



Correlation of Body Mass Index With Level of Physical Fitness During The Covid-19 Pandemic

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Abstract

The COVID-19 pandemic has had a negative impact on all sectors, including the education sector. Since the Covid-19 pandemic in Indonesia, all activities have been subject to restrictions. Education is also one of the places that are negatively affected. The policy of learning from home will certainly affect the physical activity of students. When students have low activity, it will affect their body mass index and cardiovascular fitness level. This study aims to determine the correlation between Body Mass Index and cardiovascular fitness levels of Dirgantara Putra Bangsa Vocatinal School students who take part in extracurricular sports during the covid-19 pandemic. This study is an observational study with a cross-sectional design. The sample size is 40 athletes consisting of 20 male students and 20 female students. Cardiovascular fitness level was measured using a 2.4-kilometer run test. The analysis test used the Pearson product-moment test to see the relationship between body mass index and cardiovascular fitness level. The results showed that there was no relationship between body mass index and the level of cardiovascular fitness of Dirgantara Putra Bangsa Vocational School students who took part in extracurricular sports with a significance value of $p = 0.882$. This study concludes that there is no correlation between body mass index and cardiovascular fitness levels in Dirgantara Putra Bangsa Vocational School students who take part in extracurricular sports during the COVID-19 pandemic.

How to Cite

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INTRODUCTION

The Covid-19 pandemic brings various negative impacts in all circles around the world (Jena, 2020). The Covid-19 virus is also the cause of the highest death rate for now (Purnamasari & Raharyani, 2020). The policy of keeping a distance or so-called social distancing is carried out to limit community interaction to prevent the transmission of the COVID-19 virus (Alfaritsi et al., 2020). This distance distancing policy is also implemented by most schools, both elementary schools, junior high schools, and also high schools. The limitation of this activity of course has an impact on the teaching and learning process in sports education subjects which can have a negative impact on the level of physical fitness of students (Syafuruddin et al., 2021). Especially before the COVID-19 pandemic, maintaining physical fitness was something that was often forgotten by the public, especially teenagers (Gantarialdha, 2021).

Physical fitness at the age of teenagers tends to have a low category or not fit. Based on Sports Development Index (SDI) data, the category of physical fitness in Indonesian society is divided into very good at 1.08%, 4.07% good, 13.55% moderate, 43.90% poor, and 37.40% very poor (Ridwan et al., 2017).

Physical fitness can be defined as the body's ability to maintain and adjust physiological functions to conditions in an efficient manner without being tired so that they can still carry out other activities. The components of physical fitness related to health are muscle strength, muscle endurance, body flexibility, cardiorespiratory endurance, and body composition (Fariz & Dewangga, 2020). Of all these components, the most important component is cardiorespiratory endurance. The most effective measure of cardiorespiratory endurance is to assess a person's VO₂max (Dieny et al., 2020).

Body mass index (BMI) is one of the factors associated with VO₂max. Body mass index or body mass index (BMI) is a way to monitor the nutritional status of adults, especially those related to being underweight and overweight (obesity) (Gantarialdha, 2021). Weight loss increases the risk of infectious diseases while being overweight increases the risk of degenerative diseases (Widiantini & Tafal, 2014). In developing countries, the highest number of overweight adolescents is in Asia, which is 60% of the population or about 10.6 million people. In Indonesia, the prevalence of overweight in the population over the age of 18 in 2018 shows a

fairly high number. The prevalence of overweight is 13.6% and the prevalence of obesity is 21.8% (Gunawan & Adriani, 2020).

The tissue directly involved in the energy formation process is muscle tissue, not fat. Thus, the ability to produce energy possessed by obese people is smaller because there is less muscle tissue than fat. A person with more muscle tissue will have better physical fitness (Tayech et al., 2020).

