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The Impact of Covid-19 Pandemic on Students' Sedentary Behavior in Indonesia

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Abstract

Indonesia is one among many countries applies lockdown or large-scale social restriction in order to suppress transmission rates. The current study examines the impact of COVID-19 pandemic lockdown decision on sedentary behavior among adolescents in Indonesia. An online survey was administered to 255 adolescents on August until October. The online survey consists of questions on demographic information and Adolescence Sedentary Activity Questionnaire (ASAQ). Statistical analysis was performed to compare the difference between total hours spend on performing sedentary behavior before and after the pandemic. A paired sample t-test revealed there was a significant difference in total hours spend on performing sedentary behavior before and after the pandemic ($t(254) = -12.8$, $p < .001$). Adolescence is performing more sedentary behavior after the pandemic ($M=10.43$, $SD=3.11$) compared to the time before the pandemic ($M=8.68$, $SD=3.47$). In conclusion, the covid-19 pandemic cause change on sedentary behavior where there were increase of the total hour adolescence spend on performing sedentary behavior, including a significant change in learning behavior.

Keywords: sedentary behavior, adolescence, gender difference, learning

INTRODUCTION

Recently, the world encountering a novel situation due to novel coronavirus SARS-CoV-2 resulted in the disease, namely COVID-19, which WHO declared as the global pandemic on 11 March 2020 (Ducharme, 2020). The first confirmed case was found in China and then followed by numerous cases worldwide, including Indonesia. The number of cumulative cases per 15 November 2020 was over 53.7 million worldwide and 463.007 in Indonesia (World Health Organization, 2020). The high number signified the rapid transmission of the virus since December 2019. Although the cumulative case is rapidly increasing, no precise treatment and vaccine could be offered for COVID-19 (Sardar *et al.*, 2020). Thus, there is insecurity regarding how the COVID-19 pandemic would be controlled.

The COVID-19 pandemic is a devastating disaster for the entire population earth. All segments of human life on earth are disturbed, without exception education. Many

countries decide to close schools, colleges as well as universities, including Indonesia (Rizqon Halal Syah Aji, 2020).

Correspondingly, medical teams and researchers have been focusing on treatment, prevention, treatment and vaccine development to control the virus transmission and complemented by precautionary behavior recommended by WHO and health authority as behavioral measures to prevent further contamination (Rahmani and Mirmahaleh, 2021). People are encouraged to merge the behavioral measures into the daily routine; some of them are isolation, social and physical distancing, maintaining cleanliness, wearing a mask, disinfecting surface and object (Hasnain, Fermi and Ghani, 2020; West *et al.*, 2020). One practice of social distancing implemented as preventive measures in many countries is lockdown (Thu *et al.*, 2020). Social distancing adds more space between people to lessen the probability of virus transmission (Sen-Crowe, McKenney and Elkbuli, 2020). This precautionary measure required people to uphold strict social distancing and obligatory to diminish social interaction and work. To this point, it has been implemented on a provincial and countrywide scale and has been proven to decrease the number of people infected drastically and to control virus transmission in many countries, i.e., Italy and India (Barkur, Vibha and Kamath, 2020; Silverio *et al.*, 2020).

Notwithstanding the positive impact, lockdown creates a negative impact and alteration in all aspects of life. Lockdown as a form of lessening social contact associated with loneliness, psychological distress, and low life satisfaction (Altieri and Santangelo, 2020; Benke *et al.*, 2020). It is also reported that lockdown has caused changes in the educational learning system globally, becoming online learning and distance learning (Mishra, Gupta and Shree, 2020). This also happens in Indonesia that currently dealing with the transformation from the conventional educational system to a system that promotes social distancing, physical distancing, digital learning, and self-quarantine (Abidah *et al.*, 2020). Furthermore, Robinson *et al.* (2020) and Ruíz-Roso *et al.* (2020) discovered that people were experiencing difficulties in practicing physical activity and healthy eating during the lockdown. Regarding this, Lange and Nakamura (2020) also stated that lockdown resulted in the emersion of unhealthy behavior such as bingeing, sedentary behavior with reduced physical activity, elevated consumption of alcohol and tobacco, and increased screen time causing impaired sleep patterns.

