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The Relationship between Visceral Fat and Percentage Fat with VO2max in Young Rowing Athletes

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Abstract
The author researched visceral fat factors, body fat percentage and young rowing athletes in West Bandung district with the aim of seeing the relationship between Visceral Fat and Body Fat Percentage on VO2max. Method: the subjects in this study were young rowing athletes in West Bandung Regency, the research used clinical trials that had approval from the Bandung Health Polytechnic Education Committee. The parameters measured include anthropometry involving visceral fat and body fat percentage and VO2max capacity. Results: The results show that the relationship between Visceral-Fat and VO2max results is (r = -0.499) with significant results (P = 0.118). This value can conclude that there is no relationship between Visceral-Fat and VO2max results in rowing athletes, while the correlation results show (r = -0.499) indicating that the correlation is inversely proportional to the degree of moderate correlation which can be concluded if the percentage value is greater Visceral-Fat then the resulting value of VO2max will be low.
Keywords: *Rowing, Visceral Fat, Fat, And Vo2max*

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INTRODUCTION

Rowing is an endurance sport whose target is air using boats and paddles during a race. In the sport of rowing, there is a media tool called an ergometer machine, which is a development of rowing rowing. This ergometer machine is designed to resemble a type of rowing paddle, but this activity is carried out on land. The rowing technique on a number ergometer is almost the same as the technique in a rowing boat, a rowing type ergometer machine is used to call rowing movements aimed at training (Flood., et al, 2017).

The problems found by researchers are based on what happens, often a decline in athletes' performance, such as physical condition and aerobic endurance, which can affect the ongoing competition. One example is when athletes will carry out an ergometer test over a distance of 2000 meters and when simulating a race with several intervals. Because the sport of rowing is one of the most physiologically demanding factors, the respective metabolic rate will increase 20 times compared to normal metabolism (Flood and Simpson, 2012).

Rowing is a sport that really demands maximum aerobic capacity. Poor physical appearance will have a negative impact on performance. Under these conditions, lack of physical

fitness is an important factor in the performance of Rowing athletes. The higher the athlete's maximum aerobic capacity, the lower the rowing athlete's fatigue. Aerobic endurance can be measured by looking at maximum oxygen consumption. It can be tested using various methods, namely, Balke test, Rockport test and bleep test.

Based on previous research conducted by (Latifah, 2019), it is stated that athletes' endurance can be influenced by visceral fat factors and the percentage of body fat in athletes. The author researched the visceral fat factor, body fat percentage and young rowing athletes in West Bandung district with the aim of seeing the relationship between Visceral Fat and Body Fat Percentage on VO2max. It is hoped that the results of this research can be a reflection for both coaches and athletes themselves in an effort to improve performance according to the expected targets.

METHOD

This research involved 11 young rowing athletes in West Bandung Regency using quantitative methods. This quantitative method is a method that requires collecting, compiling, processing and analyzing data using numbers. West Bandung Regency Athletrowing had an average age = 17.38 ± 1.16 years; body weight = 63.74 ± 6.43 cm; height = 173.5 ± 4.01 cm; BMI = 21.64 ± 2.32 kg/m2. All athletes received an explanation regarding the risks and benefits of carrying out this research and were willing to fill out an informed consent form. This research has passed the ethical committee test issued by the Bandung POLTEKKES ethical committee. In anthropometric measurements, athletes were measured using the Omron Karada Scan HBF-375. The anthropometric data taken includes age, height, weight, visceral fat and body fat percentage, the results of which can be obtained if the athlete has climbed onto the device, then the data is recorded and processed again by the researcher.

The measurement of the dependent variable is by measuring VO2max using a multistage fitness test or also known as the Bleep Test. This bleep test can be done by running back and forth for 20 meters, starting with a gradual slow run that gets faster and faster until the athlete is unable to keep up with the running rhythm. If an athlete is unable to follow the running rhythm twice in a row, it means that their maximum ability is only at that level.

After that, the independent variable (VO2max) and dependent variables (body fat and visceral fat) will be analyzed using the SPSS software application. These stages go through the normality test and correlation test stages which are analyzed using descriptive, comparative and

associative approaches. In full, below is a diagram of the steps in the activities that the researcher will carry out. The correlation test can be seen, so that it can be concluded whether the hypothesis can be accepted or not. Then the author will carry out a multiple correlation test to determine the simultaneous relationship between the dependent variable (Body Fat and Visceral Fat) on the independent variable (VO2max).

