



Proceeding Paper The Changing of Physical Activities during the COVID-19 Pandemic: Do Indonesian People Exercise More? ⁺

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Abstract: Exercise, a subcategory of physical activity, has been proven to have significant health benefits for people. The COVID-19 pandemic, however, has limited people physical activities by restricting outdoor activities. This study aims to analyze how COVID-19 influences people's exercise habits. Using an online survey, we obtained data from 320 Indonesians who are currently exercising. The result shows the good effect of COVID-19 on people's exercise habits. Almost half of the participants who already exercise before COVID-19 pandemic increase their intensity and performance, one of four participants decreased their performance, while one of three participants did not change their exercise behavior. Moreover, COVID-19 pandemic also provided good effect on people's exercise since 1 of 5 participants who did not exercise before started exercising during the COVID-19 pandemic. Maintaining immune system function becomes the main reason people exercise intensively or even start making this habit. The COVID-19 pandemic can be a good momentum to promote exercising as a part of a healthy lifestyle. However, health protocols to prevent coronavirus spread must be strengthened.

Keywords: COVID-19; exercise; immunity; physical activity

1. Introduction

During the coronavirus disease 2019 (COVID-19) pandemic, people are suggested to do physical distancing and stay at home to prevent the spread of the virus. The government has implemented a strict isolation strategy and encourage people to do their work, study, and even entertain themselves from home. Although this regulation aims to reduce the transmission of COVID-19 and protect the people, it also has reduced people's physical activity. Physical activity (PA) is defined as body movement produced by skeletal muscles and required energy [1]. Adequate level of physical activity is beneficial for people's physical and mental health, including the immune system [1,2].

However, WHO claimed that most people in many countries are physically inactive and have sedentary behavior even before the COVID-19 pandemic occurred [1]. While sedentary behavior is any waking behavior with low energy expenditure, including sitting, lying, and reclining, physical inactivity is defined as an insufficient level of physical activity compared to the recommended PA. Among Indonesian people, one in three aged more than ten years are physically inactive [3]. This unhealthy behavior might be exacerbated by the restricting regulations during COVID-19, including stay-at-home policies, closure of gyms, and home office regulations. Studies found that eating snack at night and cigarette spending among Indonesian people had raised during the lockdown period, might increase the obesity rate [4,5].

Although restriction during the COVID-19 pandemic might hinder people from doing their activities, the COVID-19 pandemic can be good momentum for increasing physical



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Copyright: © 2021 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https:// creativecommons.org/licenses/by/ 4.0/). activity. Self-isolation has adversely affected people's fear, misinformation, and stigma on COVID-19 that begins with accumulated boredom and overload information about the COVID-19 pandemic [6,7]. This phenomenon made people looking for other fun activities to distract their attention from the fear of COVID-19 and get rid of boredom. One of the options to fill their leisure time is by doing exercise or sports activity. According to WHO, exercise is part of physical activity that is planned, structured, repetitive, and aims to improve physical fitness [1].

People are expected to boost their immunity which necessary to fight against COVID-19 by living a healthy lifestyle, including exercise regularly [8]. Exercise has been shown to have clear health benefits for people [9]. Regular exercise has significant role in increasing the body's immune system to defend against COVID-19 [2]. However, exercise motivation appears to be a complex issue. It depends on the population involved (e.g., children, adolescents, the elderly), reasons for doing so (e.g., fitness, weight control, competition), type of the exercise activities (e.g., baseball, swimming), and the contexts of exercising (e.g., entertainment, clubs, educational frameworks) [10]. COVID-19 pandemic made the various motivational barriers to exercise decrease due to increasing public awareness to boost the body's immunity to avoid COVID-19.

The evidence as to whether Indonesian people tend to exercise or not during COVID-19 is still emerging. While some studies found that physical activity among people in several countries was declined, there is no evidence whether containment strategies during COVID-19 will exacerbate the physical inactivity of people in Indonesia [11,12]. In this paper, we will focus on exercise habit as one of the physical activity categories. This paper aims to investigate the changing of exercise behavior before and after the COVID-19 pandemic among Indonesian people currently exercising. The rest of the article is as follows. The next section describes the data employed, the studied variables, and the statistical method used. The section afterward presents the main empirical findings and then discusses these results.

