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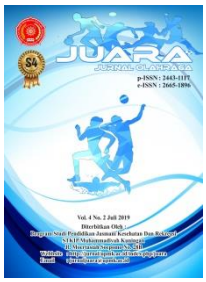

Level of Physical Activity and Mass Body Index of Students in the Pandemic Period

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Abstract

Physical activity is essential in maintaining health. This study aimed to investigate the level of physical activity of students at the time of the COVID-19 pandemic. The International Physical Activity Questionnaire (IPAQ) questionnaire was used to examine students' level of physical activity. Students who participated in this study were 1367. The number of female students in this study was 920, while male students were 447. The results showed there were differences in physical activity between male and female students. The average activity value of male students is three medium categories, while female students are two low categories. The biological activity of male students is one level higher than female students. The female student body mass index is included in the "light fat" category. This can be interpreted as the lower the level of physical activity, the more potentially these students are obese. Simultaneously, the body mass index of male students is included in the "normal" category. In conclusion, the higher the level of physical activity, the more potential the student has a good body mass index.

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INTRODUCTION

The government is calling for a national quarantine or considering various forms of efforts to prevent the spread of the new coronavirus disease in 2019 (COVID-19), significant problems arise regarding the possible ill effects of physical inactivity (The Lancet, 2020). All sporting events and competitions have been suspended or canceled. However, one important exception has been made to allow people to practice sports and physical activities outdoors provided that an interpersonal distance of at least 1 m can be maintained. This appears to be a reasonable compromise between the unfavorable health consequences of physical inactivity and the urgent need to contain the COVID-19 outbreak.

The World Health Organization (WHO) has established clear guidelines on the minimum amount of physical activity needed to maintain adequate health and fitness. For example, it is recommended that adults aged between 18 and 64 years, the age group most affected by COVID-19 according to the most recent statistics (i.e., accounting for more than 70% of all severe cases) (Wu & McGoogan, 2020), should follow weekly exercise. At least 150 minutes of moderate-intensity physical activity or 75 minutes of vigorous physical activity, or an appropriate combination of moderate-intensity physical activity. New findings state the benefits of simple physical exercise for survival (Cheng et al., 2018; Engeseth et al., 2018; Tiberi & Piepoli, 2019). The amount of free time and no physical activity were negatively correlated with the risk of cardiovascular death regardless of age, sex, and presence or absence of pre-existing cardiovascular disease (Cheng et al., 2018).. Physical fitness has been independently associated with the risk of premature cardiovascular death in a population aged 50 years or older, which suggests that physical fitness not only reduces the risk of death from cardiovascular disease but also possibly by doing a regular physical exercise (Engeseth et al., 2018). Limited physical activity or, even more worryingly, the inability to walk out of the house regularly as a consequence of strict quarantine can be associated with the risk of many disorders and diseases such as diabetes, cancer, osteoporosis, and cardiovascular disease (Castrogiovanni et al., 2016; Sanchis-Gomar et al., 2014). A decrease in physical activity can also affect a person's mental health, which may be experienced as unpleasant emotions such as sadness, anger, and frustration (Brooks et al., 2020)k. Disease outbreaks can trigger symptoms of post-traumatic stress, depression, and/or confusion.

The level of physical activity has a significant health impact. One-third of students who have a moderately high level of physical activity in high school become inactive when transitioning to university life (Simona et al., 2015). On the other hand, within the school's scope, students receive physical education subjects that have a positive impact on an active lifestyle. Active lifestyle as an advantage of physical education is characterized by participation in physical activity as an essential determinant of health (Bailey et al., 2009). Although the study results (Olivares et al., 2015) state that the influence of parents is more relevant than the power of physical education teachers to promote physical activity in adolescents, regardless of age, gender, and physical condition. However, physical education still plays a significant role in shaping students' habits to be physically active both during Physical Education and outside learning. Physical education learning is currently not possible to do face-to-face. Now, parents have a role in promoting their children's physical activities.

The PESS (Physical Education and School Sport) program from (Bailey et al., 2009) can encourage adolescents to engage in physical activity for health, as follows: 1) If adolescents are required to take physical education subjects in school, they will come to enjoy/love physical activity; 2) School is the right context to introduce teenagers to physical activity; 3) If teens are taught the importance of physical activity for health at school, they will want to remain physically active for life; 4) If youth are exposed to a variety of different physical activities, they will find something they like and will choose to continue to be active after physical education hours and outside of school; 5) If adolescents take physical education subjects (theory and practice), they will be better informed and more likely to continue with their physical activities.