RESULTS AND DISCUSSION

Result

Table. 1. Characteristics Anthropometri Of Rowing Athletes

Subject = 11	**Average ± SD**
Age	17,38 ± 1,16
Weight (Kg)	63,74 ± 6,43
Height (Cm)	173,5 ± 4,01
VO2Max (ml/kg/min)	46 ± 2,77
Fat (%)	12,2 ± 0,03
V-Fat (%)	5,9% ± 0,03

Based on the results of this research, it can be seen in Table 1. Anthropometric characteristics of rowing athletes which had 11 rowing athletes as subjects had age (Years) with an average age of (17.38 ± 1.16) years, body weight (Kg) with an average of (63.74 ± 6.43), Body height (Cm) of athletes with an average of (173.5 ± 4.01), Maximum aerobic capacity / VO2max (ml/kg/min) of rowing athletes with an average of (46 ± 2.77), Number of percentages body fat (%) in rowing athletes with an average of (12.2 ± 0.03) and Visceral-Fat (%) in rowing athletes with an average of (5.9% ± 0.03).

Table 2. Normality Test

	Kolmogorov-Smirnov[a]			**Shapiro-Wilk**		
Variable	Statistic	df	Sig.	Statistic	df	Sig.
V-Fat	0,188	11	,200*	0,878	11	0,099
Fat	0,171	11	,200*	0,902	11	0,196
Weight	0,231	11	0,104	0,892	11	0,146
VO2max	0,278	11	0,017	0,839	11	0,030

a. Lilliefors Significance Correction

Based on the results of the normality test using the Kolmogorov-Smirnov method, the test shows that the result data is normally distributed including, Visceral-Fat, Fat where the results of

the significance value test meet the criteria (P>0.05). However, the value of VO2max is not normally distributed because the data does not meet the criteria (P = 0.017).

Then the results of the normality test based on the Shapiro-Wilk test method showed that the result data was normally distributed including, Visceral-Fat, Fat where the results of the significance test met the criteria (P>0.05). However, the value of VO2max is not normally distributed because the data does not meet the criteria (P = 0.030).

From the results of the normality test above using the Kolomogorov-Smirnov Test and Shapiro-Wilk Test methods, it can be concluded that the data is not normally distributed. If there is a non-normal distribution that does not meet the requirements (P>0.05), with data that is not normally distributed, the data is tested using a correlation test with the Spearman's rho rank correlation method.

Table 3. Correlationt Test

NO	Spearman's rho		V-Fat	Fat	VO2max
1	V-Fat	Correlation Coefficient	1,000	,925**	-0,499
		Sig. (2-tailed)		0,000	0,118
2	Fat	Correlation Coefficient	,925**	1,000	-0,369
		Sig. (2-tailed)	0,000		0,265
3	VO2max	Correlation Coefficient	-0,499	-0,369	1,000
		Sig. (2-tailed)	0,118	0,265	

Based on the results of the relationship between Visceral-Fat and Fat on VO2max levels in Table 3, it shows that the correlation between Visceral-Fat and VO2max results is (r = -0.499) with significant results (P = 0.118). From this value it can be concluded that there is no relationship between Visceral-Fat and VO2max results in rowing athletes, while the correlation results show (r = -0.499) indicating that the correlation is inversely proportional to the degree of moderate correlation which can be concluded if the percentage value is greater Visceral-Fat then the resulting value of VO2max will be low

The correlation results between Fat Percentage and VO2max are (r = -0.369) with significance results (P = 0.625). From this value it can be concluded that there is no relationship

between fat percentage and Vo2max results because the value is significant (P > 0.05). To test the correlation between fat percentage and VO2max results, it shows that there is a correlation that is the same as the correlation between Visceral-Fat and Vo2max. These results are in accordance with research (Sari, 2019) which conducted research on athletes aged 10-30 years. It can be said that the greater the value of body fat, the lower the value of physical fitness or aerobic capacity (VO2max), and vice versa.

DISCUSSIONS

These results are in accordance with research (Sari, 2019) which conducted research on athletes aged 10-30 years. It can be said that the greater the value of body fat, the lower the value of physical fitness or VO2max, and vice versa. Then, based on the results of this research, it is the same as research conducted by (Parikh et al., 2018). It can be said that the greater the value of visceral fat, the lower the value of physical fitness or aerobic capacity (VO2max), and vice versa. This is also in accordance with previous research which conducted research on adolescents aged 18-19 years where the value of visceral fat was inversely proportional to the value of.

Then in his research, it is in line with researchers (Ningrum, 2023), that there is a relationship between body fat and cardiovascular endurance in hockey athletes, which means that the higher the percentage of body fat, the lower the aerobic endurance in hockey athletes. High body fat in athletes will be a barrier and provide an additional burden on cardiorespiratory function during exercise. A reduction in this function will have an impact on the low maximum oxygen uptake (VO2Max) used. An athlete needs to avoid this, because good physical fitness can be achieved with optimal cardiovascular endurance (Suryana & Fitri, 2017).

CONCLUSION

The results of this study show that there is an inverse relationship between Visceral-Fat values, Body Fat Percentage and VO2max results in young rowing athletes in West Bandung. Even better, every coach, athlete and historian from sports science can collaborate to optimize performance from the results that have been obtained. It is recommended that further research be carried out because research on rowing in Indonesia is still lacking in interest.

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