


# Changes to Physical Activity Levels in Adults Aged 50+ in the First Six Months of the COVID-19 Pandemic

Gerontology & Geriatric Medicine  
Volume 8: 1–9  
© The Author(s) 2022  
Article reuse guidelines:  
[sagepub.com/journals-permissions](https://sagepub.com/journals-permissions)  
DOI: 10.1177/23337214221106848  
[journals.sagepub.com/home/ggm](https://journals.sagepub.com/home/ggm)  


Maya Baughn<sup>1</sup> , Amanda Grimes, PhD<sup>1</sup> , and Carol Kachadoorian, MPA<sup>2</sup> 

## Abstract

The purpose of this study is to qualitatively explore the impact of the COVID-19 pandemic on older adults' PA nearly 6 months into the pandemic. Approximately 230 interviews were conducted with a diverse sample of participants (22.1% Black and 10.8% Hispanic). Data were transcribed in fall 2020 and analyzed using NVivo 12. Overall, most older adults (54.6%) interviewed reported no change in their PA, often reporting that their work kept them active. Decreases in PA for older adults (42.7%) were attributed to little social connectedness and stay-at-home restrictions. The few reporting an increase in PA (2.6%) had more time available to be active, including setting goals while staying home. This data provides an insight on how COVID-19 impacted PA levels for older adults. These findings can inform tailored interventions to promote PA during the pandemic.

## Keywords

safety measures, physical health, social connectedness, interview

## Introduction

### COVID-19

Coronavirus disease 19 (COVID-19) is a respiratory infection from the SARS-CoV-2 pathogen (Shereen et al., 2020). In the early spring of 2020, the spread of the virus reached a worldwide level, evoking Pandemic status by the World Health Organization (WHO Director-General's Opening Remarks at the Media Briefing on COVID-19 — 11 March 2020, 2020). At the time of study data collection, many state and local orders required social distancing of six feet, masks to be worn at all times in public indoor spaces, and other protections as recommended by the Centers for Disease Control and Prevention (CDC) (Centers for Disease Control and Prevention, 2021). Many older adults are at an increased risk of more severe infection and death from COVID-19 (Mueller et al., 2020). Many experience limited access to care for all health conditions and considerable social and economic hardships (Williams II et al., 2021). Social isolation is of particular concern for older adults, partly because of lower technology adoption rates (Kotwal et al., 2021), although the rate of spending on technology, learning, and its use increased

overall (Kakulla, 2021). These consequences of the pandemic may negatively impact health-promoting behaviors like physical activity (PA).

### Physical Activity

Remaining physically active continues to be important for middle-aged and older adults' health, wellness, and mobility. The Physical Activity Guidelines for Americans recommends 150 minutes of moderate to intense activity per week along with 2 days of muscle-strengthening for adults aged 18–64 years; recommendations are similar for those over the age of 65 with the addition of balance training (U.S. Department of Health and Human Services, 2018). Moreover, maintaining moderate levels of PA can improve immune responses against

<sup>1</sup>University of Missouri-Kansas City, Kansas City, MO, USA

<sup>2</sup>dbiTilde CORE, Inc, Oxford, MD, USA

### Corresponding Author:

Maya Baughn, School of Nursing and Health Studies, University of Missouri Kansas City, 2464 Charlotte St, Kansas City, MO 64108, USA.  
Email: [mrb6rp@umsystem.edu](mailto:mrb6rp@umsystem.edu)



viral infections (Son et al., 2021) and positively improve overall physical health (U.S. Department of Health and Human Services, 2018). However, more than half of adults over 50 do not meet the PA guidelines (National Center for Health Statistics, 2021).

In addition to physical health, PA also impacts mental health for people of all ages. For example, formal PA from structured exercise can help improve psychological well-being by reducing stress (Whitehead & Blaxton, 2017). Conversely, PA decreases can result in decreased motivation for adults to complete tasks (Faulkner et al., 2021). Initial research findings suggest that declines in PA during the pandemic increase the severity of isolation-related mental illnesses compared to pre-pandemic levels of PA and mental illness prevalence (Amini et al., 2021; Faulkner et al., 2021).

In an effort to reduce the spread of COVID-19, many locations that adults used for PA closed, including fitness and community centers, schools, and churches. Similar efforts by private and public sector employers to limit COVID-19 infection rates may have reduced the opportunity for PA by requiring or encouraging telework, increasing physical barriers, and encouraging physical distance (Viramgami et al., 2020). Evidence suggests that increased isolation due to the COVID-19 pandemic impacted older adults' health including lower PA rates (Browne et al., 2020; Carriedo et al., 2020). Other psychosocial factors may have contributed to a decline in PA during the first 6 months of the COVID-19 pandemic, and it is unclear if decreases in PA from before the pandemic continued after March of 2020.

