

Barriers to Physical Activity among Adults and Older Adults during the COVID-19 Pandemic: A Systematic Review

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ABSTRACT

Background/Aim: A lack of physical activity among adults was observed in several countries during the COVID-19 pandemic. People clearly encountered social, demographic, personal, psychological, and economic barriers to physical activities, but no systematic review or meta-analysis has yet investigated these factors. This systematic review fills this gap by investigating the barriers to physical activity during the COVID-19 pandemic among adults.

Methods: This systematic review followed the PRISMA checklist and evaluated databases from Google Scholar, MEDLINE, PubMed, ScienceDirect, the Cochrane Library and other specific database websites. A comprehensive search was conducted for articles published between 2019 and October 2022 on the barriers to physical activity during the pandemic. The selection process was verified, and 12 articles were included in this systematic review. The data were extracted from each study in terms of the type of physical activity performed, the data collection instrument used, types of barriers, country of study, age of participants, and barriers to physical activity.

Results: Of 12 studies, ten reported a decrease in the level of physical activity while two reported an increase. The reported barriers to physical activity during the pandemic were a lack of equipment or facilities, lack of time, lack of motivation, lack of social distancing, fear of being infected with COVID-19, or having no partner.

Conclusion: This systematic review identified barriers to physical activity during the pandemic; thus, future studies are needed to overcome these barriers and to harness the factors that can facilitate a recommended level of PA among adults during a health crisis.

Keywords: Physical activity, Barriers, COVID-19, Pandemic, Adults

INTRODUCTION

An emergent coronavirus disease (COVID-19) with acute respiratory signs and symptoms was first identified in Wuhan, China at the end of 2019¹. It was defined as a pandemic by the World Health Organization (WHO) in January 2020². At the date of this systematic review, there have been more than 600 million confirmed cases of COVID-19 worldwide. The death rate is 1.06% of the total number of cases³. The given report indicates that the number of daily cases fluctuates according to the period of the year with an increase in winter³. Highly restrictive regulations and protocols were imposed in the first few months of the pandemic to try and limit the spread of the disease. These included social distancing; lockdowns; and the closing of markets, schools, universities, and social activities^{4,5}. Many countries also prohibited social gatherings and meetings in groups such as in education and recreation centres and gyms. Even outdoors was restricted at times⁶⁻⁸.

There was a huge reduction in physical activities (PA) due to these social restrictions and lockdowns during COVID-19's first wave. This consequently had a negative impact on people's health^{9,11}. The direct impact of COVID-19 on populations' PA was confirmed, and many countries investigated the situation and set appropriate plans to mitigate its consequences^{12,13}.

A reduction in PA has negative consequences for the general health of societies^{13,14}. The association between a lack of PA during the COVID-19

pandemic and other social, demographic, personal, psychological, or economical barriers has been reported in different communities^{15,16}. Furthermore, there is evidence confirming the emergence of additional obstacles to PA during the pandemic, but these barriers vary across countries and age groups^{14,17,29}. This systematic review attempts to provide evidence on the reported barriers to PA during the COVID-19 pandemic among adults. The aim is thus to conduct a comprehensive systematic review on the barriers to PA during the COVID-19 pandemic among adults.

METHODOLOGY

Research Design: This systematic review was conducted based on the preferred reporting items for systematic reviews and meta-analyses (PRISMA)⁴⁰ procedure to identify studies that investigated the barriers to PA during the COVID-19 pandemic among adults. See attached supplementary material for PRISMA guidelines. The literature was searched using a scientific approach. This systematic review is registered with PROSPERO under the registration number CRD42022364699.

Search Strategy: An extensive search was conducted using the predetermined electronic databases of Google Scholar, MEDLINE, PubMed, ScienceDirect, the Cochrane Library (Cochrane Database of Systematic Reviews, and Web of Science), the science and social science citation index, and other specific database websites. The

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websites of relevant organizations such as the WHO and the CDC were also searched. A preliminary search identified relevant keywords to frame an advanced search among these mentioned databases. The identified keywords for each website are shown in Table 1.

