

Physical activity and daily exercise-related social distance policy during Covid-19 pandemic: A systematic literature review

SANTI ANUGRAHSARI¹, HAFID ABBAS², SURYADI³

^{1,2,3}Educational Management, Postgraduate Program, Universitas Negeri Jakarta, Jl. Rawamangun Muka No 1, Jakarta 13220, INDONESIA

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Abstract:

The current global COVID-19 Pandemic has generated extensive sociopolitical changes among the entire world community. Although restrictions differ from country to country and are not enforced simultaneously, some regulations are mandatory worldwide, i.e., home confinement, closure of cultural and social events, remote work, online schooling, restricted movement, social distancing, or restricted Physical Activity (PA). In contrast, it is believed that one who does not routinely perform physical activity and daily exercises will fall ill. If exposed to COVID-19, they may suffer more severe. During the social distancing, several studies examined the limitations of daily physical and sport activities due to physical and social restrictions at all ages and conditions. However, no articles had summarized daily physical activity and exercises across ages and countries. Therefore, this study answered this gap and aimed to explore the policy of physical and social limitations related to physical activity and daily sports. It employed a systematic literature review method subjecting 21 selected articles published in 2020 and 2021 with the authors' inclusion criteria such as the articles containing the results of quantitative, qualitative research, mixed methods, or Meta-Analysis methods. The articles selected and summarized were related to physical activities and sports at various ages, including children, adolescents, young adults, and elderly across countries in specific populations in regard with health protocols when doing daily exercises. This study concluded that daily physical and sport activities must be carried out and prioritized to maintain health despite of being restricted due to the COVID-19 Pandemic as long as people comply with health protocols.

Key Words: Daily Activity - Exercise - Sport - Restriction - COVID-19 Pandemic

Introduction

COVID-19 is a disease spread mainly in close contact through droplets during talks, sneezes, or coughs. It's also an infectious disease caused by SARS-CoV-2. Its speedy spread and transmission bring about a worldwide COVID-19 pandemic, so governments of all countries have been forced to adopt measures to control and press its reach. Restrictive measures are enforced in public spaces, including the obligation of using face masks. This policy is extended to outdoor and indoor exercise practices due to increased respiratory volume and greater risk of transmission. The restriction on physical activity, daily exercises, and daily sports routines leads to a problem since they must still be performed to maintain health. Physical activity (PA) plays a crucial role in maintaining and improving health in general. Although a direct effect on preventing COVID-19 has not been found, exercise and diet can prevent people from getting sick. Obesity is a risk factor for hospitalization complications (Stefan et al., 2020). Physical activity can increase immune function, for example, mobilizing lymphocytes and releasing cytokines (Simpson & Katsanis, 2020). Apart from this mechanism, people who have a lot of activities are not susceptible to infection. Research in exercise immunology suggested that optimal physical activity can effectively reduce respiratory tract infections (Campbell & Turner, 2018); (Fondell et al., 2011). The physical distancing policy has resulted in the temporary closure of gyms, bans on team sports, and cancellation of several competitions. It may have been a dramatic change for individuals who used to exercise in this way during the Pandemic. Sudden changes in individual training can also result in injury rates and training intensity (Nielsen et al., 2014). Therefore, if COVID-19 restrictions are put in place to provide more opportunities for exercise, an increase in the frequency and intensity of exercise may occur in cardiovascular adaptation (Patel et al., 2017). Prolonged PA and sedentary activity behavior (SB) were high before the coronavirus (COVID-19) pandemic. Moreover, the enforcement of government policy (lockdown) to control the spread of COVID-19 may have affected PA and SB levels (Sadarangani et al., 2021). Even research conducted by (Raiola & Di Domenico, 2021) in Italy states that practicing physical activities indoors in gyms, physical and professional activities that have been developed for outdoor training still attracts participants for various reasons and causes participants to choose methods others or decide not to engage in any motor activity or sport. Research conducted by (Anugrahsari et al., 2021) stated that Clinical Clerkship Students with moderate physical activity categories and understand about distance when exercising with educational video learning and they believe how important it is to exercise during a pandemic by adhering to health protocols. In the field of education in formal schools, there are also obstacles in the form of a decrease in online learning in Physical Exercise during school closures caused by COVID-19 and making it difficult for frontline sports teachers. They recommend that schools

