluded that the results of the 50-meter breaststroke swimming test obtained by students of SMP Negeri 40 Makassar can be categorized as less with an average result of 1.36 minutes (descriptive data results).

Keywords : Strength; Legs; Arms; Breaststroke; Swimming.

INTRODUCTION

Swimming sports in Indonesia are increasingly developing, this is indicated by the many swimming competitions held almost every year at the international and national levels (Putra, 2017). Due to the increasing interest in this sport, every National Sports Week (PON) is held, and swimming sports become the main event (Rasyid et al., 2017). With the increasing achievements achieved by swimming athletes in Indonesia (Mulyawati & Indraswari, 2018).



Therefore, the achievement of results or achievements achieved (Rahmat et al., 2021) it is hoped that amid the tight competition in the sport of swimming, the achievements achieved can be improved (Hasanuddin, 2019), but to realize this is not easy, many factors influence the progress of an achievement in the sport of swimming (Syarifuddin et al., 2019) for example, arm length, height, leg length (anatomy), breathing ability, agility, balance, coordination, strength (Siregar & Syahara, 2019), flexibility (physiology), speed of movement and stroke frequency (biomechanics) (Siallagan et al., 2021), personality, attribution, motivation, aggression, anxiety, stress, activation, leadership, communication, concentration, and self-confidence (psychology) (Wardhani, 2022).

Swimming is one of the sports that is widely enjoyed by the public, especially teenagers and children (Kusmita et al., 2022), therefore many places in Indonesia, especially in big cities, provide it (Rona et al., 2020). Swimming pools can be used by the public to improve physical fitness and sports achievements (Dewi, 2021). Swimming is also a sport that uses hand and foot movement patterns that are carried out simultaneously so that they can float and move forward from one place to another (Rona et al., 2020). The combination of movements between the feet and hands and breathing techniques (Ibrahim & Barlian, 2018) combined with movement coordination while swimming will create more effective and better movement results (Sefriana, 2020). Breaststroke is the most attractive style because it is not tiring quickly when compared to other styles (Wicaksono & Putri, 2020). After all, the breathing process can be done easily so that it is easier to use in long-distance and relaxed swimming (Sobriyanyo et al., 2020). Breaststroke is often also called frog swimming because the movements of the breaststroke are very similar to the movements of a frog when swimming.

The government is trying to improve the field of sports to increase the level of physical and spiritual fitness of the Indonesian nation (Pratama et al., 2022), also improve the coaching and achievement aspects in various sports, especially in the field of swimming (Maulana et al., 2018) which is a leading sport that often gets medals when compared to other sports, this is because of the many competition numbers in the swimming sport (Pradana et al., 2018).

Achievements in the sport of swimming, especially in breaststroke, have supporting aspects that must be considered, one of which is the technique in doing breaststroke, in this case, leg strength and arm strength to get maximum results. Leg muscle strength functions as a stabilizer in the water, helps push the glide, helps the swimmer to float (Kurniawan & Winarno, 2022), and avoids body rotation when swinging the arms and leg muscles are one of the main drivers. While arm muscle strength functions as a producer of faster glide than other styles (Yeni et al., 2019), the producer of the greatest thrust and the determinant of swimming speed. The technique in breaststroke swimming is swimming with the chest facing the surface of the water (Krisna & Maidarman, 2022), with both legs kicking outwards while both arms are straightened in front of the chest (Syam & Bismar, 2020). Both hands are opened to the side like a movement of splitting the water so that the body can move forward faster. Body movements that imitate the movements of a swimming frog so breaststroke swimming is usually called the frog style (Ikhwan et al., 2021).

