# HEALTH LITERACY LEVEL AND PHYSICAL ACTIVITY ADOLESCENTS DURING COVID-19 PANDEMIC

**Rarasofia Diffa Berlianti, Izzatul Arifah**

Study Program of Public Health, Faculty of Health Sciences,
Muhammadiyah University of Surakarta

## ABSTRACT

**Background:** Technological developments increase sedentary behavior and result in a lack of physical activity in adolescents. Meanwhile, the COVID-19 pandemic has limited youth in physical activity. Several factors affect the lack of physical activity in adolescents. One of them is the health literacy factor which is rarely studied. This study aims to analyze the relationship between the level of health literacy and physical activity in adolescents at senior high school 1 Karanganyar during the COVID-19 pandemic.
**Subjects and Method:** This research is a school-based cross-sectional study conducted in Karanganyar, Central Java on 14-21 February 2022. The research samples were students of classes X and XI at senior high school 1 Karanganyar who were willing to be respondents with a total of 280 respondents. The sample was selected using a simple random sampling technique. The dependent variable in this study is physical activity. The independent variables are the level of health literacy. Health literacy was measured using the HLS-SF-Q12 instrument and physical activity was measured using the PAQ-A and distributed online via the Google form. Data analysis was performed by statistical tests using the Chi-square test.
**Results:** The level of health literacy and the majority of adolescent activities are in the less category. Adolescents' physical activity levels decreased during the Covid-19 Pandemic. The results showed that there was a relationship between the level of health literacy and physical activity in adolescents at senior high school 1 Karanganyar (OR= 21.0; 95% CI 2.29 to 192.37; p=0.007). The proportion of students who have a good category of physical activity tends to be higher in the group of adolescents with a good level of health literacy.
**Conclusion:** The level of health literacy is related to the physical activity of adolescents. This study recommends efforts to increase students' health literacy to increase the level of physical activity of adolescents. This effort can be done through education on various social media.

**Keywords**: health literacy, physical activity, adolescent

**Correspondence:** Izzatul Arifah. Muhammadiyah University of Surakarta. Jl. A. Yani Tromol Pos 1, Pabelan, Kartasura, Surakarta, Central Java. Email: ia523@ums.ac.id. Mobile: +6281227151421

## BACKGROUND

The adolescent population in the world is currently increasing, so it must be a common concern. This is based on WHO data, that the total youth population is around 16% of the world's population, namely 1.2 billion, with the largest distribution being on the Asian continent with a total of 650 million teenagers (WHO, 2019). Meanwhile, the number of teenagers in Indonesia based on BPS data is 46 million or 17.2% of the total population (BPS, 2020).

Adolescence is a key stage of development for shaping health in adulthood. However, adolescence is prone to health behavior problems, one of which is a lack of physical activity (Hasan et al., 2019). This happens in


https://doi.org/10.26911/FP.ICPH.09.2022.39

line with technological developments due to the rise of programs that attract the attention of teenagers that can be done just by sitting, such as electronic games, social media, and other applications that are easily accessible via mobile phones (Destiany and Sulchan, 2012).

Research data shows that the level of physical activity of adolescents around the world is still low. This is based on research on adolescents from 10 countries stating that only 17.9% of men and 10.7% of women are quite physically active (McPhie and Rawana, 2015). The level of physical activity in adolescents in Indonesia also shows a similar thing, namely that there are 33.5% of the population aged ≥10 years the criteria of being less active in physical activity (Riskesdas, 2018). This also happened in Central Java, which showed that the proportion of physical activity in adolescents of 30.21% was in the criteria of being less active in physical activity. One of the districts in Central Java is Karanganyar Regency which shows physical activity data, namely 31.66% of adolescents in the criteria of being less active in physical activity (Riskesdas, 2019).

Lack of physical activity is a risk factor for non-communicable diseases. Individuals who are less active in physical activity have a 20-30% higher risk of dying from non-communicable diseases than individuals who are moderately active in physical activity. Adequate physical activity is very important to prevent diseases such as obesity, heart disease, hypertension, and other non-communicable diseases (WHO, 2018). Physical activity is important for adolescents because it can maintain health by managing weight, strengthening the vascular system, and affecting agility which can have a good impact on the body, namely supporting bone and muscle growth, improving sleep quality, increasing self-confidence, and being able to manage stress (Kusumo, 2020).