and governments provide adequate support, include online teaching tools and learning guides, to be creatively and interactively developed by online learning sports teachers, which will benefit students in mastering motor and physical skills (Chan et al., 2021). Several studies examined the limitations of daily physical activity and sports activities related to physical and social restrictions at all ages and conditions. With the background above, the author thinks about the importance of answering the following questions: How is PA and daily exercise for children, adolescent, young adults and old age in social and physical distancing policy on COVID-19 Pandemic in various countries. Finally, this paper aims to explore the physical and social restrictions policy related to physical activity and daily sports activities at various ages worldwide.

Materials and Methods

The current study employed a systematic literature review method. The synthesis was made through the formulation of research questions and searches on systematic literature. The articles analyzed in this study were tracked using the Search Engine ProQuest (<https://www.proquest.com>). The investigation was carried out using the keyword Physical Activity* AND COVID-19* and limited to 2020-2021. The search results were 9501 articles. In addition, the keywords used are: first, Physical Activity * AND Daily Exercise * AND lockdown, results were 3528 articles. Second, with the exact keywords added with the word AND age* AND sport* AND countries*. The results found 717 articles. Described in Fig 1.

Research Question The research questions (RQ) were arranged under PICOC (Population, Intervention, Comparison, Outcomes, and Context) criteria.

Table 1. Summary of PICOC

Population	All ages (children, adolescents, young adults, and old age)
Intervention	Social and Physical Distancing Policy on COVID 19 Pandemic
Comparison	Between ages in Various counties
Outcomes	Physical Activities and Daily exercises
Context	Worldwide

The research questions (RQ) and motivation are provided in Table 2.

Table 2. Research Questions on Literature Review

No	Research Question	Motivation
1	The impact of lockdown policy on physical activities and daily exercises in various ages during Pandemic.	Identifying the implications of lockdown policy on physical activities and daily exercises in different ages during Pandemic
2	The impact of lockdown policy on physical activities and daily exercises in various countries during COVID 19 Pandemic.	Identifying the impact of lockdown policy on physical activities and daily exercises in various countries during COVID 19 Pandemic
3	The current trends of physical activities and daily exercises during during COVID 19 Pandemic.	Identifying trends regarding physical activities and daily exercises during COVID 19 Pandemic
4	The method of health protocol enforcement to physical activities and daily exercises during Pandemic.	Identifying the application of health protocols to physical activities and daily exercises during COVID 19 Pandemic