Inclusion and Exclusion Criteria: A comprehensive search was conducted for all relevant articles. The inclusion criteria were articles published between 2019 and October 2022, written in English, on the subject of PA barriers during the COVID-19 pandemic among adults (18-65) with full text available. The full texts were screened for their relevance and those determined as fulfilling the above criteria were included in this systematic review. Studies were excluded if they were conducted with children, adolescents, or the elderly. They were also excluded if they focused on specific groups such as pregnant women, the obese, or people with pathological conditions.

Risk of Bias (quality) Assessment: The quality of the included studies was appraised using the STROBE (Strengthening the Reporting of Observational studies in Epidemiology) statement criteria:

- Appropriate study design
- Accurate data collection technique
- Valid data collection tools
- Representative sample size
- Appropriate selection methods
- Accurate methods for measurements
- Determine source of bias

Accurate statistical methods: The quality of the included articles was ranked as high, moderate, or low (Table 2). The study was considered to be high quality if it fulfilled seven or more of the eight assessment criteria, moderate quality if five or six of the eight assessment criteria were fulfilled, and low quality if only four or less of the criteria were fulfilled.

Table 1: Summary of search

Search Engine	Search Terms	Limits activated	Date of search	Papers	Included by title and abstract
Google scholar	(adult OR people OR population OR adolescent) AND ((physical activity) OR (physical exercise)) AND (barrier OR obstacle) AND (COVID OR coronavirus OR SARS)	English Human 2020 to 2022	October 2022	17000	31
Cochrane Library	barrier in Title Abstract Keyword OR obstacle in Title Abstract Keyword AND physical activity in Title Abstract Keyword OR exercise in Title Abstract Keyword AND covid in Title Abstract Keyword	English PICO words (advanced search) 2020 to 2022	October 2022	37	0
PubMed (MEDLINE (OvidSP), and EMBASE (OvidSP)	((physical activity) OR (physical exercise)) AND (barrier OR obstacle) AND (covid OR corona OR SARS) AND (adult OR adolescent OR people)	English Human 2020 to 2022	October 2022	202	15
Sciencedirect	Barriers of Physical activity among adults during covid 19 pandemic	English Research articles 2020 to 2022	October 2022	2091	21
Grey literature search	Barriers of Physical activity during covid 19	2020 to 2022	October 2022	0	0
Total	Titles and Abstracts examined Full texts retrieved	-	-	19330 -	- 67
Papers included in the review	The included articles in this systematic review are 12 articles				

Table 2: Quality Assessment of included studies

No	Study	Appropriate study design	Accurate data collection technique	Valid data collection tools	Representative sample size	Appropriate selection methods	Accurate methods for measurements	Determine source of bias	Accurate statistical methods	Quality (Low, Moderate, High)
1	Barrett et al ²⁸	✓	✓	✓	✓	✓	✓	✓	✓	High
2	Roche et al ²²	✓	✓	-	-	✓	✓	✓	✓	Moderate
3	Kass et al ²⁵	✓	✓	✓	✓	✓	✓	✓	✓	High
4	Farah et al ²⁶	✓	✓	-	✓	✓	✓	✓	✓	Moderate
5	Alqahtani et al ²⁹	✓	✓	✓	✓	✓	✓	✓	✓	High
6	Katewongsa ³⁰	✓	✓	✓	✓	✓	✓	✓	✓	High
7	Symons ²¹	✓	✓	✓	-	✓	✓	-	✓	High
8	Woodruff ³¹	✓	✓	✓	✓	✓	✓	✓	✓	High
9	Saunders ³²	✓	✓	✓	-	✓	✓	✓	✓	Moderate
10	McCorm ²⁴	✓	✓	✓	-	✓	-	-	✓	Low
11	De Souza ²⁷	✓	✓	✓	✓	✓	✓	✓	✓	High
12	Fearnbac ³³	✓	✓	✓	✓	✓	✓	✓	✓	High