METHOD

This research is a descriptive-analytic study with a cross-sectional design. The research population is students who take extracurricular sports at Dirgantara Putra Bangsa Vocational School. Sampling was done by purposive sampling of as many as 40 people. Divided into 20 male students and 20 female students. There are two research variables, namely BMI as the independent variable and the level of cardiovascular fitness as the dependent variable. Data were collected by test method and anthropometric status measurement using scales and microtome as well as physical fitness level, especially about cardiovascular endurance through a 2.4 Kilometer running test. A cardiovascular fitness check will be carried out at the resumption of training in early September 2021.

Table 1. Category Body Mass Index

Category	Score BMI
Underweight	<18.5
Normal	18.5-22.9
Overweight	23-24.9
Obesity I	25-29.9
Obesity II	>30

Measurement of cardiorespiratory fitness in this study using the 2.4 km Run Test from Cooper. This test is a form of the field test to measure a person's level of cardiorespiratory fitness. Test takers must run as fast as possible over a distance of 2.4 km. The travel time achieved by the test taker is recorded in minutes, two digits behind the comma. This time is used to predict the level of cardiorespiratory fitness by confirming with Cooper's table of cardiorespiratory fitness. The condition for participants who take this test must be declared healthy by a doctor, and wear comfortable and polite sports clothes. Data from the research variables were then analyzed using the Pearson product-moment test.

Table 2. Category of Cardiorespiratory Fitness Values Running Test 2.4 Kilo Meters

Category	Skor VO2Max	
	Male (minutes)	Female (minutes)
Very Good and Well Trained	<08.27	>11.50
Very Good	08.37-09.40	11.50-12.29
Good	09.41-10.48	12.30-14.30
Moderate	10.49-12.10	14.31-16.54
Low	12.11-15.30	16.55-18.30
Very Low	>15.31	>18.31

RESULTS AND DISCUSSION

Of the 40 respondents, there were 20 (50%) male respondents and 20 (50%) female respondents according to the following **Table 3**.

Table 3. Gender Characteristics of Respondents

Gender	Frequency	Percentage (%)
Male	20	50%
Female	20	50%
Total	40	100%

Of the 40 respondents who were divided into 20 respondents were male and 20 were female, respondents were male and there were 20 (50%). In the male respondents, there is 1 respondent with an underweight body mass index, there are 18 respondents with a normal body mass index, there is 1 respondent with an obese body mass index I. In female respondents, there are 6 respondents with an underweight body mass index, 10 respondents with normal body mass index, 4 respondents with overweight body mass index.

Table 4. Characteristics of Respondents Body Mass Index

IMT	Male		Female	
	Fre-quency	%	Fre-quency	%
Under-weight	1	5%	6	30%
Normal	18	90%	10	50%
Over-weight	0	0%	4	20%
Obesity I	1	5%	0	10%
Obesity II	0	0%	0	0%
Total	20	100%	20	100%

Of the 40 respondents who were divided into 20 respondents were male and 20 were female, respondents were male and there were 20

(50%). In the male respondents, there is 1 respondent with a moderate level of cardiovascular fitness, there are 8 respondents with a low level of cardiovascular fitness, there are 11 respondents with a very low level of cardiovascular fitness. In female respondents, there are 2 respondents with a moderate level of cardiovascular fitness, 1 respondent with a low level of cardiovascular fitness, 17 respondents with a very low level of cardiovascular fitness.

Table 5. Cardiovascular Fitness

IMT	Male		Female	
	Fre-quency	%	Fre-quency	%
Very Good and Well Trained	0	0%	0	0%
Very Good	0	0%	0	0%
Good	0	0%	0	0%
Moderate	1	5%	2	10%
Low	8	40%	1	5%
Very Low	11	55%	17	85%
Total	20	100%	20	100%

In respondents who have an underweight BMI, there is 1 respondent with a moderate level of fitness, and 6 respondents with a very low fitness level. In respondents who have a normal BMI, there are 9 people with a low level of cardiovascular fitness, 19 respondents with a very low level of fitness. In respondents who have an overweight BMI, there are 4 respondents with a very low level of cardiovascular fitness. In respondents who have a BMI Obesity I, there is 1 respondent with a less fitness level. The results of the analysis with the personal product moment test get a value of $p = 0.88$, and an r -value of -0.024 . This result proves that there is no correlation between body mass index and the level of cardiovascular fitness of students who take extracurricular sports at Digrantara Putra Bangsa Vocational School.

