




Physical Activity of Indonesian Students Decreased Significantly During the Covid-19 Pandemic

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Abstract. Introduction: The existence of the COVID-19 pandemic that entered Indonesia had an impact on the physical activity of students. Activities that were usually carried out on campus and outside campus were hampered. The pandemic required students to perform activities mostly at home to reduce the transmission of COVID-19 in Indonesia.

Methods: This study aims to determine changes in college students' physical activity during the COVID-19 pandemic. This cross-sectional study recruited 211 subjects through online platforms. Physical activity levels were measured using the Global Physical Activity Questionnaire (GPAQ). The Chi-Square test was operated to define the differences in physical activity.

Results: The majority of study subjects were female (74.4%), with the average age being 22 years old. Before the pandemic, 103 (48.8%) students had performed high-level physical activity, 92 (43.6%) students were in moderate-level physical activity, and 16 (7.6%) students were in low-level physical activity. During the pandemic, 44 (20.9%) students had high-level physical activity, 81 (38.4%) students were in moderate-level physical activity, and 81 (38.4%) students were in low-level physical activity. There was a significant decline in student's physical activity levels during the pandemic compared to before. The proportion of high-level physically active students decreased by 57% during the pandemic, whereas low-level physically active students increased by more than five times ($p < 0.05$).

Conclusions: This study can conclude a significant decrease in Indonesian student physical activity during the COVID-19 pandemic compared to before the COVID-19 pandemic and suggested to raise awareness of the vital role of physical activities regardless of the limited space or opportunity to do outdoor activities.

Keywords: Physical activity · Covid-19 · Student

1 Introduction

Coronavirus Disease 2019, commonly known as Covid-19, was first introduced in Wuhan, China, in December 2019 [1]. The virus causes respiratory diseases that also could damage multiple organs. It can spread through the mouth and nose when an infected person is coughing, sneezing, talking, singing, or breathing. The best way to avoid and slow the spread of the coronavirus is to limit mobility outside the house, followed by

keeping of at least one meter distance from each other, wearing masks, washing hands, avoiding crowds, and other prevention methods [2, 3].

As of March 7, 2022, there were 5,770,105 COVID-19 cases in Indonesia. Meanwhile, 5,171,402 cases have recovered, but 150,430 people have not survived [1]. The Indonesian government applied a partial lockdown to halt the virus's spread preventing people from performing activities outside. Schools and universities were closed, and the students performed learning activities at home in front of a computer or handphone, which led to limited movement or physical activity. This pandemic also resulted in lifestyle changes due to the closure of public facilities used for sports, such as fitness centers, stadiums, swimming pools, parks, and playgrounds. In this condition, a person tends to be less physically active, and sleep deprivation and dietary changes lead to weight gain and poor fitness [4].

WHO defines physical activity as any bodily movement generated by skeletal muscle that involves energy expenditure. Physical activity pertains to all mobility, including during leisure time, transport to and from places, or as part of a person's work. WHO recommends 150 min of moderate-intensity physical activity or 75 min of vigorous physical activity each week [5]. The usual or popular activities are walking, cycling, exercising, active recreation, and playing and skill activities [1].

Many studies reported physical activity changes during the COVID-19 pandemic. Barkley reported the acute effect of the Covid-19 pandemic on students' and employees' physical activity and sedentary behavior. The study indicated that the high-activity group experienced decreased physical activity. In contrast, the low-activity group experienced an increase [6]. In the country, the overview of physical activity in men during the Covid-19 pandemic by Larasaty reported that respondents who did activity physique were low by 40%, moderate by 33%, and high by 27%. The study shows that most people failed to fulfill WHO recommendations for daily physical activity [7].

This research aims to discover the change in the physical activity of college students in Indonesia during the Covid-19 pandemic by comparing it with the activities before the pandemic.

2 Methods

This cross-sectional study was conducted from February until June 2022. The study subjects were Indonesian college students recruited from online student platforms. The before and during pandemic physical activity information was assessed using the Global Physical Activity Questionnaire (GPAQ).

The GPAQ is composed of 16 questions to capture physical activity carried out in three behavioral domains, which are work, including the travel to and from places, recreational activities, and sedentary behavior. The work and recreational activities were categorized into vigorous or moderate activities that were assessed based on the number of days in a week and the duration in hours and minutes. Sedentary behavior only measured the duration of sitting or reclining on a typical day [8].

We used Metabolic Equivalents (MET) to analyze GPAQ data. One MET is equivalent to oxygen consumption while sitting at rest in a room at standard temperature and humidity. The typical value of 1 MET is 3.5 ml of oxygen per kilogram of body weight

per minute, equivalent to a caloric consumption of 1 kcal/kg/hour. It is estimated that the caloric consumption of a person who is sitting quietly is four times higher than that of a person who is moderately physically active and eight times as compared to sitting quietly, a person's caloric consumption is four times higher when being moderately active, and eight times higher when vigorously active [9].

Students' physical activity level was classified into low, moderate, and high. High-level physical activity means that students conducted more than 300 min per week of any combination of walking at a speed of more than 5 km/hour on an uphill road, such as climbing a mountain, jogging 8 km/hour, heavy lifting, shoveling sand, digging hoe, playing badminton, football, volleyball or basketball ($MET \geq 3000$); moderate-level physical activity is if students perform 150–300 min any combination walking at a speed 5 km/hour on a flat surface such as going to the office, home, class. Doing light activities such as gardening, planting trees, washing the car, and cleaning the grass with a lawn mower. Sports table tennis, bowling, cycling ($MET = 601-3000$); low-level physical activity is if students do not fit any of the criteria mentioned earlier ($MET = 0-600$) [10].