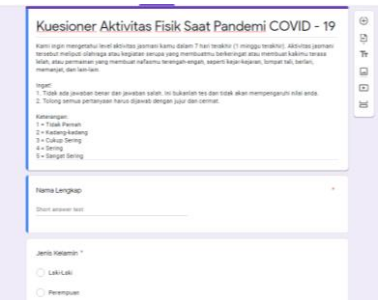
At the time of learning before the pandemic, physical education teaching for children with unlimited mobility was supervised by the teacher. There is a new normal with students side by side with Covid - 19 but still running health protocols. Several teachers in Bojonegoro District gave assignments to make videos of aerobic exercise and game sports movements and advise to carry out any physical activity during this pandemic. Their parents are currently teaching students to promote physical activity.

This study aims to investigate the level of physical activity of students during the COVID-19 pandemic. Most of the articles looked at the time before the pandemic. This study also describes the relationship between physical activity and the level of student body mass index. Physical activity plays a vital role in these difficult times.

METHODS

This study uses a survey method. This research was conducted on students in several senior high schools in Bojonegoro Regency. The number of questionnaires distributed was 1400. Samples were taken randomly, totaling 1367 high school students, with an average age between 16-18 years. There were 447 male students and 920 female students. Evaluation of the level of physical activity was carried out using a short form questionnaire from the international physical activity questionnaire (IPAQ short) distributed via a google form.

Gambar 1: Kuesioner Aktifitas Fisik



The questionnaire was translated from English into Indonesian before the form was used. A chi-square test is performed to find out whether there is a relationship between physical activity between male and female students. This test is performed through SPSS 22. Body mass index is used to determine whether the body weight is ideal, under, or overweight.

Table 1. Physical Activity Parameters (Kowalski et al., 2004)

Skor	Category
5	Very high
4	High
3	Moderate
2	Low
1	Very low

Table 2. Obesity Indicators National Nutrition Guidelines

Nutritional Status	IMT (kg/m^2)
Very thin	<17
Thin	17-18,4
Normal	18,5-25,0
Fat	25,1-27,0
Very Fat	>30

FINDINGS AND DISCUSSION

Findings

In the chi-square test, results were obtained at 0.026. So it can be concluded that there is a relationship between male and female physical activity. The overall average score for the male students' physical activity level is three, so it is in the medium category.

Table 3. Characteristics of Male & Female Research Subjects

	Male		Female	
	Value Range	Average	Value Range	Average
Age	16-18	16,4	16-18	16,9
Weight (Kg)	40-75	55,3	60-87	62,2
Height (cm)	149-176	161,1	146-169	154,8
Body Mass Index (BMI)	18-28,3	21,5	21,2-33,5	26,00

Table 4. Male & Female Body Mass Index

	Body Mass Index (BMI)	Absolut (f)	Prosentase (%)		Body Mass Index (BMI)	Absolut (f)	Prosentase (%)
Male	Very thin	0	0%	**Female**	Very thin	0	0%
	Lightweight	72	16,1%		Lightweight	0	0%
	Normal	329	73,6%		Normal	375	40,76%
	Light grease	33	7,3%		Light grease	416	45,2%
	Very fat	13	2,9%		Very fat	129	14,0%
	Total	447	100%		Total	920	100%

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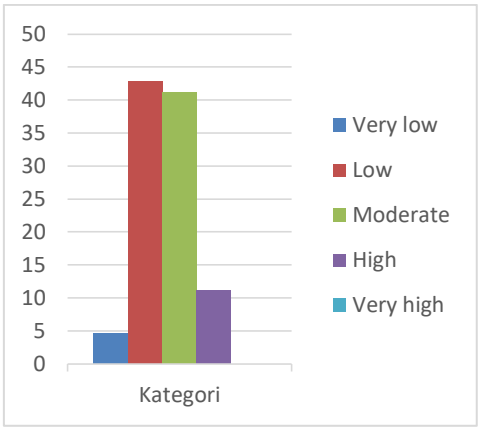
Diagram 1. Distribution of Male Students' Physical Activity Level



The overall average score for female students' physical activity level is 2, so it is in a low category.

Discussion

There are findings that female students have "low" levels of physical activity. After being traced, it turned out that female students spent more time playing games, doing online assignments, online meetings, and doing household cleaning activities. Types of physical activity in the following order are most popular with female students: walking, cycling, chasing, running, jumping, gymnastics, dancing, and badminton. From cross-checking with body mass index data, the female students, on average, fall into the "light fat" category. This means that the lower the level of physical activity, the more potential these students will be obese.

Male students are more active in physical activities because most of them do light exercise such as push-ups, sit-ups, and jogging to fill their spare time. His daily physical activities include walking, cycling, running, exercising, swimming, and chasing. The male students' body mass index falls into the "normal" category. This can be interpreted that the higher the level of physical activity, the more potential these students have a good body mass index.