Table 6. Correlation of BMI with Cardiovascular Fitness

BMI	Cardiovascular Fitness Level							P-Value	R
	Very Good and Well Trained	Very Good	Good	Moderate	Low	Very Low	Total		
Under-weight	0	0	0	1	0	6	7	0.88	-0.024
Normal	0	0	0	0	9	19	19		
Over-weight	0	0	0	0	0	4	4		
Obesity I	0	0	0	0	1	0	1		
Obesity II	0	0	0	0	0	0	0		
Jumlah	0	0	0	1	10	29	40		

The results of statistical tests showed that there was no relationship between body mass index and cardiovascular fitness level in students who took part in extracurricular sports at Dirgantara Putra Bangsa Vocational School with a value of $p = 0.882$ ($p > 0.05$). The results of this study are in line with research by Subekti and Santika who concluded that there is no significant relationship between obesity and fitness (Subekti & Santika, 2021).

Physical fitness is very important for a person, therefore it is necessary to develop and maintain the physical fitness of a person and athlete. Physical fitness is an important factor in a person, in today's era people must realize how important sports activities or activities are, both sports in sports education for achievement and sports for health (Bryantara, 2017). In this study, students must be aware of and understand the state of their own physical fitness. Good physical fitness can make students take part in learning or carry out daily activities with a sense of enthusiasm to fight so that they can give good and very satisfying results (Aryadi, 2020). So with enthusiasm, students will get good achievements in learning or in participating in competitions (Emda, 2017).

Based on table 7, although they have a normal body mass index, there are no respondents with a good level of cardiovascular fitness. Even in respondents with a body mass index who are underweight, overweight, and obese, there are also no respondents with a good level of physical fitness. This could be because the activities carried out by students during the COVID-19 pandemic affect a person's level of fitness. Because physical activity can stimulate muscle contraction. When a muscle contracts, muscle contractile protein synthesis proceeds much faster than the rate of destruction, resulting in the actin filaments and the myofibrils themselves breaking down within each muscle fiber into hypertrophy. The hypertrophied fiber results in an increase in the components of the phosphagen metabolic system, including ATP and phosphocreatine. This increases the ability of the aerobic and anaerobic metabolic systems to increase energy and strength (Giriwijoyo & Mulyana, 2011).

In addition, it can be caused by several factors, including heredity, nutritional factors, and physical activity. Nutritional status is influenced by two factors, namely direct factors, and indirect factors. Direct factors include infectious diseases and food intake, while indirect factors such as education, knowledge, skills, and food security are related to the ability to meet food needs. Even though heredity and nutritional factors can

cause thinness, if you often do regular activities, you can get fit because, with regular activities, the workload of the heart will be reduced (Utami, 2012). In addition, it can also be influenced by several reinforcing factors, namely socio-economic factors. Income is the most important factor in determining the quality and quantity of food and there is a close relationship between income and nutrition. Low income will affect food demand so that it determines the dishes in the family both in terms of food quality, the number of meals, and the variety of dishes (Prasetyo & Winarno, 2019).

CONCLUSION

Based on the results and discussion above, it can be concluded that there is no correlation between body mass index and cardiovascular fitness in students who take extracurricular sports at dirgantara putra bangsa vocational school.