Moreover, lockdown changed overall lifestyle due to restriction of movement and subsequently physical constraint activity, resulting in an escalation of sedentary behavior (Qin *et al.*, 2020; Rahman *et al.*, 2020). Sedentary behavior is behavior performed such as sitting, lying, and reclining position characterized by energy expenditures less than 1.5 Metabolic Equivalents (METs) (Pate, O'Neill, & Lobelo, 2008). Sedentary behavior is associated negatively with physical health (Cheval *et al.*, 2020). Margaritis *et al.* (2020) stated that sedentary behavior is a risk factor for chronic illness and increase mortality. It is also reported that sedentary behavior is related to physical health and obesity and psychological conditions such as stress, anxiety, and depression (Thibault *et al.*, 2010; Lee and Kim, 2019). A previous study by Giurgiu *et al.* (2019) stated that sedentary behavior significantly affects mood dimension where people who spend more sedentary time feeling less well and energized. The previous study also reported that sedentary behavior is associated with many variables, including demographic variables, biological variables, psychosocial variables, behavioral variables, and environmental variables (Pate *et al.*, 2011). The following findings explained the urgency of assessing the change of sedentary behavior during lockdown period.

Research on sedentary behavior during the covid-19 pandemic was generally reviewed through two main themes. The first is the level of sedentary behavior throughout the pandemic (Meyer *et al.*, 2020; Zheng *et al.*, 2020). The second is that sedentary behavior is associated with other health effects (Barwais, 2020; da Silva *et al.*, 2020; Lim and Pranata, 2020). Nevertheless, there is still a limited study available on sedentary behavior alteration before and after the pandemic in Indonesia despite its detrimental impact on mental and physical health. It would be necessary to investigate sedentary behavior pattern in order to analyze its impact in Indonesia and for prevention measure purposes.

During the lockdown period, people enforced to stay at home and restricted to travel, thus spend most time sitting, laying down, and focusing on a gadget for many purposes such as work and education, which stimulate sedentary behavior (Chandrasekaran and Ganesan, 2020). As one country that is also implementing lockdown or Indonesia large-scale social restrictions, Indonesia is also currently implementing online-distance learning, restrict traveling to places, public transportation, and social gatherings (Kementarian Kesehatan, 2020). Consequently, adolescents who should be attending education directly in school currently unavoidably have to attend class online because of social distancing measures. Thus, it is necessary to identify how sedentary behavior changes during the pandemic in adolescence.

Therefore, the current study intended to investigate the effect of the COVID-19 pandemic on adolescent sedentary behavior, specifically in Indonesia. The research question for this study is to determine the difference in sedentary behavior before and after the pandemic. The hypothesis was formulated as followed. The alternative hypothesis (H_a) is the difference in sedentary behavior before and after the pandemic in adolescence is not equal to zero. The null hypothesis is the difference in sedentary behavior among adolescence before and after the pandemic is equal to zero. The objectives of this study are to determine sedentary behavior in adolescence and gender effect on sedentary behavior.

In this case, the Indonesian Ministry of Education and Culture issued various policies regarding behavior and how to help those who were studying in Indonesia during this period, the Ministry of Education and Culture in collaboration with various Ministries and related agencies will facilitate foreign students who have completed their studies in Indonesia so that they can return to Indonesia immediately. country of origin. This facilitation of returning to their home country is also accepted by Indonesian students who are studying abroad. As a form of reciprocity in maintaining relations between countries, Indonesia will also provide optimal facilitation, As a follow-up, a virtual coordination meeting was held with various Ministries and agencies related to the extension of the permits of foreign students receiving *darmasiswa* scholarship which will end soon (Kemendikbud 2020)

METHOD

The current study was conducted with 255 Indonesian adolescents (15.7% male, 84.3% female). The participants' age ranged from 18-23 years old which considered as age of adolescents (Stanley, as cited in Santrock, 2003) years old ($Mean = 19.8$, $SD = 1.11$). Participants were those who are currently active as student. Through the convenience sampling method, the sample was recruited utilizing social media and personal contact. Participants were voluntarily participated in the study by completing an online survey administered through a google form. The data collection was commenced in 20 August until 20 October 2020.