Table 3: Summarized findings of the systematic review

Country	Study	Year	Participants	Instruments used PA measurement	PA status	Type of PA	Barriers of PA	P Value	Interpretations
Ireland	Barrett et al ²⁸	2020	Adults	An online, anonymous questionnaire	Decreased PA by 13%.	Regular activity	<ul style="list-style-type: none"> Restrictions and social distancing Inability to access usual means Advice not to leave home 	Repeated cross sectional study (No P values were provided)	COVID-19 restrictions
UK	Roche et al ²²	2020-2021	Younger (aged 18–24) and older adults (aged 70+)	Qualitative	Decreased	<ul style="list-style-type: none"> Home exercises Outdoor activities 	<ul style="list-style-type: none"> Caring responsibilities and conflicting priorities Fear of contracting COVID-19 COVID-19 restrictions 	Qualitative study (No P values were provided)	Social factors
UK	Kass et al ²⁵	2021	Adults 18 years or more	International Physical Activity Questionnaire Short Form (IPAQ-SF)	Walking, running and cycling increased	<ul style="list-style-type: none"> Walking Gym Outdoor (running or cycling) 	<ul style="list-style-type: none"> Lack of time 	(P < 0.0001)	Nature of life during the pandemic
USA	Farah et al ²⁶	2020	Adults ≥ 18 years old	validated questionnaire	71.3% was inactive	<ul style="list-style-type: none"> Climb stairs, Swimming, Jump rope, Play soccer, Running 	<ul style="list-style-type: none"> Laziness and fatigue lack of motivation lack of appropriate facilities/space Lack of time Weather Lack of partner 	0.145 0.388 0.007 0.718 0.283 0.843	Interpersonal factors
Saudi Arabia	Alqahtani et al ²⁹	2020	18 and 69 years old	International Physical Activity Questionnaire-Short Form	Decreased	<ul style="list-style-type: none"> Walking Home exercises 	<ul style="list-style-type: none"> Male sex Being single Completing higher education Being resilient lack of time Lack of motivation lack of facilities 	0.03 < 0.001 < 0.01 0.05 < 0.001 < 0.001 < 0.001	Demographic characteristics
Thailand	Katewongsa ³⁰	2019-2020	18_64 years	Global Physical Activity Questionnaire	Declined from 74.6% to 54.7%	<ul style="list-style-type: none"> SPA Work-related Recreation 	<ul style="list-style-type: none"> Unemployment Urban residence Chronic diseases 	0.04 0.03 0.00	Socioeconomic factors
Belgium	Symons ²¹	2020	Adults 18 years or more	psychometric evaluation of the exercise benefits and barriers scale	More exercised especially in light-intensity and moderate-intensity exercise	<ul style="list-style-type: none"> Regular exercises 	<ul style="list-style-type: none"> Time format Lack of facility and equipment. Lack of family encouragement Sport environment Physical effort 	< 0.001 < 0.001 < 0.001 < 0.001 < 0.001	COVID-19 situation and social factors
Canada	Woodruf ³¹	2020	18 to 77 years	Steps count by wearable activity tracker	Decreased PA	<ul style="list-style-type: none"> Run or walk outside Gyms and fitness 	<ul style="list-style-type: none"> Access/equipment, Time Motivation Changing in PA type 	< 0.001 < 0.001 .253 .02	Lack of arrangement