Physical activity is strongly suspected to be associated with adolescent obesity (McManus & Mellecker, 2012). Establishing the link between obesity and physical activity is very important to prevent obesity more widely. In general, non-obese children spend about 100 minutes a day more physically active (all activities above sedentary behavior) than obese children (McManus & Mellecker, 2012). In addition to improving cardiovascular function (Pinckard et al., 2019), physical activity provides overall protection against stress (Narasimhan & Rajasekaran, 2016). A positive effect on the immune system (Dorneles et al., 2020) can withstand the immunogenicity commonly seen in aging (Weyh et al., 2020). It can increase the immune response to viral antigens, reducing the incidence of viral infections across ages (Campbell & Turner, 2018).

The home environment that has a significant influence on a student's physical activity is the parents. This is following the results of a review (Neshteruk et al., 2017), which reviewed research conducted from 2009-2015, which found that physical activity between father and son was interrelated and significantly related. During this pandemic, students are closer to their parents as teachers at home. In research (Gao et al., 2013) which implemented the Dance Dance Revolution (DDR) program in physical education learning in elementary schools, it increased enjoyment or comfort in physical activity and students' level physical activity. (Gråstén, 2016) in his research, the particular physical education program (manipulation or modification of the school environment, both physical and psychological) could increase students' physical activity. Changes in the level of physical activity that occur due to treatment in 2 different elements, psychological (e.g., attitude, competence in PE class) and the physical environment (e.g., facilities, structure, and methods). From other aspects, such as the playing environment outside of school and social activities, it also turns out to influence a person's physical activity level (Mötteli & Dohle, 2017).

The pandemic has forced many people worldwide to stay home and self-isolate for extended periods. WHO recommends 60 minutes/day of moderate to vigorous physical activity for 6-17 years, 75 minutes/week of moderate physical activity, or 150 minutes/week for moderate physical activity for adults and the elderly, including 3 and 2 days/week, respectively. - each, by strengthening muscles and bones. Practical recommendations for staying active at home, with aerobic exercise using a bicycle or rowing ergometer, dancing, and playing dynamic videos, can help counteract the effects of Covid (Hammami et al., 2020).

Regular physical activity, especially at low to moderate intensity, has been shown to have anti-inflammatory effects and increase overall immunity (Campbell & Turner, 2018). Also, physical activity is essential for maintaining respiratory function in children and adults (Puente-Maestu & Stringer, 2018).

Everyone benefits from outdoor physical activity. However, people with COVID-19 infection should consult a doctor before resuming exercise. The risk of contracting or transmitting COVID-19 outside appears lower than indoors (Qian et al., 2020).

Measures need to be put in place to allow for physical distance, i.e., maintaining a distance of 1.5 meters to other people at all times, also when engaging in physical activity. For example, walking and cycling are active modes of transportation that increase physical activity levels while reducing the risk of infection than public modes of transportation. In practice, the teacher helps map where the open spaces are for exercise and avoid overcrowding.

Use of technology to help manage and schedule space use: smartphone apps can be

developed to alert residents to nearby public spaces for exercise and suggest alternatives to avoid overcrowding. Set up special hours for training. Cycling, jogging, walking, and workout at home are recommended. Exercising at home without any equipment and limited space is still possible. For example, for those whose domestic life involves extended periods of sitting, there may be options to be more active during the day by stretching, household chores, climbing stairs, or dancing to music. Additionally, especially for those with internet access, there are plenty of free resources to stay active during a pandemic.

Home workouts using various safe, simple, and easy-to-perform exercises are perfect for avoiding airborne coronaviruses and maintaining fitness levels. Such forms of exercise can include but are not limited to strengthening exercises, activities for balance and control, stretching exercises, or a combination of these. Examples of practices at home involve walking around the house and to the shop as needed, lifting and carrying groceries, alternating knee bends, climbing stairs, standing-to-sitting and sitting-to-standing using chairs and off the floor, squats, and sit-ups and pushups.

The use of eHealth video and exercise, which focuses on encouraging physical activity via the Internet, cellular technology, and television, is a viable way to maintain bodily function and mental health during this critical period (Tate et al., 2015). Research is needed that combines other variables such as duration of sitting and daily calories and more heterogeneous subjects.

CONCLUSION

During the pandemic, the level of physical activity shows that male students are one level higher than female students. The female students' body mass index falls into the "light fat" category. This means that the lower the level of physical activity, the more potential these students will be obese. Meanwhile, male students' body mass index falls into the "normal" category. This can be interpreted that the higher the level of physical activity, the more potential these students have a good body mass index. There should be efforts to improve physical activity for female students. Parents' daily physical habits affect their children. Physical treatment is needed through a modification to increase one's physical activity. Physical activity is essential for reasonable physical, mental and social health. We recommend engaging in up to one hour of physical activity a day outdoors, emphasizing that people exercise alone and maintain a distance of at least 1.5 meters from other people at all times. Most of the daily physical activity should be aerobic and involve large muscle groups three times per week.

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