The instrument used in this study is an online survey consisting of questions related to demographic information and The Adolescent Sedentary Activity Questionnaire (ASAQ). ASAQ is a self-report questionnaire designed specifically for adolescence. ASAQ was reported to have good to excellent reliability ($r \geq 0.70$), face validity, and sensitivity to change in sedentary time (Hardy, Booth and Okely, 2007). ASAQ provides information on sedentary behavior such as screen time, education, travel, cultural, and social sedentary behavior. Participants were asked to fill the questionnaire with minutes spent on specific behavior before and after the pandemic.

This study is a quantitative research study with two-tailed test and F-significant level of 0.001. The collected data was analyzed using Jamovi statistic software (2020). Frequencies statistic was performed for participant demographic characteristics and total hours of sedentary behavior based on gender and age. A paired sample t-test was conducted to compare the total hour spend on sedentary behavior before and after the pandemic occurrence. An independent sample t-test was performed to analyze the gender effect on sedentary behavior.

RESULTS AND DISCUSSIONS

Table 1 below shows the descriptive statistic in the total hour of sedentary behavior reviewed from gender and age. A paired sample t-test revealed that there was a significant difference in total hours spend on performing sedentary behavior before and after the pandemic ($t(254) = -12.8$, $p < 0.001$). Adolescence is performing more sedentary behavior after the pandemic ($M = 10.43$, $SD = 3.11$) compared to the time before the pandemic ($M = 8.68$, $SD = 3.47$). These results suggest that being in lockdown does affect physical inactivity, specifically sedentary behavior. The total hour of sedentary behavior is 20.16 % higher than before the Covid-19 pandemic.

However, an independent sample t-test results revealed that there was no significant difference between male ($M = 8.67$, $SD = 2.45$) and female ($M = 8.68$, $SD = 3.22$) self-report on total hour spent on performing sedentary behavior before the pandemic ($t(254) = -0.0278$, $p = 0.978$). Similarly, after the pandemic, there was also no significant difference between male ($M = 10.92$, $SD = 2.37$) and female ($M = 10.34$, $SD = 3.63$) self-report on total hour spend on performing sedentary behavior ($t(254) = -0.9670$, $p = 0.334$). These results suggest that no gender effect on total hours spent on sedentary behavior before and after the pandemic.

Table 1. The Descriptive Statistic of Total Hour of Sedentary Behavior.

Variable	Total N= 255	Total hour of Sedentary Behavior (<i>M</i>)	
		Before	After
Gender			
Male	15.7 %	8.67	10.92

Female	84.3 %	8.68	10.34
Age			
18	7.8%	8.86	13.3
19	22.7%	7.69	10.2
20	34.5%	8.74	9.24
21	18.0%	9.75	11.2
22	2.0%	6.00	13.3
23	3.9%	12.8	12.3

The objective of the current study was to examine the impact of lockdown on sedentary behavior. The main finding of this study is that lockdown considerably increases adolescent sedentary behavior. This finding is confirmed by a previous study conducted during the Covid-19 pandemic with Italian undergraduate students by Gallè et al. (2020) that found a significant rise in sedentary activity and reduced physical activity. Similarly, previous research by Romero-Blanco et al. (2020) and Savage et al. (2020) found a significant increase in sitting time and cause a negative impact on movement behavior during lockdown among university students. Based on these identical findings, it confirms that lockdown caused an increase in sedentary behavior in general. Since sedentary behavior has been associated with many adverse effects, it might be necessary to study further the association between lockdown, sedentary behavior, and health condition physically and mentally. However the impact caused by the Global Covid-19 pandemic outbreak has significantly changed the pattern of the learning system between lecturers and students in Indonesia. As if it has entered a new era, the existence of an online learning system is indeed a single solution to maintain the existence of education in the midst of problems (Bilqis Farah, Robby Darwis Nasution, 2020).

