



## JUARA: Jurnal Olahraga

E-ISSN 2655-1896 ISSN 2443-1117

<https://doi.org/10.33222/juara.v7i2.1982>



### Physical Activity in School Children in a Pandemic Period?: A Systematic Review

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#### Info Artikel

Article History:

Received 10 January 2022

Approved 01 June 2022

Published 08 June 2022

#### Keywords:

Physical Activity,  
Pandemic, School,  
Lifestyle

#### Abstract

The purpose of this study was to review articles that were carried out systematically and qualitatively synthesized on physical activity for school students during a pandemic. The research method carried out by conducting a limited search was on studies published in the article search period from 2019 to 2021 by following the PRISMA guidelines, the search was carried out by systematically identifying 135 publications that underwent title, abstract, or full-text review. Studies were excluded if the articles were not in English or did not include original data. The results of a systematic review found 14 articles that met the eligibility criteria, based on self-reported data as many as 60% to 70% of school students did not meet the recommendations for physical activity that should be done such as walking, playing sports and cycling. Intrinsic factors such as motivation, the goal of maintaining health and changes in body shape provide a significant factor for the physical activity carried out. In conclusion, many factors cause this, such as the social environment, home environment, and changes in hormones, which are factors that often occur due to low physical activity. Physical activity that is often done but in low intensity is walking, cycling and sometimes doing the treadmill. Given that physical activity is not just physical activity outside the home, it is far from being a health promotion tool for a long period.

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#### INTRODUCTION

The World Health Organization (WHO) 2019 reported the discovery of the first case of pneumonia in Wuhan City, Hubei Province, China (Song J, 2020). Still, the aetiology was

unknown (Sohrabi et al., 2020). Since the case was first discovered, the spread of infection was growing very fast (Anderson et al., 2020). Until April 13, 2020, all countries had confirmed this pneumonia case, including Indonesia. The Chinese government said that

the pneumonia case was a new coronavirus or covid-19 (Q. Li et al., 2020).

Since the Indonesian government announced the first documented case of covid-19 on March 2, 2020, this case has increased significantly to 4,241 instances of covid-19 in 34 provinces since it was announced until April 13, 2020, with the highest points in Jakarta Ministry of Health of the Republic of Indonesia, 2020). The increase in the number of cases occurred very quickly and spread between countries in the world. Based on the issues, the WHO has declared covid-19 as a pandemic (Cucinotta & Vanelli, 2020); this is what makes various countries impose lockdown rules in their countries to reduce the spread of covid-19 through activities outside the home. This enforcement is also one of the alternatives carried out by the Indonesian government by implementing a regional quarantine to reduce the spread of covid-19 in Indonesia; this regulation causes all offices, schools, and universities to be carried out from home.

The quarantine policy in Indonesia has been in effect since March 15, 2020, and this is intended to prevent the outbreak from spreading outside the community (Lippi et al., 2020). In this regulation, a big problem occurs in the community regarding the worst possible impact of limited physical activity. The World Health Organization (WHO) has provided clear guidelines on the minimum amount of physical activity required to maintain the health and fitness of each individual to keep the body in shape (WHO, 2018). Maintaining

each individual's fitness needs to be maintained properly because the first and most potent reaction of viral invasion in the body is the activation of a high human immune and inflammatory response (Q. Li et al., 2020; G. Li, Hu, & Gu, 2020). With limited physical activity due to the COVID-19 outbreak, it is undoubtedly important for every individual to be physically active in various activities as a preventive to keep the body in shape, such as stationary bicycles, aerobic exercise, treadmills, push-ups and sit-ups (Bauman, 2004) and even doing activities such as cleaning the yard, shopping is part of being physically active (Lam et al., 2020).