METHODS

The type of research used in this study is descriptive research. Descriptive research is used to collect, summarize and interpret the data obtained, which is then reprocessed so that it is expected to produce a clear, comprehensive picture of the problem that is the

object of research. There are two variables involved in this research, namely the independent variable, namely: leg strength (X1), and arm strength (X2), while the dependent variable is: Breaststroke swimming ability (Y). The population of this study was 20 students of class VIII of SMP Negeri 40 Makassar. The sampling technique in this study was "Total sampling" The reason for the sampling technique is because the total number of students of class VIII of SMP Negeri 40 Makassar who will be studied so that the number of samples obtained is 20 people. After all the research data has been collected, namely data on leg strength levels, arm strength data and breaststroke swimming ability data, to test the hypothesis that will be proposed in this study, the data is compiled, processed and analyzed statistically with the help of a computer through the SPSS version 22 program at a significance level of $\alpha = 0.05$ (95%).

RESULTS AND DISCUSSION

Results

The measurement data of leg strength level was obtained from half squat jump for 30 seconds the measurement of arm strength level was obtained from push up for 30 seconds and the measurement of breaststroke swimming ability for 50 meters. The data are summarized in the following table.

Table 1.

Results of descriptive analysis of data for each variable

	Half Squat Jump	Push Up	Breaststroke swimming
N	20	20	20
Mean	38	31	1,36
Std. Dev	8,28	4,65	0,27
Range	30	15	1
Minimum	20	22	1
Maximum	50	37	2
Sum	760	620	27,25

Based on the following table, a summary of the results of the descriptive analysis of leg strength and arm strength data with breaststroke swimming ability is as follows:

1. Half Squat Jump for 30 seconds total mean value = 38 from 20 samples with a total value (sum) of 760, for the standard deviation value = 8.28 with a range value of 30 times from the smallest number (minimum) of 20 times while the largest number (maximum) = 50 times
2. Push Up for 30 seconds total mean value = 31 times, from 20 samples with a total value (sum) of 620. For the standard deviation value = 4.65 with a range value (range) of 15 times from the lowest number (minimum) of 22 times while the highest number (maximum) = 37 times
3. Breaststroke swimming average time taken = 1.36 minutes, from 20 samples with a total value (sum) of 27.25. For the standard deviation value = 0.27 with a range value of 1 minute from the fastest time (minimum) 1 minute while the longest time (maximum) = 2 minutes.

Results of data analysis on the percentage frequency of leg strength and arm strength levels with breaststroke swimming ability

The results obtained in the study on the analysis of the level of leg strength and arm strength with breaststroke swimming ability in students of SMP Negeri 40 Makassar. Presented in the form of a percentage to obtain the frequency category of each variable obtained.

Percentage frequency of classification of half squat jump test results for 30 seconds

A description of the percentage of frequencies obtained in the 30-second half squat jump test research, expressed in percentage form to obtain the frequency category for each variable obtained.

Table 2.

Percentage frequency of data from the half squat jump test results for 30 seconds

Value	Frequency	Percentage	Classification	Description
<50 kali	1	5%	Very good	5
45-49 kali	9	45%	Good	4
35-39 kali	6	30%	Medium	3
25-29 kali	2	10%	Poor	2
11-24 kali	2	10%	Very poor	1
Total	20	100		

Meanwhile, the form of a bar diagram regarding the results of the 30-second half squat jump test obtained by students at SMP Negeri 40 Makassar, can be seen in the following image.

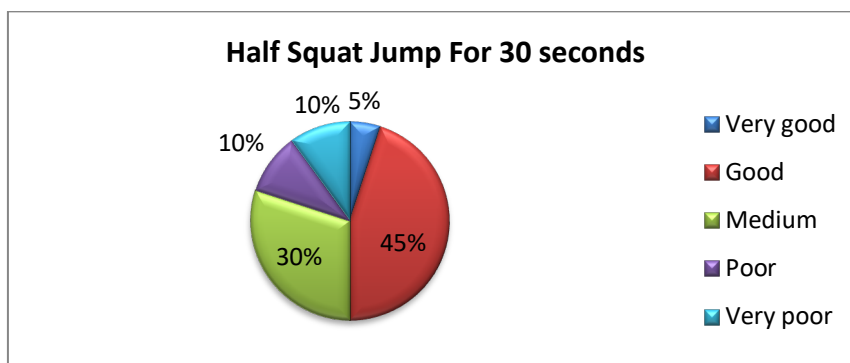


Figure 1.