REFERENCES

- Alfaritsi, S., Anggraeni, D., & Fadhil, A. (2020). Analisis wacana kritis berita 'tentang social distance', cara pemerintah cegah penyebaran virus corona di Detik.com.' *Jurnal Communicology*, 8(1), 131–152.
- Aryadi, D. (2020). Pengaruh Motivasi belajar, terhadap kebugaran jasmani dan hasil belajar. *Jurnal Pendidikan Dasar Setiabudi*, 4(1), 52–62.
- Bryantara, O. F. (2017). Factors That are Associated to Physical Fitness (VO₂ Max) of Football Athletes. *Jurnal Berkala Epidemiologi*, 4(2), 237. <https://doi.org/10.20473/jbe.v4i2.2016.237-249>
- Dieny, F. F., WIdyastuti, N., Fitranti, D. Y., Tsani, A. F. A., & Fikri, F. (2020). Profil Asupan, Status Gizi, Status Hidrasi dan Performa Atlet Sekolah Sepak Bola di Kota Semarang. *Indonesian Journal of Human Nutrition*, 7(2), 108–119.
- Emda, A. (2017). Kedudukan motivasi belajar siswa dalam pembelajaran. *Lantanida Journal*, 5(2).
- Fariz, M., & Dewangga, M. W. (2020). Survey study : analisis kompetensi pelatih kebugaran fitness center di wilayah jakarta selatan. *Smart Sport Jurnal Olahraga Dan Prestasi*, 17(10), 41–45.
- Gantarialdha, N. (2021). Hubungan Indeks Massa Tubuh Terhadap Ketahanan Kardiorespirasi Dinyatakan Dalam Vo₂Max. *Jurnal Medika Utama*, 02(04), 1162–1167.
- Giriwijoyo, S., & Mulyana, B. (2011). Meningkatkan Kemampuan Fungsional otot/Latihan Otot. *Jurnal Kepeleatihan Olahraga*, 3(1), 1–38.
- Gunawan, S. P., & Adriani, M. (2020). Obesitas Dan Tingkat Stres Berhubungan Dengan Hipertensi Pada Orang Dewasa Di Kelurahan Klampis Ngasem, Surabaya. *Media Gizi Indonesia*, 15(2), 119–126.
- Jena, P. K. (2020). Impact of Pandemic COVID-19. *International Journal of Current Research*,

- 12(07), 5.
- Prasetyo, M. A., & Winarno, M. E. (2019). Hubungan Status Gizi Dan Aktivitas Fisik Dengan Tingkat Kebugaran Jasmani Pada Siswa SMP. *Sport Science and Health*, 1(3), 198–207.
- Purnamasari, I., & Raharyani, A. E. (2020). Tingkat Pengetahuan Dan Perilaku Masyarakat Kabupaten Wonosobo Tentang Covid -19. *Jurnal Ilmiah Kesehatan*, 3(1), 33–42.
- Ridwan, M., Lisnawati, N., & Enginelina, E. (2017). Hubungan antara asupan energi dan aktifitas fisik dengan kebugaran jasmani. *Journal of Holistic and Health Sciences*, 1(1), 73–85.
- Subekti, M., & Santika, I. G. P. N. A. (2021). Hubungan Indeks Massa Tubuh (IMT) dan Kadar Lemak Tubuh Terhadap Kebugaran Fisik Atlet Kabaddi di Masa Pandemi Covid-19. *Prosiding Seminar Nasional IPTEK Olahraga*, 6–9.
- Syafruddin, M. A., Haeril, H., & Ikadarny, I. (2021). Tingkat kebugaran jasmani mahasiswa di masa pandemi covid-19. *Prosiding Seminar Nasional Ilmu Keolahragaan*, 1(1), 8–17.
- Tayech, A., Mejri, M. A., Makhoul, I., Mathlouthi, A., Behm, D. G., & Chaouachi, A. (2020). Second wave of covid-19 global pandemic and athletes' confinement: Recommendations to better manage and optimize the modified lifestyle. *International Journal of Environmental Research and Public Health*, 17(22), 1–13. <https://doi.org/10.3390/ijerph17228385>
- Utami, S. R. (2012). Status Gizi, Kebugaran Jasmani Dan Produktivitas Kerja Pada Tenaga Kerja Wanita. *Jurnal Kesehatan Masyarakat*, 8(1), 74–80. <https://doi.org/10.15294/kemas.v8i1.2815>
- Widiantini, W., & Tafal, Z. (2014). Aktivitas Fisik, Stres, dan Obesitas pada Pegawai Negeri Sipil. *Kesmas: National Public Health Journal*, 4, 325. <https://doi.org/10.21109/kesmas.v0i0.374>.