Canada	Saunders ³²	2022	Older adults	LLFI	25% reported decrease in PA 10% decrease in other mobility	<ul style="list-style-type: none"> Physical activity, Housework Move around their home 	<ul style="list-style-type: none"> walking volume < 0.05 fall history < 0.05 male sex < 0.05 unpleasant neighborhood < 0.05 musculoskeletal pain < 0.05 self-reported health < 0.05 	Environmental factors
Canada	McCorm ²⁴	2020	Adults	Qualitative	Decreased	<ul style="list-style-type: none"> Regular activity 	<ul style="list-style-type: none"> Crowding Lack of physical distancing 	Qualitative study (No P values were provided) Afraid COVID-19
Brazil	De Souza ²⁷	2021	Adults 19 years or more	Google Forms questionnaire	87.8% practicing some kinds of activities during 2 nd wave of pandemic	<ul style="list-style-type: none"> Regular activity 	<ul style="list-style-type: none"> Lack of motivation, Space at home, Professional instruction 	Descriptive cross sectional study (No P values were provided) Interpersonal factors
USA	Fearnbac ³³	2020	Adults 18 years of age or older	Long-form PA questionnaire	Dropped by average of 1,460 MET minutes	<ul style="list-style-type: none"> Home exercises Gyms 	<ul style="list-style-type: none"> Living alone 0.06 Low household income < 0.01 Loss of employment 0.06 	Socioeconomic factors

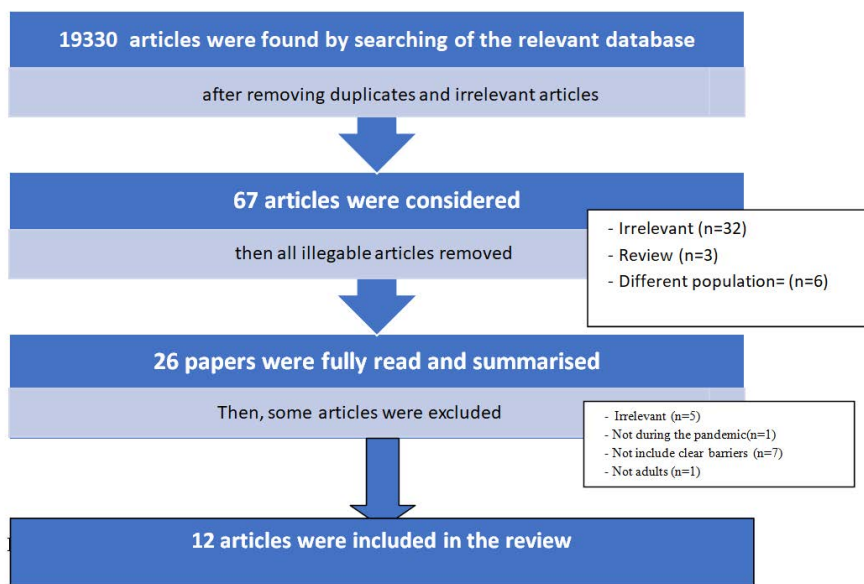


Figure 1: Flow diagram

Data Extraction and Synthesis: Two researchers independently extracted the data into a prepared data extraction form using Excel. The data extraction form was tested and revised before using it for data extraction. In the case of disagreement during the selection or extraction of data, a third researcher was asked to review and evaluate; his opinion was final. The extracted data included information from each study on the type of PA, type of instrument used, type of barrier, country of study, age of the participants, and barriers to PA; a significant change in PA level was defined as a p-value less than 0.05 (Table 3).

Validity of the Data: The data extracted were checked for accuracy, and a third one was asked to judge, weigh, and validate the data to

ensure their validity if any discrepancies were raised between the investigators. Two experts independently searched the identified databases using the established eligibility criteria. The full-text articles returned in the search were checked for their eligibility. EndNote X4 reference manager software was used to sort the articles into those included and those excluded and to remove any duplicates. A flow chart was used to illustrate the search strategy and the selection process of the included studies (Figure 1).

The included studies are presented here as a narrative. The main findings were discussed and explained. The data synthesis was performed via a formal narrative synthesis about the PA data including the type of PA,

the type of instrument used, the type of barrier, country of study, the age of the participants, and the barriers to PA as quantitative variables. Each variable included in the review was interpreted and explained and shown as a frequency and percentage. Excel was used to calculate the percentages and frequency. Two experts synthesized the data to enhance the validity of the study.

