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Research Article

The Relationship between Physical Activity and Body Mass Index During the Covid-19 Pandemic in Students of the Faculty of Medicine, Indonesian Christian University

Wiradi Suryanegara[1]*, Wendy Hendrika[2]

[1.] *Department of Medical Community, Faculty of Medicine, Universitas Kristen, Jakarta, Indonesia*

[2.] *Department of Surgery, Faculty of Medicine, Universitas Kristen Indonesia*

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*Address for Correspondence:

Wiradi Suryanegara, Department of Medical Community, Faculty of Medicine, Universitas Kristen, Jakarta, Indonesia

Abstract

Background: Policies related to large-scale restrictions during the pandemic require each individual to carry out physical activities and routines at home, so every activity that is usually carried out is now completely limited, and it affects the current public health, as well as there is no research related to the relationship between physical activity and BMI in the 2018 batch of the Faculty of Medicine, Christian University of Indonesia. It is the basis of researchers conducting this research. Method: This research design is descriptive-analytic, with a cross-sectional approach, with a population of 156 respondents and a sample of 113 respondents whom Spearman will analyze with a p-value < 0.05. Result: The frequency of physical activity in the 2018 Indonesian Christian University Faculty of Medicine students in the "Light" category was 54% (61 people), "Medium" was 30.1% (34 people), and "Heavy" was 15.9% (18 people). Meanwhile, the frequency of Body Mass Index in the respondents in this study was divided into the categories of "undernourished" by 11.5% (13 people), "Normal" by 63.7% (72 people), "Overweight" by 9.7% (11 people), and "Obesity" by 15% (17 people). Then, both were correlated with a significant value of 0.04. Conclusion: The Body Mass Index in the 2018 Indonesian Christian University Faculty of Medicine students was in the normal category at most 63.7% (72 people), while the most physical activity was, the light category was 54% (61 people), and these two variables had a correlation one another.

Keywords: Physical Activity, BMI, Covid 19 Policy, Health, Restriction

INTRODUCTION

The existence of large-scale restrictions during the COVID-19 pandemic requires that every individual who usually carries out physical activities outside the home must do so at home, and routine activities are also limited for every student who is usually active in activities on campus. It becomes inactive at home, spending more time in front of a computer screen or cell phone. Physical activity is body movement produced by skeletal muscles and requires energy, such as traveling, housework, etc. In theory, physical activity is divided into three categories, namely, heavy physical activity, moderate physical activity, and light physical activity. Apart from this division, physical activity has several concepts: type, duration, frequency, intensity, and volume. Regardless of the division, every physical activity affects people's health. [1; 2; 3; 4].

In this case, it is hoped that the public can increase awareness of the importance of physical activity for health, considering that the benefits of physical activity in daily life are quite numerous, one of which is related to Body Mass Index (BMI), which is an indicator that is often associated with body fat. [5] The continuation of limited activities, which affects BMI, cannot be separated from every policy, which is an effort by the Indonesian government to continue to reduce the incidence and death rates due to COVID-19. Various policies have been implemented, but the lack of public awareness about Covid-19 means that the number of Covid-19 cases continues to increase. One of the applicable regulations is Indonesian Government Regulation No. 21 of 2020, which regulates "Large-Scale Restrictions in the Context of Accelerating Handling of Coronavirus Disease 2019 (COVID-19)". [6; 7].

Supported by the absence of research regarding the relationship between physical activity and BMI in the Class of 2018 Faculty of Medicine, Indonesian Christian University. It is the basis for researchers in conducting this research, and it is hoped that any process or results obtained can still encourage the community to carry out physical activities in their daily lives. The formulation of the problem in this research is: What is the description of physical activity and Body Mass Index, as well as the relationship between these two variables in students of the Class of 2018 at the Faculty of Medicine, Indonesian Christian University, during the Covid-19 pandemic, in 2021? The research aims to determine the relationship between physical activity and body mass index during the COVID-19 pandemic among students at the Faculty of Medicine, Indonesian Christian University, Class of 2018, in 2021.