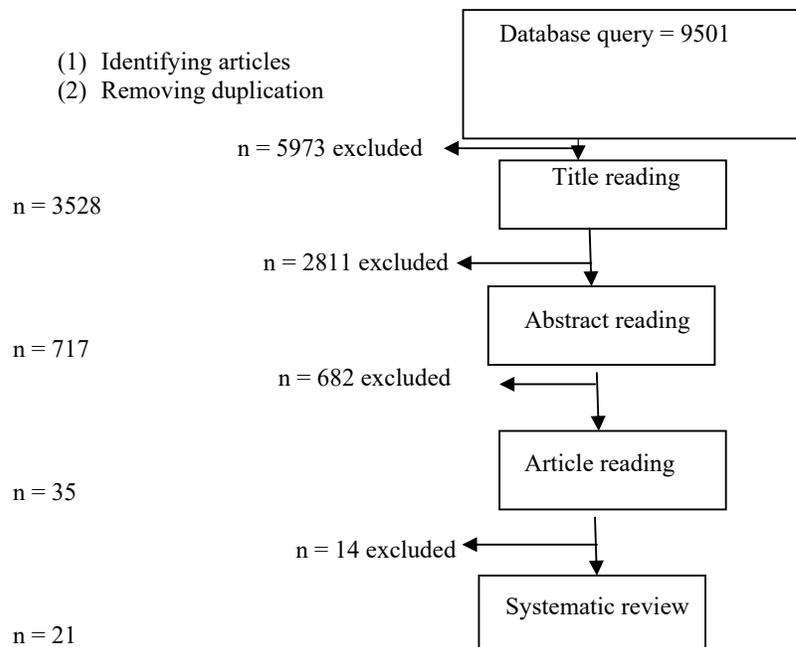


Fig 1. Flowchart of inclusion criteria

The inclusion and exclusion criteria were used for selecting the articles, as provided in Table 3:

Table 3. Inclusion and Exclusion Criteria

Inclusion Criteria	Articles published from 2020 to 2021. Containing the results of quantitative, qualitative research, mixed methods, or Meta-Analysis Constituting the results of physical activity and daily exercise-related social distance policy during COVID-19 Pandemic
Exclusion criteria	Written in languages other than English Proceedings

Results

Twenty-one articles met our inclusion criteria. Twelve articles discuss physical activity and daily exercises according to age (children, adolescents, young adults, and old age), and the remaining nine discuss the description of physical activity and daily exercises worldwide.

Table 4 . Articles and topics discussed

Author	Study
Chan et al (2021); Sadarangani et al (2021); Bronikowska et al (2021); Pelletier et al (2021); Harrison et al (2021); Sunda et al (2021); Rodríguez-Larrad et al (2021); Nathan et al (2021); Ding et al (2021); Maertl et al (2021); Adamakis (2021); Rutkowska et al (2021)	Physical Activity and Daily activity related to the lockdown policy at every age of the community
Wilke et al (2021); Hermassi et al (2021); Hanan & AbdulazizA (2021); Brancaccio et al (2021); Pérez-Rodrigo et al (2021); Füzéki et al (2021a,b); Eek et al (2021); Füzéki, Schröder, Groneberg & Banzer (2021)	Physical Activity and Daily activity related to lockdown policies in various countries

Discussion

From the systematic literature review results in this study, we discuss its parts, namely PA and Daily exercise at all ages and in various countries related to different lock policies between each country.

Physical Activity and Daily Exercises among Children, Adolescents, Young Adults, and elderlies during Pandemic

A study on adults in South America during the early Pandemic compared the time to sit (ST), screen exposure, Moderate Physical Activity (MPA), Vigorous Physical Activity (VPA), and Moderate to Vigorous Activity (MVPA). It assessed the impact of lockdown on group combinations which reported if they complied with PA guidelines and were involved in excessive ST. The participants were adults in South America who filled in an online survey related to demographics, lifestyles, and chronic diseases. It found that the mean MPA and VPA declined by 42.7 and 22.0 min/day while the increases occurred in screen and ST (Sadarangani et al., 2021).

The other research is a qualitative study on 21 families. It performed interviews with 45 people from rural and urban in Canada. The participants suggested that the unstructured and structured PA decreased during the Pandemic, that many elderlies perceived it as a benefit. Parents and children had a negative assumption about spending less time with friends and a positive perception of spending more time with family. Parents and children were afraid and anxious about their capabilities of guaranteeing the safety of their families from the spread of the virus and the possibility of adjusting with the new life. The findings emphasized on the influence of the Pandemic on friendship for families and the change in children's fun time towards unstructured play (Pelletier et al., 2021). Researches on adolescents conducted by (Bronikowska et al., 2021), proved that teenagers who did not comply with WHO guidelines increase by 13.4% in the frequency of PA during the lockdown. PA's self-rated health provided a compelling correlation with MVPA in a cohort of students who comply with WHO guidelines before the outbreak yet failed to maintain those recommendations during COVID-19 restrictions. Hal showed the negative influence of the Pandemic on PA committed by young people. The results suggested the need for PE teachers and parents to motivate their students or children in taking systematic PA.