This finding could be interpreted as lockdown as a solution to minimize the virus transmission and regulate people to stay at home; however, it prompted people to spend more time performing sedentary activity rather than physically active activity since people are not allowed to go anywhere. People are doing activity that could be done effortlessly at home as well as promoting physical distancing at the same time. Another possible explanation is novel situation caused by the pandemic has become a stressor. Study found that new environment might produce changes in some aspects which become source of stress (Risaharti and Wang, 2018). Furthermore, study found that increase in stress caused increased in certain type sedentary activity (Diaz *et al.*, 2018). (Diaz *et al.*, 2018) (Diaz *et al.*, 2018) Therefore, increase in sedentary behavior might be cause by the present of stressor which is the pandemic situation. Nevertheless, it would be necessary to promote physical activity during the inactivity period, especially during lockdown to maintain physical and mental health since previous studies mentioned that sedentary behavior is associated with negative effects on physical aspects such as obesity as mood dimensions such as depression and anxiety.

Particularly for adolescents or those who currently attending online education. As stated before, lockdown has changed learning method from conventional face-to-face method to online distance learning method which required student to sit, attend computer or phone for certain time resulted in increased screen time which is also form of sedentary activity. This might explain the significant increase of sedentary behavior during pandemic. Thus, a recommendation should be made to the concerned party to promote adolescent physical activity during the lockdown, specifically during online learning. Reference should be advised on how adolescence can increase physical activity over the lockdown period despite the compulsion of being motionless to promote physical and mental health. The research results show full online lectures are a new thing, so some students experience difficulties. The use of technology itself is a new thing, so it requires adaptation, while some regions experience network constraints

One solution that could be offered is implementing problem-based learning. Supporting this idea, study found that applying problem based learning increase student's psychomotor during learning process (Oktaviani, Nurmaliah and Mahidin, 2019). By promoting psychomotor might lessening the sedentariness. Another solution is promoting physical activity by staying active through the day and doing light exercising at home or utilizing online health application (Chandrasekaran and Ganesan, 2020). This strategy has been recommended to maintain happy and healthy life during lockdown period.

Another finding of the current study is that there was no difference in total hours of sedentary behavior between male and female adolescents. Conflicting to this result, the previous study found that females spend more time being sedentary compare to males (Nilsson *et al.*, 2009). Another study with an adult also confirmed the difference in sedentary behavior between male and female adults (Sumardiyanto, Sultoni and Jajat, 2019). However, the research also reported the difference between male and female in type-specific sedentary behavior rather than the overall sedentary behavior (Herman and Saunders, 2016; Prince *et al.*, 2020). Thus, there were mixed findings on gender associations with sedentary behavior. It indicated that differences in sedentary behavior between males and females might influence by factors associated with sedentary behavior as reported in previous studies that sedentary behavior is associated with more than one variable (Pate *et al.*, 2011).

CONCLUSIONS

Conclusively, the lockdown has been found to be associated with positive and negative effects. However, the prolonged lockdown could have resulted in negative effect. The negative impact of lockdown on adolescent sedentary behavior was significantly discovered in the current study's analysis. Sedentary behavior significantly increased during lockdown among adolescence, which confirmed previous studies' findings. This implicated sedentary behavior is inevitable because of the change of regular, active lifestyle into a passive lifestyle during the lockdown because of the social and physical distancing regulation. Sedentary behavior has been associated with unfavorable effect such as chronic illness, and mental health condition such as depression and anxiety. Therefore, authority should not only be focusing on suppressing virus transmission but also physical and mental health.

There are strengths and limitations to this study. The current study identified the pandemic's impact on sedentary behavior and proposed the association between sedentary behavior and health during the pandemic. Meanwhile, the limitation is that,

first, the current study did not analyze individually the type of sedentary adolescence performed. Each activity performed during the sedentary time could be different according to the sedentary-associated variable. Second, this study was using a self-report instrument, which might lead to imprecisions. The future study recommended exploring the type of sedentary behavior performed and considering another distinct demographic characteristic

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