2. Material and Methods

The population in this research is people above 15 years old who are currently exercising. We conducted an online survey using a Google Form with a simple random sampling technique. Random sampling is employed to apply quantitative methods to the data as it allows the results to be generalized to the larger population and for statistical analyses to be performed [13]. Using random sampling techniques with an online survey is not easy as there is no systematic way to collect a traditional probability sample of the general population using the internet [14]. However, it is allowed to randomly sample and contact people via another method and ask them to complete the survey online [13]. In this case, we approached our respondents through WhatsApp, Instagram, and Line, in one week, from 2 December to 8 December 2020. We also tried to reach some healthy lifestyle influencers on Instagram but this did not work. At the end of the survey period, there were 326 Indonesian people who had filled the questionnaire.

The questionnaire in this research consists of two parts that identify respondents' socio-demographic characteristics and their exercise habits. Age, gender, education, occupation and residence address are used to describe the respondents' socio-demographic characteristics. The exercise variable is described by asking about the change in respondents' exercise habits before and after the COVID-19 pandemic, the reason behind it, and a description of current sport activities (duration, location, sport type). Researchers then cleaned the collected data by removing respondents who were not suited to this research. After the cleaning process, there were 320 respondents who qualified to be analyzed using Microsoft Excel. Descriptive analysis was employed to the variables.

3. Results

3.1. Sosio-Demographic

As shown in Table 1, most respondents in this survey are men (61.4%), 20–29 years old (68.5%), and have higher education (74%). Previous research also demonstrates that young men are more likely to exercise than women [15]. Additionally, half of the people who exercise in this research work as employees both in the private and public sector (44.5%); only 2.8% work as housewives. Respondents also mostly live in Java (76%), since Indonesian people are still concentrated on Java Island [16]. Furthermore, full versions of the respondents' characteristics are shown in the table below.

Variable	Category	Ν	%
Gender	Male	197	61.4
	Female	124	38.6
Age (years)	15–19	31	9.7
	20–24	105	32.7
	25–29	115	35.8
	30-34	32	10
	35–39	16	5
	40-44	13	4
	45–49	5	1.6
	>50	4	1.2
Education	Primary	0	0
	Secondary	83	25.9
	Higher	238	74.1
Occupation	Student	99	30.8
	Lecturer	23	7.2
	Civil Servant	52	16.2
	General Employee	91	28.3
	Entrepreneur	21	6.5
	Housewives	9	2.8
	Jobseeker	19	5.9
	Others	7	2.2
Region of residence	Java	262	81.6
	Sumatra	29	9
	Bali & Nusa Tenggara	4	1.2
	Sulawesi	8	2.5
	Kalimantan	12	3.7
	Maluku & Papua	6	1.9

Table 1. Respondent Characteristics.

Source: Authors' Online Survey.

3.2. Exercise Habits

Running, home workouts, and sports games, including football, badminton, and many more, were the most popular exercise among respondents during the COVID-19 pandemic. They usually exercised at home (40.2%), outside (31.8%), or in a building other than their houses (28%). Most participants exercised for 30–60 min with frequency once or twice a week. As a result, they feel more vitalized, both physically and mentally.

3.2.1. The Changing of Exercise Behavior

There were several changes in the exercise habits of participants who were already exercising before the COVID-19 pandemic. Almost half of the respondents performed better during this pandemic by increasing the duration and the sport type. As shown in Figure 1, Maintaining immune system function was the main reason for the better exercise performance during the COVID-19 pandemic. On the other hand, one in three respondents felt no difference in their exercise habits before and after the COVID-19 pandemic. However,

one in four respondents said their exercise performance decreased after the COVID-19 pandemic. The restriction of sports facilities to open (43%), fear of catching COVID-19 (10%), decreased motivation to exercise (33%), and fewer friends to exercise together (29%) became the reason for some respondents to reduce their exercise intensity.



Figure 1. Respondents' reason to start exercising (green) and perform better during COVID-19 pandemic (blue).

The changing of exercise habits can be analyzed based on socio-economic characteristics. Exercise behavior changes among males were vary compared to females. While most females exercised better during the COVID-19 pandemic, the proportion of males who increased, decreased, and had no change in their exercised habits was almost similar. Moreover, the changing of exercise behavior was hardly different across age groups and education levels. However, participants in certain occupations exercised better during the COVID-19 pandemic, including homemakers, entrepreneurs, and students. The change is hardly different among employees since the proportion of participants who experienced no change, increase, and decrease exercise performance was almost the same.