Another research is an online survey on 9969 adults aged 40 years and above in four US urban areas, covering demographic variables, health, physical activity and quality of life. They were requested to respond to some questions related to diseases before and during Pandemic. The finding denoted a decrease in physical activity due to COVID-19 (Harrison et al., 2021). Besides, research on the impact of COVID-19 lockdown policy on fitness index in adolescents found a decline in muscles, and it became more pronounced in boys than in girls. It proved that the lockdown harmed muscle fitness status in boys (Sunda et al., 2021).

The next research subjected university students in Spain to transform physical activity and sedentary behavior before and during the lockdown. It focused on gender comparison. It employed a questionnaire, which was short IPAQ (International Physical Activity Questionnaires). Students were requested through sixteen university administrative channels, and 13,754 participants took part. It found out that women adapted to confinement better than men did in terms of physical activity. The research results were perceived to help design

strategies for each sex to promote physical activity and reduce sedentary behavior during confinement (Rodríguez-Larrad et al., 2021).

A study about physical activity levels shows no changes in weekly physical activity (PA) minutes during the Pandemic. However, the frequency and duration of unstructured physical activity significantly developed. Outdoor activity or jogging around the house, parks or playgrounds, recreation areas, and indoor play at home increased significantly. The time spent and frequency of physical activity significantly decreased during COVID-19. During the lockdown, unstructured children's physical activity increased while the outdoor activity turned the other way around. Therefore, it is necessary to examine whether children's increased PA can be maintained through physical distance (Nathan et al., 2021).

Another study examined the PA involvement of adults from eleven countries (United States, Brazil, Ireland, Spain, Bulgaria, Turkey, North Macedonia, China, India, Malaysia, Singapore) through an anonymous cross-sectional survey. Of the 11 775 participants, 43.9% were less active, and 44.8% admitted a decrease during the lockdown. Statistically, the researchers studied the significant differences in the proportion of less active participants, PA levels, and PA decline. A tighter government policy could lead to a higher tendency to be involved or less active during the lockdown. More significant depression or anxiety may cause a decrease in PA levels. A considerable decline in PA scores during the Pandemic across the country was also found. Therefore, this paper suggested government intervention in promoting PA during this international outbreak (Ding et al., 2021).

Besides, an online survey was conducted by COSMO (COVID-19 Snapshot Monitoring) in Germany with 1034 participants aged from 18 to 74 on the possibility of doing PA according to the recommendation of the World Health Organization. WHO suggested that adults perform PA at least 2.5 hours/week. It turned out that 440 (42.6%) participants met these criteria, and those with <6 years were less likely to meet WHO recommendations. Also, those with higher levels of education, good coping behaviors, alcohol consumption, and life satisfaction tend to meet WHO recommendations. It suggested the need for PA intervention strategies to particular subgroups, such as those with low education backgrounds and parents with children (Maertl et al., 2021).

There is a case study that aims to provide a detailed report on individual males who were physically active before the lockdown policy compared to remaining PA during the COVID-19 Pandemic, mentioning more than 8 weeks in total (4 x 2 week period), daily PA (outdoor measures and exercise sessions), sleep monitoring (total and deep sleep time), and body weight and composition, as well as a structured exercise program developed and implemented during the lockdown period (Adamakis, 2021).

The last paper is conducted by Rutkowska et al. (2021) about the total energy expenditure. It subjected eighty-nine healthy adult students with IPAQ scores. During the first measurement, the mean total PA level was 8640 metabolic equivalents (MET)-minutes/week and 10,560 MET- minutes/week in the second measurement. The examination proved considerable difference. The enforcement of "unfreezing" laws for sports and outdoor activity contributed significantly to the overall increase in PA rates. Therefore, this research recommended that students follow WHO guidelines to do PA during the lockdown to keep healthy (Rutkowska et al., 2021).