FINDINGS

Search Result: The 12 included studies were descriptive and cross sectional; ten were quantitative^{21,25,33}, and two were qualitative^{22,24}. The studies were conducted in eight countries: three in Canada^{24,31,32}; two in the United Kingdom (UK)^{25,22}; two in the United States of America (USA)^{26,33}; and one in each of Ireland²⁸, Saudi Arabia²⁹, Thailand³⁰, Belgium²¹, and Brazil²⁷. The sample sizes were varied and were representative to the population. Different instruments were used to measure the PA and its barriers including an online questionnaire^{27,28}, the International Physical Activity Questionnaire-Short Form (IPAQ-SF)^{25,29}, and Long Form (IPAQ-LF)³³, a global PA questionnaire³⁰, step counters³¹, a qualitative approach^{22,24}, and others^{21,26,32}. The studies were conducted with adults aged 18 years to 65 years.

Physical Activity Situation during the Pandemic: The PA status among adults was discussed in the 12 included studies. Of the 12 studies, ten showed a drop in PA^{22,24,26,33}, and two reported an increase in the level of activity^{21,25}. The first study by Kass et al²⁵ in the UK reported that walking, cycling, and outdoor activity significantly increased ($P = .00012$) during the lockdown, but the time spent sitting increased during the same period²⁵. Another study conducted in Belgium by Symons et al²¹ showed a significant increase ($P < 0.001$) in light and moderate PA during the lockdown versus the period before the lockdown²¹.

Physical Activity Barriers According to the Country of Data Collection: The barriers to PA during the pandemic were reported from the nine countries included. The most commonly reported barrier was the lack of equipment or facilities; this was reported in Ireland²⁸, the USA ($P < 0.001$)²⁶, Saudi Arabia ($P < 0.001$)²⁹, Canada ($P < 0.001$)³¹, and Brazil²⁷. The second-most reported challenge for PA during the pandemic was a lack of time. This was reported from five countries: the UK by Kass et al²⁵ ($P < 0.0001$), the USA by Farah et al²⁶ ($P = 0.321$), Saudi Arabia by Alqahtani et al²⁹ ($P < 0.001$), Belgium by Symons et al²¹ ($P < 0.001$), and Canada by Woodruff (2021)³¹ ($P < 0.001$). All of these studies found that a lack of time was the main barrier to PA during the pandemic. The third-most reported barrier to PA during the pandemic was lack of motivation as reported in the USA²⁶ ($P < 0.001$), Saudi Arabia²⁹ ($P < 0.001$), and Brazil²⁷.

There are other reported barriers such as a lack of social distancing—this is the main barrier for enrolment in PA in Ireland²⁸. This study by Barret et al²⁸ mentioned restrictions and a lack of social distancing as the main barriers to PA. A qualitative study from Canada indicated that a lack of physical distancing and crowds decreased PA during the pandemic²⁴. Fear of being infected with the COVID-19 was also reported in studies in a cross-sectional study in Ireland²⁸, a qualitative study in the UK²², and a quantitative study in Belgium ($P > 0.001$)²¹. There were other reported obstacles such as having no partner as reported in the USA ($P = 0.84$)²⁶.

Physical Activity Barriers According to the Activities Practiced: The barriers to PA during the pandemic were reported from nine included countries. The barriers were for different types of activities (Table III). Regular activities were reported as being inhibited in Ireland²⁸, Canada²⁴, Brazil²⁷, and Belgium²¹; walking and other outdoor

activities were inhibited in Saudi Arabia²⁹, the UK^{22,25}, and Canada^{31,32}; home exercises were inhibited in the USA³³, Saudi Arabia²⁹, and the UK²²; gyms and swimming were limited in the USA²⁶, the UK²⁵, and Canada³¹; spas were restricted in Thailand³⁰.

DISCUSSION

This review synthesised the available evidence on the barriers to PA among adults during the COVID-19 pandemic. Most studies here demonstrated that PA declined due to the pandemic consistent with the results of a systematic review conducted by Stockwell (2021)⁴³. However, these results were contradicted by Kass (2021)²⁵ who found that walking, running, cycling, and outdoor activities increased during the lockdowns. Similarly, Symons (2021)²¹ showed that there was an increase in light and moderate PA during the lockdown in Belgium compared to pre-lockdown. These contradictory results could be explained by the fact that the participants could leave their homes to perform PA under many lockdown rules, and thus engaged in PA during this designated outdoor time.