During the self-quarantine period carried out by the world community, especially the Indonesian people, to break the chain of the covid 19 virus, every individual has problems with physical inactivity, of course, this can hurt their health such as risk factors for heart disease, diabetes and to be able to maintain physical condition during the COVID-19 pandemic (Wilson & Barnett, 2020). Some research results say that the perception and mindset determine a person's physical activity whether their daily life physical activity is by their needs or not (Zahrt & Crum, 2020). Several reasons cause a person to lack physical activity during the COVID-19 pandemic; this is due to many concerns in carrying out physical activities, including environmental, social, and psychological factors (Bauman et al., 2012; Teychenne et al., 2020). Of course, suppose physical activity in the environment around

the house continues to be a wrong perception in the community during the COVID-19 pandemic. In that case, this can hurt quarantined people because their body condition is not in good shape during the COVID-19 pandemic, which is currently a person's immune system. Become the essential thing in the fight against the coronavirus.

Furthermore, it is necessary to consider and understand the determinants when designing interventions to increase physical activity in schoolchildren during the Pandemic Period. However, a systematic review of the effect of physical activity on schoolchildren during the pandemic is still lacking. We conducted a systematic literature review on physical activity in schoolchildren during the pandemic to address this knowledge gap. We aim to summarize physical activity and the facilitators and perceived barriers to physical activity in students during this pandemic and identify the types of physical activity that students prefer to do during the pandemic. We hypothesize that these students may not be aware of the health benefits of physical activity, especially during the COVID-19 pandemic.

## **METHODS**

The strategy used to search the literature obtained through search databases, both national and international journals. National and international journal providers can be accessed and used in searching review articles using a search database from Google Scholar,

Pubmed, and Scopus, which then uses the search term "physical activity in students during the Covid-19 pandemic". The search period for articles is from 2019 to 2021. This study uses the inclusion criteria of 14 bibliographies. In the initial stage, the researcher identified the first item with 135 articles on Google Scholar, 25 articles on Pubmed, and 10 articles on Scopus findings.

Furthermore, the articles were selected into 25 national articles and 20 international articles. The results of the appropriate and required selection are 7 National Journal articles and 6 International Journal articles. Data collection for the literature study was carried out using a database search tool to search for literature sources. This systematic literature review is based exclusively on publicly available literature. Thus, no human ethics committee review is required. We conducted this review guided by the principles of Selected Reporting Items for Systematic Reviews and MetaAnalyses (PRISMA) (Liberati et al., 2009) and related updates (Moher et al., 2015). The research was carried out by analyzing journal articles and then making a summary related to the questions and objectives of the study. The journal search procedure to become an ingredient in this research is to have criteria by the PICOT procedure.

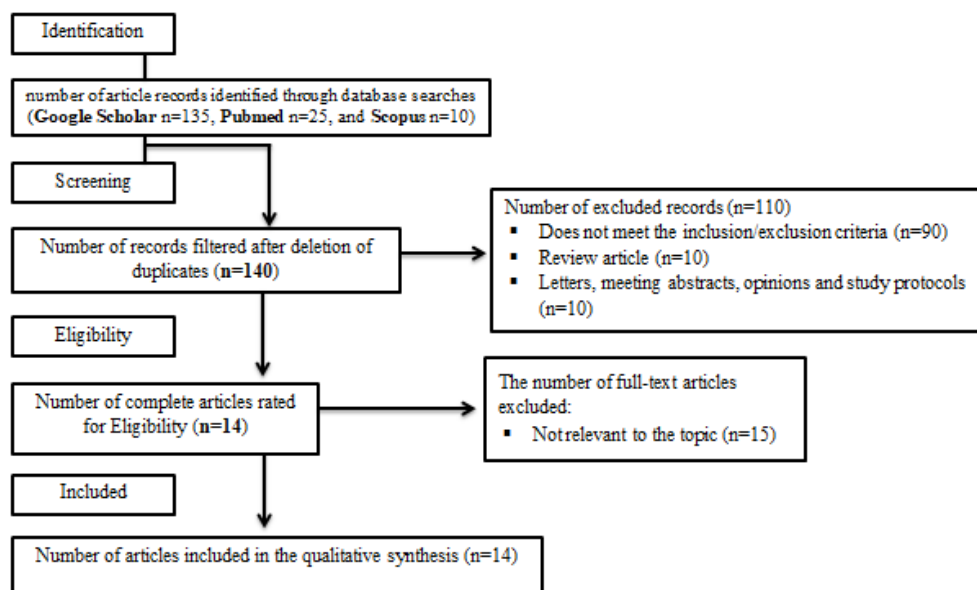
Figure 1 shows the flowchart of the article that will be reviewed. The researcher uses a database of international journal providers through the Scopus website, Pubmed, and Google Schooler. The questions

used by researchers to conduct and retrieve journal articles as research data were processed according to the PICOT and the terms used in searching for journal articles and using Boolean Operators. Researchers write keywords with Boolean Operators, namely Physical Activity "and Covid-19.