Both and lack of physical activity can be caused by several factors. Of them, individual factors that influence physical activity in adolescents are knowledge and perceptions of healthy living, motivation, and social support in carrying out physical activities, preferences or interests in sports, and knowledge about the benefits of physical activity (Welis and Sazeli, 2013). Lack of knowledge can affect the lack of physical activity because knowledge can improve individuals in implementing a healthy lifestyle in everyday life (Hosseini et al., 2015). The amount of knowledge gained by adolescents is related to the ability to receive, understand, and process information about health. This is known as health literacy (Wittenberg et al., 2019). Physical activity is a healthy lifestyle that can be influenced by the level of health literacy (Geboers et al., 2014).

Previous research conducted by Rutkauskaite (2019), regarding the level of health literacy and physical activity in adolescents conducted in Lithuania, stated significantly that individuals who actively participate in extracurricular sports have a higher level of health literacy than those who do not participate, however, there is no relationship between health literacy and physical activity. According to research conducted by Darni et al. (2021) on stu-


https://doi.org/10.26911/FP.ICPH.09.2022.39

dents in the city of Mataram, who stated that the physical activity of adolescents is related to physical activity at school because schools were closed during the COVID-19 pandemic, adolescents did a lot of activities at home with less active activities. Then the research by Leonardo et al. (2021) which was conducted in East Barito Regency on adolescents stated that the physical activity of adolescents was related to the COVID-19 pandemic. Meanwhile, research by Managkabo et al. (2021) conducted in Manado on university students during the COVID-19 pandemic stated that there was a relationship between knowledge and physical activity.

Studies on the level of health literacy is still limietd. Health literacy is an important aspect for every individual. One element of society that is the next generation of the nation is students. The level of health literacy in students is also very important, especially at the high school level. Senior high school level is the highest level in elementary and secondary education. High school students are considered able to know and obtain health information, and are expected to become agents of change in society to disseminate health information (Candrakusuma and Nurhayati, 2020).

This study aimed to examine the relationship between health literacy and physical activity in adolescents during COVID-19 pandemic.

## SUBJECTS AND METODE

### 1. Study Design

This was a cross-sectional study conducted at Senior high school 1 Karanganyar, Central Java, on 14-21 February 2022.

### 2. Population and Sample

The population in this study were students of class X and XI at SMA Negeri 1 Karanganyar. The sample used in this study used the Lameshow formula (1997) and obtained a total sample of 280 respondents using a simple random sampling technique.

### 3. Study Variables

The dependent variable was physical activity. The independent variable was health literacy.

### 4. Operational Definition of Variables

**The level of health literacy** is a respondent's statement regarding their ability to access information about health, understand, evaluate, and apply this information about health to make health-related decisions or behaviors. With a bad category if the health literacy score is 0-33, and good if the score is > 33-50.

**Physical activity** is the behavior of the respondent's physical activity (sports or other activities) carried out in the past week. With the unfavorable category, if the PAQ-A score < the median score is 3, and it is good if the PAQ-A score ≥ the median score is 3.

### 5. Study Instruments

The research instrument used was a health literacy level questionnaire using the Short-Form Health Literacy Survey Questionnaire 12 (HLS-SF-Q12) and physical activity using the Physical Activity Questionnaire for Adolescents (PAQ-A) which had been tested for validity and reliability.

### 6. Data Analysis

Data analysis used the chi square statistical test.


https://doi.org/10.26911/FP.ICPH.09.2022.39

### 7. Research Ethics

This research has received ethical approval from the Health Research Ethics Committee (KEPK) Faculty of Medicine, University of Muhammadiyah Surakarta with Ethical Eligibility Letter No. 4093/B.1/KEPK-FKUMS/II/2022.