The findings of this review show the barriers to PA during the pandemic across nine countries. The most common barrier was a lack of equipment or facilities as in Ireland²⁸, the USA²⁶, Saudi Arabia²⁹, Canada³¹, and Brazil²⁷. This barrier may occur because most houses in these countries do not have the physical space required for the equipment, which made it difficult for them to exercise during the pandemic. There was also a lack of public awareness about the need for PA during lockdowns, which may have led to a decrease in PA. Accordingly, it is recommended that future houses be built with the need for PA in mind using a suitable architectural design with open areas for exercise, e.g., gardens or special rooms. Increasing people's awareness of the need for PA is also recommended to encourage people to engage in it.

The second-most reported challenge for PA was a lack of time. This was reported from five countries: the UK²⁵, the USA²⁶, Saudi Arabia²⁹, Belgium²¹, and Canada³¹. These subjects all mentioned that a lack of time was the main barrier to PA during the pandemic. This finding is consistent with the findings of past studies by Farah et al²⁶, which found that a lack of time is a prevalent obstacle in the USA. This might be explained by the increased workload and prolonged working hours that were required while working from home during the lockdown. This could have given people less time for exercise.

The results of this review showed that the third most common barrier to PA during the pandemic was a lack of motivation as reported in Brazil²⁷, Saudi Arabia²⁹, and the USA²⁶. This is not surprising because a lack of motivation has been previously found to be a barrier to physical activity in health practitioners^{35,36} and healthy people^{37,38} before the pandemic. Although the Centres for Disease Control and Prevention reported that inviting a friend to share exercise time was effective in overcoming this obstacle, social distancing during the pandemic made this option impossible.

A lack of social distancing was also a barrier to PA in Ireland as reported by Barret et al²⁸ who mentioned restrictions and social distancing as the main barriers to PA. One of the three studies from Canada indicated that a lack of physical distancing and the resulting crowdedness decreased PA during the pandemic due to the fear of catching COVID-19²⁴. This review highlights that the fear of being infected with COVID-19 was also reported in studies in Belgium²¹, Ireland²⁸, and the UK²². Furthermore, having no partner was cited as a barrier to PA in the USA²⁶. Therefore, online gym classes and/or virtual exercising with friends could be an effective strategy to further facilitate PA.

This systematic review also examined the barriers to PA during the pandemic according to the activity. Different countries reported barriers to different types of activities (see section 'Physical activity barriers according to the activities practiced'), which included regular exercises and exercise both indoors and outside. In general, in order to overcome these barriers, decision-makers should consider the negative impact of low PA and its complications³⁹. Future research should therefore concentrate on enhancing the level of PA to reduce the effect of lockdowns during a pandemic.

To the best of our knowledge, this systematic review is the first to investigate the barriers to PA during the COVID-19 pandemic in adults, but some limitations should be considered. First, only 12 studies were included in this review, which could impair its overall quality. However, we excluded studies that focused on children, adolescents, the elderly, as well as studies conducted on specific groups such as pregnant women, obese people, or individuals with pathological conditions. Further research addressing these particular populations is needed. Second, although none of the studies were conducted in Africa, East Asia, or Australia, most of the world's regions were represented in this review. Research in the countries not yet covered should also be conducted. Finally, only research papers published in English were included in this review due to the lack of resources available for translation: This may have affected the generalizability of the results. In general, future studies addressing these limitations will be valuable.

CONCLUSION

This review showed that the level of PA among adults declined significantly during the COVID-19 pandemic. The main reported barriers to PA during the pandemics included a lack of equipment or facilities, lack of time, lack of motivation, lack of social distancing regulations, fear of being infected with COVID-19, or not having a partner. Future studies should aim to overcome these barriers and to harness the factors that can facilitate the recommended level of PA among adults during a health crisis.

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Competing Interest: None.

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