LITERATURE REVIEW

Current policies require each individual to limit their activities. This activity has been ongoing and has been going on for almost the past two years. This continuous behavior eventually forms a habit in today's society; quite a few individuals stop their daily physical activity habits and become sedentary. The same goes for today's teenagers in elementary school and college. Every physical activity now requires every student to remain in front of the gadget screen. [8] According to WHO, physical activity is body movement produced by skeletal muscles and requires energy, such as traveling, housework, etc. In daily life applications, physical activity is very helpful in preventing the increase in non-communicable diseases (NCDs). Apart from that, physical activity has biological and psychological/mental functions. Biological functions include maintaining stable blood pressure, increasing endurance, maintaining ideal body weight, and so on, while psychological/mental functions include reducing stress, building a sense of sportsmanship, and so on. [9; 10; 11] Regarding application in people's lives, physical activity, related to existing concepts, is also explained in detail if applied in daily life based on age. [12; 13] a) Ages 5 – 17 years are recommended to moderate to vigorous physical activity for at least 60 minutes/day, mostly aerobic and vigorous-intensity activities, including those that strengthen muscles and bones at least 3x/week; b) Ages 18 – 64 years are recommended to do 150 minutes of moderate-intensity physical activity in one week, 75 minutes of high-intensity aerobic physical activity in 1 week, or a combination of both. The aerobic activity must be carried out for a minimum duration of 10 minutes; adult individuals can increase moderate-intensity aerobic physical activity to 300 minutes/week or do 150 minutes of vigorous-intensity aerobic physical exercise per week or a combination of both, and muscle strengthening activities for two days/week; c) Ages over 65 years are advised to do physical activity of at least 150 minutes of aerobic exercise (moderate intensity throughout the week), at least 75 minutes of aerobic exercise (high intensity throughout the week), or an equivalent combination of both; d) After knowing and understanding more about physical activity and its benefits, it is hoped that people will continue to adopt active lifestyle behavior during the pandemic to reduce the incidence of non-communicable diseases in the future.

Body Mass Index (BMI) is a metric used to further explain adults' anthropometric height/weight characteristics and classify (categorize) them into groups. This metric is also used to reference the development or prevalence of several health problems and determine public health policies. [14] In every individual's daily life, many factors support an increase or decrease in Body Mass Index. Starting from a person's activeness in daily physical activities, diet, environment, socio-economic status, and many more. Physical activity is often associated with increasing a person's Body Mass Index. Based on previous research, it is stated that low physical activity has an important influence on Body Mass Index status, namely obesity. Several studies also stated that low physical activity strongly correlates with increased body weight and low Body Mass Index status. It is because the lower the physical activity carried out, the more energy will be stored, which can increase the incidence of obesity. [15; 16; 17]

In practice, Body Mass Index (BMI) is often linked to indicators of body fatness related to body fat. It is supported by research showing that BMI correlates with body fat measurements. Based on this, BMI has the advantage that it can be used as a simple, cheap, and non-invasive replacement index for measuring body fat because, in its implementation, it only requires a person's height and weight. [18; 19] BMI calculations can be done by following the existing formula, namely: [20; 21]

$$IMT = \frac{BB}{TB^2}$$

Information:

- BMI = Body Mass Index (Kg/m2)
- BB = Body Weight (Kg)
- TB = Body Height (m2)

The results of the BMI calculation are then aligned with existing references, such as the Ministry of Health and WHO.

The incidence of Covid-19 since the beginning of 2020 until now has continued to increase. To follow up on this never-ending increase, the government has introduced various policies to support the continuity of life and health of every community in Indonesia. Starting from policies regarding budgeting funds for the COVID-19 19 outbreak to policies related to the sustainability of each community's activities. Starting from a restrictive policy on a small scale to a large scale. Carrying out online systems in various services increases risk factors that can cause non-communicable diseases. [22; 23].

Based on Indonesian Government Regulation No. 21 of 2020, which regulates "Large-Scale Restrictions in the Context of Accelerating Handling of Coronavirus Disease 2019 (COVID-19)," Especially in Article 4, which includes regulations regarding school and workplace holidays, restrictions on religious activities and/or restrictions on activities in public places or facilities. Based on Law no. 6 of 2018 concerning Health Quarantine, this action is carried out as a form of public health protection, which can potentially cause a public health emergency. In this case, Large-Scale Restrictions fall under Health Quarantine. [24; 25]

RESEARCH METHOD

This research design is analytical descriptive research, namely, research carried out to determine whether there is a relationship between two or several variables. Meanwhile, the approach was carried out using a cross-sectional approach, an approach method that is momentary in nature or only at one time and is not followed for a certain period. The research was conducted at the Faculty of Medicine, Indonesian Christian University, at Jalan Mayjen Sutoyo No.2, RT.9/ RW.6, Cawang, Kec. Kramat Jati, East Jakarta City, Special Capital Region of Jakarta. The research was conducted in July 2021.