Percentage graph of the 30-second half squat jump test

Based on the table and pie chart above on the results of the 30-second half squat jump research obtained on students of SMP Negeri 40 Makassar, out of 20 student samples, it turns out that those who have a very good classification (1) person (5%), good classification (9) people (45%), moderate classification (6) people (30%), poor classification (2) people (10%), and very poor classification (2) people (10%). Thus, it can be concluded that the results of the 30-second half squat jump test obtained on students of SMP Negeri 40 Makassar can be categorized as moderate with an average result of 38 (descriptive data results).

Percentage frequency of classification of push-up test results for 30 seconds

A description of the percentage of frequencies obtained in research on push-up tests, expressed in percentage form to obtain the frequency category for each variable obtained.

Table 3.

Percentage frequency of push-up data for 30 seconds

Value	Frequency	Percentage	Classification	Description
<50 kali	0	0	Very good	5
45-49 kali	0	0	Good	4
35-39 kali	12	60%	Medium	3
25-29 kali	5	25%	Poor	2
15-24 kali	3	15%	Very poor	1
Total	20	100		

Meanwhile, in the form of a pie chart, the percentage of the push-up test results obtained by students at SMP Negeri 40 Makassar can be seen in the following image.

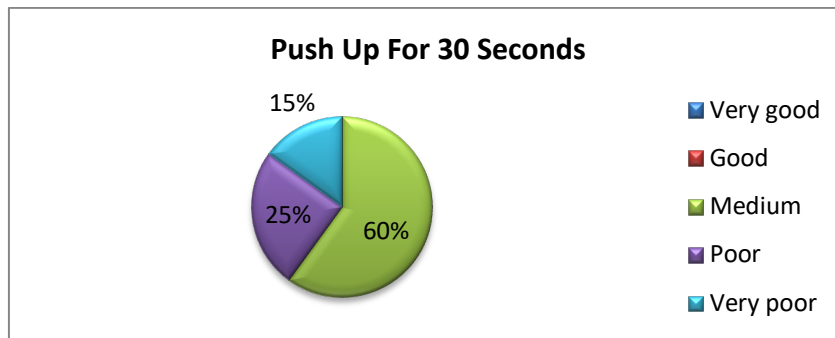


Figure 2.

Percentage graph of 30-second push-up test

Based on Table 3 and the diagram above about the results of the push-up test research obtained on students of SMP Negeri 40 Makassar, out of 20 student samples, it turns out that those who have a very good classification are (0) people (0%). Good classification is (0) people (0%), Moderate classification is (12) people (60%), Less classification is (5) people (25%), and Very Less classification is (3) people (15%). Thus, it can be concluded that the results of the push-up test obtained on students of SMP Negeri 40 Makassar can be categorized as less with an average result of 31 (descriptive data results).

Percentage frequency of classification of 50-meter breaststroke swimming

A description of the percentage of frequencies obtained in research on 50-meter breaststroke swimming, expressed in percentage form to obtain the frequency category for each variable obtained.

Table 4.

Percentage frequency of 50-meter breaststroke swimming test results data

Value	Frequency	Percentage	Classification	Description
<40 seconds	0	0	Very good	5
41 seconds - 100 minutes	2	10%	Good	4
1:01 minutes - 1:20 minutes	7	35%	Medium	3
1:21 minutes - 1:40 minutes	6	30%	Poor	2
1:41 minutes - 2:00 minutes	5	25%	Very poor	1
Total	20	100		

Meanwhile, in the form of a pie chart regarding the results of the 50-meter breaststroke swimming test obtained by students of SMP Negeri 40 Makassar can be seen in the following image.