## RESULTS

### 1. Univariate Analysis

The characteristics of the respondents analyzed in this study were age, gender, and class. Table 1 shows that the majority of respondents were 16 years old (43.6%) with the sex of the most respondents being female (69.3%) and based on class level, the most were class X (55.4%). the majority of respondents had received health information about physical activity. The majority have sources of health information through social media as many as 189 (68.8%). The most widely used social media as a source of health information is Instagram with 76 (40.4%). The results of measuring the health literacy level revealed that the health literacy level of the majority of respondents was not good as many as 232 students (82.9%).

In the table 2. Respondents who were active in physical activity before the pandemic were 84.3%, while those who were not active were 15.7%. Respondents who were active in physical activity during the pandemic were 58.9%, while those who were not active were 41.1%. Respondents who did physical activity at home were 58.2%, at sports venues by 9.6%, at home and at sports venues by 32.1%.

**Tabel 1. Sample Characteristics**

| Variable | Category | Frequency | Percentage |
|---|---|---|---|
| **Age** | 15 years | 46 | 16.4 |
| | 16 years | 122 | 43.6 |
| | 17 years | 107 | 38.2 |
| | 18 years | 5 | 1.8 |
| **Gender** | Male | 86 | 30.7 |
| | Female | 194 | 69.3 |
| **Class** | X | 155 | 55.4 |
| | XI | 125 | 44.6 |
| **Health information** | Yes | 273 | 97.5 |
| | No | 7 | 2.5 |
| **Information Source** | Parent | 28 | 10.2 |
| | Teacher | 33 | 12.0 |
| | Peer | 12 | 4.3 |
| | Social Media | 189 | 68.8 |
| | Printed Media | 6 | 2.1 |
| **Social Media** | Instagram | 76 | 40.2 |
| | TikTok | 12 | 6.3 |
| | Google | 43 | 22.7 |
| | WhatsApp | 54 | 28.5 |
| | Twitter | 3 | 1.5 |
| | Youtube | 1 | 0.5 |
| **Health Literacy** | Good | 48 | 17.1 |
| | Poor | 232 | 82.9 |


https://doi.org/10.26911/FP.ICPH.09.2022.39

**Tabel 2. Frequency Distribution of Respondents' Activeness during the COVID-19 Pandemic in Adolescents at SMAN 1 Karanganyar**

| Variable | Frequency | Percentage |
|---|---|---|
| **Differences in physical activity before and during the COVID-19 pandemic** | | |
| Yes | 256 | 91.4 |
| No | 24 | 8.6 |
| **Active physical activity before the pandemic** | | |
| No | 44 | 15.7 |
| Yes | 236 | 84.3 |
| **Active physical activity during a pandemic** | | |
| No | 115 | 41.1 |
| Yes | 165 | 58.9 |
| **Places to physical activity during the COVID-19 pandemic** | | |
| At home | 163 | 58.2 |
| At sport center | 27 | 9.6 |
| At home and sport center | 89 | 32.1 |

**2. Bivariate Analysis**

**Table 3. Analysis of health literacy level with physical activity in adolescents at senior high school 1 Karanganyar**

| Health Literacy Level | Physical Activity | | | | OR | 95% CI | | p |
|---|---|---|---|---|---|---|---|---|
| | Poor | | Good | | | Upper Limit | Lower Limit | |
| | N | % | N | % | | | | |
| Poor | 204 | 87.9 | 28 | 12.1 | 21.0 | 2.29 | 192.37 | 0.007 |
| Good | 34 | 70.8 | 14 | 29.2 | | | | |

Table 3 shows that the proportion of respondents who did physical activity was higher in the group with a good level of health literacy than in the group with poor health literacy (29.2% compared to 12.2). Based on statistical tests on both variables using the chi-square test, (OR=21.0; 95% CI 2.29 to 192.37; p= 0.007) with a contingency coefficient value of phi showing a value of 0.18. It can be concluded that Ho is rejected, which means that there is a relationship between the level of health literacy and physical activity in adolescents at high senior school 1 Karanganyar, with a very low correlation.