The population of this study was students from the 2018 class of the Indonesian Christian University Faculty of Medicine, totaling 156 students. The sample size was taken using the Slovin formula:

$$n = \frac{N}{N(d)^2 + 1}$$

$$n = \frac{156}{156(0.05)^2 + 1}$$

$$n = 112.23$$

Based on calculations, the number of samples required is 113 samples. Sampling was conducted on students from the Faculty of Medicine, Indonesian Christian University, class of 2018, using purposive sampling according to the criteria, namely, FK UKI students, class of 2018. Respondents were willing to be sampled by filling in informed consent, and those who filled out the questionnaire completely, especially filling in information related to body weight and height. Measurement of physical activity in this study requires the International Physical Activity Questionnaire (IPAQ), an instrument in the form of a questionnaire translated into Indonesian and used to obtain estimates of physical activity internationally. Use a

questionnaire by asking the questions that have been provided. The questions will lead to four domains: recreational activities, home activities, work-related activities, and activities involving transportation. Next, respondents were asked to fill in the duration of the activity in minutes and the frequency of activity in days. Next, the data obtained is converted into MET/minute units. MET is a multiple of the resting metabolic rate, and MET/minute is obtained by multiplying the respondent's activity by the duration of minutes carried out. Data that has been converted can then be grouped according to existing criteria, namely low, medium, and high. Based on the IPAQ use protocol, an explanation of the criteria for physical activity is as follows: The data collected in this study is primary data obtained using a questionnaire filled out directly online by respondents. The questionnaire aims to determine and analyze physical activity, Body Mass Index, and the relationship between the two. The variables in this research are: The data collected from this research will be calculated using the Total Physical Activity and Body Mass Index formulas. The completed questionnaire needs to be edited and verified for each question answer so there are no blank answers. After editing, the questionnaire will be coded and entered into the computer via data entry. Data analysis is carried out through 2 analyses, namely univariate and bivariate analyses.

RESULT AND DISCUSSION

After collecting data on several target respondents that have been calculated, an analysis will be carried out which aims to provide an overview of each of the variables in this research, the first of which is related to the frequency distribution of physical activity of students at the Faculty of Medicine, Indonesian Christian University class of 2018.

Table 4.1 Frequency Distribution of Physical Activity for Students of the Faculty of Medicine, Indonesian Christian University Class of 2018

1	MET < 600	Ringan	61	54%
2	600 ≤ MET < 1500	Sedang	34	30.1%
3	MET ≥ 1500	Berat	18	15.9%
Total			113	100%

The table above shows that the frequency of physical activity among Indonesian Christian University Faculty of Medicine students in the class of 2018 in the "Light" category was 54% (61 people), "Moderate" was 30.1% (34 people), and "Heavy" was 15.9% (18 people). Apart from physical activity, this research also provided an overview of the Body Mass Index (BMI) of students at the Faculty of Medicine, Indonesian Christian University, class of 2018, which can be seen in the table below:

Table 4.2 Frequency Distribution of Body Mass Index for Students at the Faculty of Medicine, Indonesian Christian University Class of 2018

1	< 18.5	Malnutrition	13	11.5%
2	18.5 – 25.0	Normal	72	63.7%
3	> 25.0 – 27.0	*Overweight*	11	9.7%
4	> 27.0	Obesity	17	15%
TOTAL			113	100%

* Correlation is significant at the 0.05 level (1-tailed)

The table above explains in detail the correlation of 2 variables, body mass index (BMI) and physical activity, where the significant value is 0.04. Based on the table above, it shows that the Body Mass Index of 2018 Indonesian Christian University Faculty of Medicine students in the "Undernourished" category was 11.5% (13 people), "Normal" was 63.7% (72 people), "Overweight" was 9.7% (11 people), and “Obesity” by 15% (17 people).

Bivariate Analysis

This analysis aims to determine the correlation between two variables related to this research: knowing the relationship between physical activity and body mass index (BMI) during the pandemic. The following are the correlation test results for two variables using Spearman.