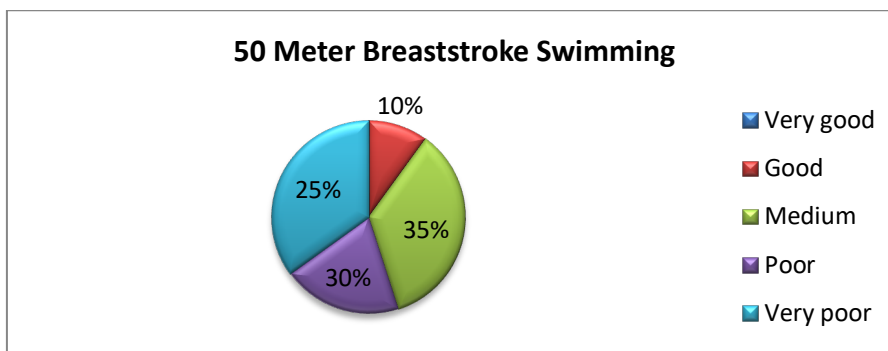


Figure 3.

Percentage graph of 50-meter breaststroke swimming

Based on Table 4 and the bar chart above on the results of the 50-meter breaststroke swimming test obtained by students of SMP Negeri 40 Makassar, out of 20 student samples, it turns out that those who have a very good classification are (0) people (0%). Good classification is (2) people (10%), Moderate classification is (7) people (35%), Less



classification is (6) people (30%), and Very Less classification is (5) people (25%). Thus, it can be concluded that the results of the 50-meter breaststroke swimming test obtained by students of SMP Negeri 40 Makassar can be categorized as less with an average result of 1.36 minutes (descriptive data results).

Discussion

Based on the description of the results of data analysis and assessment of the results of leg strength and arm strength with breaststroke swimming ability in students of SMP Negeri 40 Makassar that have been carried out, the results can be explained after conducting research using a half squat jump test for 30 seconds, a push-up test for 30 seconds and a breaststroke swimming ability test for 50 meters from 20 research samples, each of which obtained a score through the results of the descriptive analysis which were converted into a percentage scale assessment table using interpretations consisting of:

- a. Very good classification (1) person (5%), good classification (9) people (45%), moderate classification (6) people (30%), less good classification (2) people (10%), and very poor classification (2) people (10%). Thus, it can be concluded that the results of the 30-second half squat jump test obtained by students of SMP Negeri 40 Makassar can be categorized as moderate with an average result of 38 (descriptive data results).
- b. Very good classification of as many as (0) people (0%). Good classification of as many as (0) people (0%), Moderate classification of (12) people (60%), Less classification of as many as (5) people (25%), and Very poor classification of as many as (3) people (15%). Thus, it can be concluded that the results of the push-up test obtained by students of SMP Negeri 40 Makassar can be categorized as less with an average result of 31 (descriptive data results).
- c. Very good classification of as many as (0) people (0%). Good classification of as many as (2) people (10%), Moderate classification of (7) people (35%), Less classification of as many as (6) people (30%), and Very Less classification of as many as (5) people (25%). Thus, it can be concluded that the results of the 50-meter breaststroke swimming test obtained by students of SMP Negeri 40 Makassar can be categorized as less with an average result of 1.36 minutes (descriptive data results).

CONCLUSION

Based on the description of the results of data analysis and assessment of leg strength results and Based on the results of research and discussion, it can be concluded as follows:

1. The results of the analysis of leg strength in students of SMP Negeri 40 Makassar, which have been carried out through a half squat jump test for 30 seconds, with a sample of 20 students. Shows descriptive data results with an average value of 38. Thus, it can be concluded that the results of the half squat jump test for 30 seconds obtained by students of SMP Negeri 40 Makassar can be categorized as moderate.
2. The results of the analysis of arm strength in students of SMP Negeri 40 Makassar, which have been carried out through a push-up test for 30 seconds, with a sample of 20 students. Shows descriptive data results with an average value of 31. Thus, it can be concluded that the results of the push-up test obtained by students of SMP Negeri 40 Makassar can be categorized as lacking.

3. The relationship between leg and arm strength with breaststroke swimming ability in students of SMP Negeri 40 Makassar which have been carried out through a breaststroke swimming test for 50 meters with a sample of 20 students. Shows descriptive data results with an average result of 1.36 minutes. Thus, it can be concluded that the results of the 50-meter breaststroke swimming test obtained by students of SMP Negeri 40 Makassar can be categorized as lacking.

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