In a search conducted through the Boolean Operator with the keywords "Physical Activity," "school children," and "Covid-19" on the website, 14 findings were obtained, with search data from 2019 to 2021. Furthermore, the data obtained were excluded according to the researcher's need to get 2 data articles. The questions used to review journals have been adapted to the PICOT method. Each

question has P = problem/population. In this study, the authors use physical activity in school children as a problem. I/E = implementation/intervention/exposure, the author examines what happened to school children's physical activity during the Covid-19 pandemic. C = control/comparative intervention, the authors did not use comparative or control interventions in the study. T = time, the author conducted a research review of journal articles during the Covid-19 pandemic to find out what kind of activities the physical activity of school children was affected during the Covid-19 pandemic.

Figure 1 Flowchart of Articles being considered for inclusion



## FINDINGS AND DISCUSSION

### Findings

Figure 1 shows the research flowchart that we will review. We identified 135 articles from searches on Google Scholar, 25 articles

from PubMed, and 10 articles from Scopus from reference searches. There were 140 unique articles after the duplicates were removed. We have excluded 110 articles in the screening phase after we reviewed the titles

and/or abstracts of the articles we reviewed. The average article is not eligible because the article does not have a physical activity assessment or physical activity study during a

pandemic. After assessing the full-text articles, studies not relevant to the topic (n = 15) were excluded and 14 study topics were included.

Table 1 Study Characteristics

No	Author, Years	Methods	Research Findings
1	(Zhang et al., 2020)	Analysis	Students who have high physical activity in daily life can improve their cognitive abilities in preschool children.
2	(Pavey & Brown, 2019)	Longitudinal Study	Women aged 12 years and over with low physical activity and too much sitting can increase symptoms of depression in young women because increased physical activity for women aged 12 and over can avoid symptoms of depression.
3	(Lukács, 2021)	Survey	The closure of several sports facilities at universities during the pandemic significantly affects students' activeness in carrying out physical activities during the pandemic and has a negative impact if this can last for a long time.
4	(Friskawati, 2021)	Survey	The learning process that prioritizes the process of physical activity during the learning process, where the Elementary School, Junior High School, and High School students experience a significant decrease in physical activity during the pandemic and high-stress levels due to limited activity due to Covid 19.
5	(Hasan et al., 2020)	Descriptive Qualitative	The level of physical activity of Elementary School students in big cities has a low physical activity level. This is due to changes in the lifestyle of students in big cities, which have an impact on decreasing the level of physical activity of elementary school students.
6	(Zhai et al., 2020)	Analysis	The use of smartphones in students can cause high-stress levels, which can also impact poor sleep quality due to a healthy lifestyle and excessive smartphone use.
7	(Da'i & Cahyani, 2020)	Survey	The impact of different physical activities between men and women has an impact on the high potential for