Physical Activity during the Pandemic	Student Nutritional Status										*P Value*
	Malnutrition		Normal		Overweight		Obesity		Total		
	N	%	n	%	n	%	n	%	n	%	
Light Physical Activity	9	8.0	40	35.4	4	3.5	8	7.1	61	54.0	0.040
Moderate Physical Activity	3	2.7	22	19.5	4	3.5	5	4.4	34	30.1	
Heavy Physical Activity	1	0.9	10	8.8	3	2.7	4	3.5	18	15.9	
Total	13	11.5	72	63.7	11	9.7	17	15	113	110	

The table above explains in detail the correlation of 2 variables, body mass index (BMI) and physical activity, where the significant value is 0.04.

DISCUSSION

Univariate Analysis

Distribution of Physical Activity Frequency of Students at the Faculty of Medicine, Indonesian Christian University, Class of 2018 Indonesian Christian University, Class of 2018

In this study, the number of individuals in the mild category was 54% (61 people), moderate was 30.1% (34 people), and severe was 15.9% (18 people). It is in line with research conducted by Farradika et al. entitled Physical Activity Behavior and Its Determinants in Students of the Faculty of Health Sciences, Muhammadiyah University, Prof. Dr. Hamka, who showed the highest score among respondents who did a light physical activity, with a score reaching 47.80%, in this study also mentioned several factors related to very minimal activity among students, one of which was working conditions reaching a score of 81.6 % supports active physical activity, the availability of sports facilities at home reaches a value of 60.4% supports active physical activity and the support of lecturers in sports reaches a value of 58.5% supports the implementation of active physical activity. [26]

Frequency Distribution of Body Mass Index for Students of the Faculty of Medicine, Indonesian Christian University, Class of 2018

In this study, the number of individuals with a Body Mass Index in the undernourished category was 11.5% (13 people), normal was 63.7% (72 people), overweight was 9.7% (11 people), and obesity was 15% (17 people). It is in line with research conducted by Rukmana et al. entitled The Relationship Between Physical Activity and Nutritional Status in Adolescents During the Covid-19 Pandemic in Medan City, the highest value was obtained for BMI in the normal category at 56.6%. [27] Likewise, research by Supit et al. entitled Physical Activity and Nutritional Status of Students during the COVID-19 Pandemic, showed a figure of 50.5% for individuals with a normal BMI category. [28]

Bivariate Analysis

The relationship between physical activity and Body Mass Index in 2018 Indonesian Christian University Faculty of Medicine students

The research results show a relationship between physical activity and Body Mass Index of students at the Faculty of Medicine, Indonesian Christian University class of 2018. It is proven by the significance value of p 0.040 < 0.05. These results show that physical activity also affects Body Mass Index.

Physical activity is one of the factors that can influence Body Mass Index (BMI). However, other factors can influence Body Mass Index, namely age, which increases a lot at the age of 20-60 years; gender, with men more likely to be overweight than women; and genetics. Some studies show that obese parents predispose their children to obesity, and diet, especially eating fast food, contributes to obesity. [29]

These results align with research conducted by Utami and Setyarini, which shows that physical activity influences changes in Body Mass Index. In this study, it was explained that safe and effective activities can prevent overweight and obesity. [30] These results are also strengthened by research conducted by Rukmana, Permatasari, and Emilia, which shows that physical activity affects Body Mass Index. This research found that physical activity in adolescents tended to decrease during the COVID-19 pandemic, which could result in excess nutritional status as assessed by an increase in Body Mass Index. [27]

CONCLUSION

Based on the results of the research carried out, it was found that q) Body Mass Index of students at the Faculty of Medicine, Indonesian Christian University, Class of 2018, was divided into four categories, namely malnutrition at 11.5% (13 people), normal at 63.7% (72 people), overweight at 9.7% (11 people), and obesity by 15% (17 people); b) Physical activity among the 2018 Indonesian Christian University Faculty of Medicine students was divided into three categories, namely the light category at 54% (61 people), the moderate category at 30.1% (34 people), and the heavy category at 15.9% (18 people); c) Based on data analysis using the Spearman method, the significance value of p was 0.040 < 0.05, this result can be interpreted as saying that the level of physical activity plays a role in Body Mass Index. Based on the results of the research carried out, it is hoped that in the future: a) It is hoped that in the future, students will be more aware of the importance of optimal BMI so that in the future, they can take appropriate action in implementing a healthy lifestyle, which aims to reduce or even eliminate the rate of malnutrition, overweight, and obesity; and b) It is hoped that in the future, every student will be more aware of the importance of physical activity during the COVID-19 pandemic so that the 2018 students of the Indonesian Christian University Faculty of Medicine, class of 2018, will be physically fit and healthy.

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