



Correlation Between Body Fat Percent, Circle Ratio Waist Panel, Physical Activities with VO₂Max Value on Employees of Aisyah Pringsewu University in 2021

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ABSTRACT

VO₂max is one way to measure cardiorespiratory fitness. One of the factors that cause heart disease is low cardiorespiratory fitness. The purpose of this study was to determine the relationship between percent body fat, waist-to-hip ratio, physical activity with the value of VO₂max in Aisyah Pringsewu University Employees in 2021. The design of this study used a cross sectional. The number of research samples was 78 consisting of 30 men and 48 women with an average age of 30.81 ± 6.58 years. Fitness was measured using the 20-Meters Shuttle Run Test. The results of statistical analysis showed that there was a significant relationship between percent body fat and VO₂max value (p<0.05), physical activity with VO₂max value (p<0.05) and there was no relationship between waist-to-hip ratio and VO₂max value (p<0.05). 0.05. The conclusion is good, percent body fat, and physical activity have a significant relationship with the vo₂max value in employees, but the ratio of waist and hip circumference has no significant relationship.

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Kata kunci:

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ABSTRAK

VO₂max adalah salah satu cara untuk mengukur kebugaran kardiorespirasi. Salah satu faktor penyebab terjadinya penyakit jantung yaitu rendahnya kebugaran kardiorespiratori. Tujuan penelitian ini adalah untuk mengetahui hubungan persen lemak tubuh, rasio lingkaran pinggang panggul, aktivitas fisik dengan nilai VO₂max pada Karyawan Universitas Aisyah Pringsewu Tahun 2021. Desain penelitian ini menggunakan Cross Sectional. Jumlah sampel penelitian sebesar 78 yang terdiri dari 30 laki laki dan 48 perempuan dengan usia rata rata 30,81 ± 6,58 tahun. Kebugaran diukur menggunakan 20-Meters Shuttle Run Test. Hasil analisis statistik menunjukkan terdapat hubungan yang signifikan antara persen lemak tubuh dengan nilai VO₂max (p<0,05), aktivitas fisik dengan nilai VO₂max (p<0,05) serta tidak ada hubungan antara rasio lingkaran pinggang panggul dengan nilai VO₂max (p<0,05). Kesimpulannya baik, persen lemak tubuh, dan aktivitas fisik memiliki hubungan yang bermakna dengan nilai vo₂max pada karyawan. Tetapi, rasio lingkaran pinggang dan panggul tidak terdapat hubungan yang signifikan.

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INTRODUCTION

Physical fitness is the body's ability to adjust the function of its organs, one component of fitness is cardiorespiratory endurance. The quality of cardiorespiratory endurance is expressed by the maximum oxygen volume (VO₂max) which is the ability of the heart and lung organs in humans to breathe as much oxygen as possible during physical activity and VO₂max is expressed in milliliters/minute/kg body weight (Sukadiyanto & Muluk, 2011).

According to WHO data (2015) cardiovascular disease causes 17.7 million deaths and 31% of them represent all deaths as a whole. Some of the diseases that cause death include 7.4 million due to coronary heart disease and 6.7 million due to stroke. According to Riset Kesehatan Dasar in 2018, on the prevalence of heart disease with a doctor's diagnosis in the population of all ages by province, it was found that Indonesia was at 1.5% with the highest being North Kalimantan (2.2%) and the lowest being East Nusa Tenggara (0.7. %). Lampung Province is below the average percentage of Indonesian people, which is 1.3% (Kemenkes, 2018).

Many studies related to fitness have been carried out in Indonesia, the results show that the Indonesian people have a low level of fitness. A cardiovascular fitness study using the Bleep Test conducted on young adult men and women showed that as many as 55% had poor cardiovascular fitness (Sukamti, et., al, 2016).

Body composition is one of the factors that play a role in physical fitness, in addition to cardiovascular endurance. It is said that there is a significant relationship between percent body fat and physical fitness (Widiastuti, et., al., 2020).

Physical activity is also one of the determinants of a person's level of fitness. Based on the National Riskesdas report (2018) that the level of physical activity that occurs in the province of Lampung shows 28.6% in the category of less activity. Meanwhile, according to data from the Riskesdas report for Lampung Province (2018), the prevalence in the Pringsewu district is the level of physical activity in the less category, reaching 24.09% (Kemenkes, 2018).

Physical activity is known to reduce the risk of cardiovascular disease and obesity (Dewi & Wuryaningsih, 2019). A cross sectional research study conducted by Tamimi (2015) on employees of PT. Indocement Bogor showed a significant relationship between physical activity and VO₂max in field group employees, with high physical activity they will have a better level of fitness.

METHODS

Participant characteristics and research design

This type of research is a type of quantitative research using the observation method with a cross sectional approach, namely a research design that aims to find the relationship between risk factors and the effect of observations or observations between variables carried out simultaneously.

Sampling procedures

The sampling technique used is simple random sampling. Sampling is taken randomly regardless of the level in the population and each element of the population has an equal and known chance of being selected as a subject.

Sample size, power, and precision

The cross-sectional research formula was used in determining the sample size in the study (Masturoh and Temesvari, 2018). The results of the calculation of the sample obtained a sample of 78 consisting of 30 men and 48 women. The instrument in this study was a research questionnaire containing a research explanation text, informed consent, respondent's identity, an IPAQ (International Physical Activity Questionnaire) form and a PAR (Physical Activity Ratio) table as well as a Multistage Fitness Test (MFT) calculation form, measurement of body fat percentage and ratio waist circumference using BIA brand Omron Karada Scan HBF-375, 20 meters long track, Tape recorder / mp3 player, and Normative VO₂max.