Informed consent was taken for the study. The findings were presented by description and analysis performed bivariate using a chi-square statistical test using SPSS version 25.

3 Result

A total of 211 college students participated in this study. Most were female (74.4%), the mean age was 22 years, and Java Island was the most frequent location where the students came from (Table 1).

Table 1. Subjects' Characteristic

	Mean (SD)	Number (%)
Gender		
Male		54 (25.6)
Female		157 (74.4)
Age	22 years (4.8)	
Location		
Bali		7 (3.0)
Maluku		1 (0.4)
Nusa Tenggara		1 (0.4)
Papua		1 (0.4)
Pulau Jawa		179 (84.8)
Pulau Kalimantan		7 (3.0)
Pulau Sulawesi		6 (2.8)
Pulau Sumatera		9 (4.2)

Table 2. Comparison of Students' Physical Activities Before and During the Pandemic COVID-19

Physical Activity level	Before Pandemic	During Pandemic	p-value
	Number (%)	Number (%)	
Low	16 (7.6)	81 (38.4)	0.000
Moderate	92 (43.6)	86 (40.8)	
High	103 (48.8)	44 (20.9)	

Table 3. Comparison of Students' Physical Activity Before and During the Pandemic COVID-19 Based on Gender

Physical Activity						
Gender	Before Pandemic			During Pandemic		
	High Number (%)	Moderate Number (%)	Low Number (%)	High Number (%)	Moderate Number (%)	Low Number (%)
Female	74 (47.1)	70 (44.6)	13 (8.3)	34 (21.7)	70 (44.6)	53 (33.8)
Male	29 (53.7)	22 (40.7)	3 (5.6)	10 (18.5)	16 (29.6)	28 (51.9)
		P = 0.642			P = 0.054	

Table 2 presented students' physical activity levels before and during a pandemic. Before the pandemic, students who had high physical activity were 103 (48.8%), moderate physical activity was 92 (43.6%), and low physical activity 16 (7.6%). During a pandemic, students who had high physical activity were 44 (20.9%), moderate physical activity was 86 (40.8%), and low physical activity 81 (38.4%). The difference in the proportion was statistically significant based on the chi-square test (p-value 0.000).

Before the pandemic, most students (48.8%) had high physical activity, and only 7.6% had low physical activity. Only 20.9% of students performed high physical activity during the pandemic, and 38.4% fell into low physical activity.

The proportion of male students who were physically active at the level of high before the pandemic was slightly higher than female students, respectively 53.7% and 47.1%. On the contrary, the proportion of male students who were physically active during the high level during the pandemic was slightly lower than female students at 18.8% compared to 21.7%. However, the gender physical activity difference was statistically insignificant (p = 0.054) (Table 3).

4 Discussion

This study confirmed the hypothesis that there had been a decline in students' physical activity levels in Indonesia during the Covid-19 pandemic. This study indicated that the proportion of high-level physically active students decreased by 57% during the

pandemic, whereas low-level physically active students increased by more than five times. The decrease in physical activities resulted from the change in learning activities and the restriction of community activities. This study exhibited that it was challenging for students during the pandemic to maintain WHO's suggestion to conduct the minimum physical activity of 150–300 min of moderate-intensity aerobics during week [4].

National and international studies have also reported a significant decrement in physical activities during the pandemic. Nurmudin from Indonesia reported decreased physical activities and balanced nutrition during the pandemic [11]. Park et al. and Stockwell et al., in their systematic review, indicated an increase in sedentary activities and a decline in mobility, walking, and physical activities [12, 13]. Worldwide physical activity trend was a concern by Tison et al. in their investigation of the decline of step counts globally. Furthermore, they illuminated that worldwide step counts have not reverted to the level of a pre-pandemic era in the two years since the COVID-19 pandemic began [14].

This study found no significant difference in physical activity based on gender. A distinct finding was reported by Lesmana, who discovered that male students were physically more active than female students [15]. On the other hand, Amalia's study illuminated a contradictory finding of which females are more active than males. However, Amalia also reported that people who used the internet to search for healthy lifestyle information had a high awareness of their health [16].

The pandemic's negative impact on physical activities has influenced people's quality of life and general health. Puccinelli from Brazil showed the association of low physical activity levels with anxiety and depression [17]. Callow reported the same phenomenon in which the greater physical activity level experienced lower depression-like symptoms. In addition, limited physical activity during the pandemic is associated with an increased risk of heart disease, diabetes, stroke, cardiovascular disease, and others [18]. Labib offered three arguments for the notable physical activity role in mental health during a pandemic. First, physical exercise during the pandemic enhances happiness and improves mental health. Second, physical exercise minimizes depression, anxiety, and sadness. Third, the intensity and the frequency of physical exercise link to mental health improvement [19].

Comparing the student's physical activity before and during the pandemic using a questionnaire is both a limitation and a strength of the study. The limitation of this study stemmed from limited data on students' physical activity before the pandemic in Indonesia. Therefore, comparing our findings to physical activity before the pandemic is challenging. However, it is the strength of this study because it questioned the physical activities before and during the pandemic that facilitated us to compare them. The results of this study call for action to raise awareness of the vital role of physical activities regardless of the limited space or opportunity to do outdoor activities.

5 Conclusion

There was a decrease in students' physical activity levels during the pandemic compared to before. The proportion of high-level physically active students decreased by 57% during the pandemic, whereas low-level physically active students increased by more than five times.

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Authors Contribution. CDA and AS conceptualized the study. CDA prepared study protocols, collected data, conducted initial analysis, and wrote the first draft. AS conducted analysis, review and finalized final manuscript. CDA and AS approved the submitted version.

Conflicts of Interest. The authors declare no conflict of interest.

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