Physical Activity and Daily Exercises in Different Countries during the Pandemic

A survey on time spent employing MVPA and VPA was made by using Nordic Physical Activity Questionnaire. The data were collected for recreational and occupational PA before and after the lockdown. The researchers calculated the PA compliance according to the WHO guidelines. The research found that the total personal-reported PA declined by 41% MVPA and 42.2% VPA. The decrease was higher for time vs. leisure time, young and old vs middle-aged, previously more active vs less active individuals. However, the sex difference was not found. Compared to the compliance before the outbreak, it decreased from 80.9% to 62.5%. The results proved that PA levels fell globally during the Pandemic. Therefore, stakeholders are suggested to find out strategies to reduce the loss of HK to keep healthy during the outbreak (Wilke et al., 2021).

Hermassi et al., (2021) studied the impact of total lockdown on PA and life satisfaction during the Pandemic in Qatar. The study found that COVID-19 confinement led to the decline in PA and life satisfaction, yet incline in sitting time. These findings shed light on the risk of psychosocial disorders and the potential physical harm from reduced PA during early COVID-19 confinement in 2020. During the Pandemic, an online survey in Saudi Arabia was conducted. The questions were related to the participant's responses before and during lockdown. The participants who do jogging around their houses daily decreased during the Pandemic (before 30.5% vs during 29.1%), which agreed with the significant increase in the prevalence of participants who were not going around during quarantine. The lockdown imposed in Saudi Arabia had a simple but great impact on people's physical activity and eating behavior, which turned unhealthy (Hermassi et al., 2021) (Hanan & AbdulazizA, 2021).

Research on lifestyle shifts among specific populations during the quarantine was conducted in Italy. A cross-sectional study in Italy aimed to explore university lifestyle changes during quarantine for the COVID 19 pandemic (Brancaccio et al., 2021). Another study that identified shifting patterns in eating behavior and PA during the Pandemic in Spain concluded six patterns of dietary change along with that of PA during the

lockdown. The researchers divided them into three groups of lifestyle changes: less active, more active, and average cluster. People who are typically less active are more likely to be classified in a collection that increases physical activity in confinement. The different modes of lifestyle change in custody indicated the need for stakeholders to tailor supports and advice for other population groups (Pérez-Rodrigo et al., 2021).

An online survey was conducted to examine the impact of lockdown on physical activity among German adults by evaluating physical activity. It concluded that physical activity among German adults decreased in number, that promotion needs government concerns. Particular attention should be considered to bring back the activities. Another online survey aimed to examine the effect of lockdown on PA was also conducted in Italy. Using European Health Interview Survey questionnaire, the research found substantial reductions in all measures of physical activity, that it should be applied to limit adverse health effects (Füzéki, Schröder, Groneberg, et al., 2021b) (Füzéki, Schröder, Groneberg, et al., 2021a) (Füzéki, Schröder, Carraro, et al., 2021).

(Eek et al., 2021) studied self-perceived changes in PA levels and intensity during the outbreak and their relationship with general life satisfaction and perceived physical capacity in Sweden. Those who noted a decline in PA levels reported lower life satisfaction and aerobic capacity than the other groups. A reduction in PA was reported by many. The highest possibility for decreased activity occurred in the elderly groups, who had gained the strictest COVID-19 restrictions in Sweden.

Conclusion

During the COVID-19 pandemic, governments from various countries implemented policies related to lockdowns and restrictions on social and physical interactions which resulted in a decrease in physical activity, daily exercise, and sports at all ages. As a result, it poses a troubling risk that people could fall ill due to their weakened immune system for restriction of outdoor physical activity. Therefore, the government needs to promote related physical activity at all ages and reduce sedentary behavior to avoid the possibility of increasing morbidity and mortality in the community. Daily physical activities and sports must continue to be carried out and prioritized to maintain health even though they are limited as long as the community adheres to health protocols. Therefore, it is recommended to all parties in an effort to promote physical activity and suppress sedentary behavior to deal with the current and future pandemics.

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