Measures and covariates

Primary data collection in this study was carried out during the Covid-19 pandemic so it was mandatory to comply with health protocols by using masks, washing hands with soap, and maintaining a distance of 1 meter between one respondent and another. Researchers used latex medical gloves and adhered to health protocols. Before taking measurements, researchers and respondents washed their hands with soap and running water, wore masks and sat with a distance of 1 meter. Primary data collection was carried out directly, through filling out questionnaires on respondent identity data, physical activity interviews, measuring body fat percent and waist-to-hip ratio and measuring VO₂max estimation with the 20 – Meters Shuttle Run Test.

Data analysis

Conduct a test to determine the relationship between VO₂max values based on percent body fat, waist-to-hip ratio, physical activity on employees of Aisyah Pringsewu University in 2021. The statistical test used in this analysis is the Spearman correlation test.

RESULTS AND DISCUSSION

Characteristics of Research Subjects

The general description of the results of data collection related to age, weight and height of 78 respondents to Aisyah Pringsewu University employees is presented in table 1.

Table 1
Distribution of Age, Weight and Height of Aisyah Pringsewu University Employees

Variable	Mean ± SD	Minimum – Maximum
Age (years)	30,81 ± 6,584	22 – 60
Weight (kg)	64,160 ± 12,575	41,1 – 94,4
Height (cm)	159,403 ± 8,301	145,0 – 182,2

The following is a description of the characteristics of respondents as a result of data collection on 78 respondents related to gender and respondent's position, which is presented in table 2.

Table 2
Frequency Distribution of Gender and Position in Aisyah Pringsewu University Employees (N=78)

Characteristics	Frequency (f)	Percentage (%)
Gender		
Male	30	38.5
Female	48	61.5
Job title		
Lecturer	36	46.2
Driver	2	2.6
Office Boy	4	5.1
Security	8	10.3
Staff	26	33.3
The Cook	2	2.6

Data Normality Test

The results obtained on each variable were tested for normality, from the results of the analysis that showed the normality of numerical data on the value of VO2max, percent body fat, waist-to-hip ratio, physical activity are presented in table 3.

The results of the normality test using the Kolmogorov-Smirnov test in table 3 for the percent body fat and waist-to-hip ratio variables have a p-value of 0.200 (p-value > 0.05) so that it shows that the data are normally distributed, while the variables of physical activity and VO2max has a p-value of 0.000 (p-value <0.05) so it shows that the data is not normally distributed.

Table 3
Test Of Normality VO2max Value, Body Mass Index, Percent Body Fat, Waist to Hip Ratio, Physical Activity and Intake of Macro Nutrients

Variable	Kolmogorov-Smirnov			Saphiro-Wilk		
	Stat.	df	Sig.	Stat.	df	Sig.
Value of VO2max	,226	78	,000	,625	78	,000
Percent Body Fat	,080	78	0,200	,971	78	,077
Waist to Hip Ratio	,074	78	0,200	,960	78	,016
Physical Activity	,087	78	0,200	,986	78	,580

Correlation between Percent Body Fat and VO2max Value

The correlation between percent body fat and VO2max was analyzed using the Spearman correlation test because the percent body fat data was normally distributed and did not meet the linearity requirements, so the analysis used was the Spearman correlation test. The following is a table of the results of the analysis of the relationship between percent body fat and the value of VO2max.

Table 4
Analysis of the correlation between Body Fat Percentage and VO2max Value for Aisyah Pringsewu University Employees

	Value of VO2max
Percent Body Fat	r = -0,797
	p = 0,000
	n = 78

The results of the analysis based on statistical tests carried out in Table 6 obtained a p-value of 0.020 which indicates that there is a relationship between physical activity and the VO2max value of Aisyah Pringsewu University employees. Assessment of the correlation value (r) of 0.114 which means it shows a positive correlation with weak correlation strength, this explains that the higher the value of physical activity, the higher the VO2max value.

Low physical activity can result in the accumulation of energy in the body in the form of fat. If this happens continuously will cause an increase in body mass index. Increased body mass index is a major risk factor for chronic diseases such as cardiovascular disease (heart and stroke) (Pamela, 2011).

Meanwhile, if someone does physical activity, it will have a considerable influence on a person's level of fitness. The results of this study are in line with research conducted by Tamimi (2015), on field group employees at PT. Indocement

Bogor employees showing that there is a significant relationship between physical activity and VO2max.

High physical activity will have a better level of fitness. Other research shows that the level of physical activity is related to the value of cardiorespiratory fitness in Pandeglang Hospital employees (Rahmawati, 2016). According to Dewi & Wuryaningsih (2019) Lack of physical activity is known to have an impact on increasing the risk of obesity, but if someone does physical activity it is known to reduce the risk of cardiovascular disease so that it concludes that less physical activity (sedentary activity) will trigger non-communicable diseases.

CONCLUSIONS AND SUGGESTIONS

There is a relationship between percent body fat and VO2max value with p value = 0.000, physical activity with VO2max value with p value = 0.020. There is no relationship between waist circumference ratio with VO2max value with p value = 0.320. Suggestions, this research can be used as material for further research related to body mass index, percent body fat, waist-to-hip ratio, physical activity, and intake of macronutrients with VO2max value. So that there is further research by intervening in measuring fitness levels with other methods.

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