3.2.2. Start Exercising during the COVID-19 Pandemic

This study found a great effect of COVID-19 on people's exercise habits. Almost one in five participants who did not exercise before started exercising during the COVID-19 pandemic. More than half of participants who begin exercising after the COVID-19 pandemic were women (62%), 20–24 years old (40%), students (48%), and have a higher degree of education, especially a bachelor degree (46%). Most people who start exercising amid the COVID-19 pandemic did the home workout program (52%), primarily by combining home workouts with other sport types (52%). The home workout was more prevalent among females compared to males. Similar to participants who exercised better amid the COVID-19 pandemic, boosting the immune system was their motivation to begin exercising after COVID-19 pandemic occurred.

4. Discussion

The proportion of men who participated in this study higher than women. Since the participant in this study is people who currently exercising, it showed that men were more active than women. Another study also stated that women tend to physically inactive compared to men, especially during their leisure time [17]. However, during the COVID-19 pandemic, this study found that women had more positive changes in their physical activities, especially exercise behavior. Another study also mentioned that women in several countries, including New Zealand, Australia, Ireland, and the United Kingdom increased their physical activity during the initial COVID-19 containment strategies [11].

Most participants who started exercise during the COVID-19 pandemic do the home workouts program. Exercise in private environments in the home, with good ventilation and only using personal equipment, is more reasonable during the COVID-19 pandemic. A home exercise program is suitable for avoiding the airborne coronavirus and preserving fitness levels since it is safe, simple, and easy to implement [8]. A few people are still afraid to exercise outside, and they decided to exercise in their home. The home exercise program is the best option because it is safe, easy, and inexpensive to implement. This program includes aerobics (for example: walking at home or around it), muscle strength training, exercise stretching and balance, or a combination thereof [18]. Aerobic activities benefits people by reducing cholesterol levels and prevent potential heart disease [19].

Moreover, participants in this study perform acute exercise which is a moderateto-vigorous intensity. Their exercise type, duration (less than 60 min), and frequency fit the characteristic of an acute exercise. This exercise is essential to produce immune system by stimulating ongoing exchange of distinct and highly active immune cell subtypes between the circulation and tissues [9]. Moderate-intensity exercise positively enhances immune system responses against viral respiratory infections by reducing the risk and severity [18,20]. However, high-intensity exercise, especially in public gyms and crowded environments, is not recommended amid the COVID-19 pandemic, despite the fact that the adverse effect of exercising above 60 min is still debatable [8,18].

Restrictions on sports facilities might hinder people from maintaining or improving their exercise habits. As part of COVID-19 prevention, some public facilities, including sport facilities, were closed and reduce people's opportunity to meet others. Exercise is also part of recreation to foster a sense of community introduced by the programs and services offered and occur in the facilities of a sport [21]. The absence of a community to build relationships when exercising has influenced people's motivation to exercise. After all, humans are social creatures that need interaction. Maslow said that one of the four primary human needs is the facilitation of social needs to gain a sense of security through a sense of belonging, association, feeling accepted, and giving and receiving friendship [22]. Therefore, it is not surprising that one in three participants has decreased motivation to exercise due to the lack of friends to exercise with.

This current pandemic situation also highly depends on digital technology to support various activities, including sports. The use of digital devices in Information and Communication Technology (ICT) during the lockdown period has increased by (15%) [23]. A study in America showed that the use of 'physical activity' applications on smartphones could help decrease MET (metabolic equivalent of task) minutes per week for adult physical activity (18.2%) and application features related to ramifications [12]. For this reason, it is advisable for the public to maintain their exercise habits with the help of various available technological supports. Future physical activity intervention to foster an active and healthy lifestyle during the pandemic can be based on ICT solutions, such as home-based exergames and fitness apps [23].

This study has several limitations, including the low coverage of the online survey and the unstandardized questionnaire on the data collection. Utilizing an online survey is beneficial amid the COVID-19 pandemic. However, this online survey collected a small sample size and cannot be generalized to the population. Researchers unable to figure out the ideal sample size since the number of Indonesian people who exercise is still unknown. Moreover, the questionnaire was developed without acknowledging a standardized questionnaire to measure the changing of exercise behavior. For example, the scale used by Faulkner et al. (2021) presented the stages of change of participants' exercise behavior before and after the COVID-19 pandemic, which are pre-contemplation, contemplation, preparation, action, and maintenance [11]. Although this study was unable to provide deeper insight, the questionnaire in this study still described the change in participants' exercise behavior.

5. Conclusions

The COVID-19 pandemic can be a good momentum to promote sports activities as a part of a healthy lifestyle. However, health protocols to prevent coronavirus spread must be strengthened since many people are already exercising outside their home.

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