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8	(Parker et al., 2020)	Longitudinal Study	<p>obesity that can be obtained by students. During the pandemic, the tendency of female students to carry out physical activity tends to be low, this is caused by the government's restrictions on physical activity and the low interest in sports for women. While the tendency of male students to do physical activity is very high, this is also based on the high level of physical activity before the pandemic. In adolescents, physical activity slowly decreases based on their age group, as they enter adolescence, physical activity decreases, so that the promotion of physical activity during adolescence can continue to be promoted.</p>
9	(Ruotsalainen et al., 2020)	Multiple Linear Regression	<p>This study illustrates that physical activity in adolescence can have an impact on increasing memory in the future so physical activity must be carried out regularly to get results that are by the objectives of the physical activity.</p>
10	(Neshteruk et al., 2020)	Survey	<p>Parenting patterns for children have a significant impact on children's behaviour in carrying out physical activities every day, this also has an impact on increasing obesity in children. Where parents are aware of the importance of the physical activity to provide many tasks for their children to do physical activity at home to reduce the impact of obesity if no physical activity is carried out.</p>
11	(Barkley et al., 2020)	Multiple Linear Regression	<p>Teenagers' attachment to gadgets is inseparable even though every activity is always related to gadgets. This study explains what if teenagers use gadgets to increase their physical activity and the results of this study explain that using a specified application provides a reminder to teenagers to be able to consciously do physical activity regularly and systematically to improve their fitness.</p>
12	(Jansson et al., 2019)	Survey	<p>Physical activity that is integrated with</p>

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13 (Lam et al., 2020)	Descriptive Phenomenological	<p>smartphone technology, supported by social and environmental support can provide an increase the physical activity carried out by teenagers and school children by maximizing the use of smartphone technology to provide structured physical activities that can facilitate the series of physical activities to be carried out.</p> <p>For children with cancer and their parents, physical activity has made them aware of the importance of physical activity that they must do at all times, apart from improving their physical condition, physical activity can also have an impact on psychological aspects and self-confidence in dealing with the illness they are experiencing.</p>
14 (Barth et al., 2020)	Multiple Linear Regression	<p>Physical activity among teenagers or school children becomes self-esteem that must be fought for because it will be related to the body posture of the child, but this is inversely proportional to the activities carried out in the academic area where the physical activity carried out only promotes a healthy lifestyle without making it a goal form the ideal body among teenagers.</p>

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## Discussion

From the systematic review that we have done, it shows that the studies that have been evaluated related to the physical activity carried out by students during the pandemic, after carrying out a series of activities such as collecting articles and separating several articles that will be studied, we review which of the 14 studies evaluated we found that the majority were carried out using a quantitative study design.

Furthermore, the assessments carried out by qualitative studies are relatively different; The most frequently used is the IPAQ to measure

health-related physical activity. Several studies report that physical activity carried out in the school environment is physical activity to promote a healthy lifestyle such as walking, jogging, gymnastics and swimming. However, this does not have an impact on the physical activity carried out after the learning activities are completed where students tend to have low physical activity after leaving the school environment (Friskawati, 2021). In addition, we also found that the home environment has a significant impact on behaviour not to carry out physical activities outside the school environment

(S et al., 2020), in addition, we have also found that many studies have been conducted using standard tools, assessments and validations. to assess physical activity (Lukács, 2021).

In conducting this review, we identified some similarities between the methods and data collection performed on the physical activity assessments performed. The most frequently reported facilitation or intrinsic factors that are positively related to physical activity including symptom improvement, general health benefits, and motivation, especially for patients with certain disease symptoms can be increased (Lam et al., 2020).

Our reviews are subject to some limitations. There is no standard, valid, and good assessment tool to evaluate physical activity for students used in all eligible studies. Thus, the lack of a homogeneous measure limits the ability to combine physical activity estimates across eligible studies. Furthermore, self-reported measures were used in most of the included studies. As such, measurement error is a concern and can result in overestimation. Although the number of participants included in the studies eligible for this systematic review was large (4,288 papers into 14 studies), the majority of all papers were from the same study.

## CONCLUSION

Of several studies that have been evaluated to evaluate students' physical activity during the pandemic, where a third of the articles evaluated did not meet the recommended physical activity

recommendations for adolescents. Many factors cause this such as the social environment, home environment, and hormone changes to be factors that are often encountered from low physical activity. Physical activity that is often done but in low intensity is walking, cycling and sometimes doing the treadmill. Given that physical activity is not just physical activity outside the home, it is far from being a health promotion tool for a long period.

## ACKNOWLEDGMENTS

Thanks to the Rector of Universitas Muhammadiyah Gorontalo, Department of Sports Science, and all lecturers of Sports Science who have provided both material and moral support so that this research can be completed.

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