## DISCUSSION

The findings of this study support previous findings which state that adolescents who have a good level of health literacy can make decisions to plan and adapt individuals to a healthy lifestyle, so that they can improve health behavior, especially by doing physical activity (Sun et al., 2013). Another study conducted on adolescents in Norway stated that health literacy was significantly positively related to health-promoting behaviors and health-related quality of life, such as physical activity during the COVID-19 pandemic (Riiser et al., 2020).

Based on data obtained from the results of the questionnaire as many as 273 respondents (97.5%) had received


https://doi.org/10.26911/FP.ICPH.09.2022.39

health information about physical activity. The most used source of information by teenagers is social media, namely 189 respondents (68.8%). This shows that adolescents can access and process information in various media platforms that aim to disseminate and receive information from various parties. Therefore, teenagers can take advantage of social media as a medium or means for sports, such as through videos related to physical activity (Setiawati et al., 2019).

This study found that the most widely used social media was Instagram (40.2%). There is a need to recommend about social media utilization to elevate physical activities in adolescents (Jaelani et al., 2018).

Other findings in this study indicate that there are still few physically active adolescents. This is indicated by the percentage of respondents who fall into the category of poor physical activity, namely 238 respondents (85%). Then based on calculations with the PAQ-A questionnaire, the results show that in general, adolescents tend to be active in physical activity when participating in sports lessons, and do 2-3 times/week activities such as sports, dancing, or playing games that are very active after school. However, during school breaks, the majority of students use their time just by sitting around (chatting, reading, and doing schoolwork). This is in line with research which states that adolescents who have less active physical activity during recess do activities such as eating, playing on mobile phones, studying, or reading (Mahyuni et al., 2018).

Another interesting finding was that in this study there were differences in physical activity before and during the COVID-19 pandemic. The data obtained shows that there were differences in physical activity before and during the pandemic by 256 respondents (91.4%). The difference in the physical activity of the respondents before and during the pandemic can also be seen in terms of the activeness of physical activity which has decreased, from the active category of doing physical activity by 84.3% to 58.9%. This is in line with research conducted by Indahwati et al. (2021) on students or student-athletes that physical activity before and during the COVID-19 pandemic which in general also experienced a decline, from the category of always doing physical activity or exercise by 44% to 20.7%. This certainly can be the cause of a significant decrease in physical activity. However, the decline in physical activity before and during the COVID-19 pandemic adolescents is not surprising, considering the closure of schools and sports venues such as closing gyms, swimming pools, playgrounds, fields, and other public places to reduce the possibility of outdoor activities.

The data obtained from the results of the questionnaire showed that during the COVID-19 pandemic, 163 respondents (58.2%) did a physical activity at home. It is possible that staying at home for too long can increase the behavior of sitting, lying down, playing games, watching television, and using a cell phone so that energy expenditure is reduced. This can result in an increased risk of non-communicable diseases (Nurmidin et al., 2020). In addition, an increased risk of non-


https://doi.org/10.26911/FP.ICPH.09.2022.39

communicable diseases such as obesity, diabetes mellitus, and heart conditions can make you more susceptible to COVID-19 disease. However, the government and related agencies have conducted education about the best physical activities that can be done during a pandemic. This education is carried out using various sources and media, online and offline with due observance of health protocols (Wicaksono, 2021). Therefore, with this, a level of health literacy is needed for adolescents to access information on physical activity during the COVID-19 pandemic.

A good level of health literacy can make individuals make more informed health decisions (Kaboudi et al., 2017). However, current study indicate that the level of health literacy in adolescent is low. It is recommended to use school media to increase student health literacy through the school website, and school social media, and optimize information sources that students like to get health information sources that are by student socio-culture (Latif and Riana, 2020).

WHO stated that to improve health literacy students can optimize learning in schools by establishing a program or curriculum to inculcate health literacy structurally which aims to strengthen health literacy in adolescents (WHO, 2021). Therefore, schools need to provide facilities or support to improve health literacy and physical activity in adolescents.

## AUTHOR CONTRIBUTIONS

The first author the preparation of the manuscript, data collection, and data analysis. The second author provided research direction, research design, and analysis, as well as the final alignment of the manuscript.


## FUNDING AND SPONSORSHIP

None.


## CONFLICT OF INTEREST

None.

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