### Literature Gap

Previous studies have examined the initial impact of COVID-19 quarantine and stay-at-home orders on older adults' PA. However, these studies tended to focus specifically on how fitness facilities closures affected active adults (Kaur et al., 2020), including the transition to online programming for some group fitness settings, (Jennings, et al., 2020) and did not adequately explore other factors contributing to PA changes during the COVID-19 pandemic. One study examining the relationship between COVID-19, PA, and depression noted significant decreases in PA (Lage, et al., 2021). Further, these studies focused on the immediate impacts of COVID-19 precaution measures on PA with the majority having limited sample sizes. For example, one study conducted in France interviewed only 14 professional trainers and older adults (Goethals et al., 2020). The limited studies conducted in the US looked at the change in activity levels for middle-aged and older adults do not provide meaningful information about COVID-19 and PA for these adults.

### Purpose

This study examines the impacts of COVID-19 on older adults' PA and the factors that influenced PA maintenance or

changes. Findings from this study will help inform future health policy and interventions to recover from and better prepare for a future pandemic.

## Methods

### Recruitment and Study Design

Trained researchers recruited a purposive sample of older adults 50+ ( $n = 231$ ) to participate in a semi-structured interview study. Each researcher was required to recruit one older adult from the age groups 50–59, 60–69, 70–79, 80–89, and  $\geq 90$ . If a researcher could not identify a participant  $\geq 90$ , they repeated another age group. Interviews took place in fall 2020, about 6 months following the declaration of the COVID-19 pandemic, when initial measures to curb the spread of the disease were commonplace. Each participant gave informed consent, and all study procedures were approved by the University of Missouri-Kansas City institutional review board.

The authors developed a semi-structured interview guide with open-ended questions accessing the impacts of the COVID-19 pandemic on PA. Demographic questions for race, age category, income, and marital status were closed-response questions. The open-ended question, "Are you remaining as active as you were before COVID-19? If so, how? If you are less active, say why," allowed participants to detail changes in PA due to COVID-19.

### Data Collection and Analysis

Trained researchers interviewed participants during October 2020 in person, by telephone, or virtually through video conferencing and recorded responses to interview questions. Interviews were transcribed by the researcher into Qualtrics (Qualtrics, Provo, UT) in preparation for analysis. After all interviews were completed, the full sample of responses were analyzed using the qualitative software NVivo (version 12) to identify themes related to changes in PA levels (maintenance, increase, or decrease). One author then coded subthemes, identifying prominent reasons for the changes or maintenance of PA.

## Results

Table 1 reports sample demographics. The sample was majority female (58.5%), reported to be married or having a domestic partner (56.8%), and White (56.8%), followed by Black/African American (22.5%) and Hispanic/Latinx (11%). The most commonly reported income was \$50,000 to \$74,999 annually (23.2%), closely followed by a reported income of less than \$25,000 (20.8%). Age groups were relatively evenly distributed, with the most frequently reported age group being 50–59 years old.

**Table 1.** Socio-demographics.

Characteristic	N (%)	Characteristic	N (%)
<b>Age</b>		<b>Gender</b>	
50–59	66 (28.9)	Male	93 (41.5)
60–69	56 (24.6)	Female	131 (58.5)
70–79	59 (25.9)	<b>Marital status</b>	
80–85+	47 (20.6)	Married/Domestic partner	134 (58.8)
<b>Income</b>		Widowed	49 (21.5)
Less than \$25,000	43 (20.8)	Divorced	20 (8.8)
\$25,000 to \$34,999	17 (8.2)	Other	25 (11.0)
\$35,000 to \$49,999	35 (16.9)	<b>Race</b>	
\$50,000 to \$74,999	48 (23.2)	Hispanic/Latinx	25 (11.0)
\$75,000 to \$99,999	24 (11.6)	Black/African american	51 (22.5)
\$100,000 to \$124,999	20 (9.7)	White	129 (56.8)
\$125,000 or more	20 (9.7)	Other	22 (9.7)

### Changes in PA

After responding to an open-ended question about PA changes since the start of the COVID-19 pandemic in early 2020, participants reported one of three conditions: an increase in PA, a decrease in PA, or no change in PA. Approximately 54.6% of participants reported no change in PA levels, 42.7% reported decreases, and 2.6% reported increases. Breakdowns by each of the three conditions for socio-demographic information are displayed in [Table 2](#).

### No Change in PA Levels

Participants reporting no change in PA levels included those who were physically active and those who were not. Reasons for no change in PA ([Table 3](#)) were an already physically inactive lifestyle prior to the COVID-19 pandemic; continued employment or other meaningful work during the pandemic such as increased completion of chores (i.e., yard work, cooking, cleaning), or being a caregiver; and being able to adapt PA and lifestyle to fit CDC recommendations to spend time outdoors, walking, or doing home workouts. Of those who reported no change to their PA, the majority were married (60.7%) over the age of 65 (62.3%) with an annual income of \$50,000 or more (55.6%).

### Decreased PA Levels

For those who reported a decrease in PA ([Table 4](#)), the most significant reasons were inability to exercise at the same level pre-COVID-19 (e.g., diminished physical health, hesitation toward going outside), difficulty to be active during the start of COVID-19 (e.g., lack of motivation, social isolation), and fewer opportunities to be active due to closed facilities that accommodate PA or being unable to follow CDC recommendations for social distancing. Socio-demographics for those who reported a decrease in PA include the majority

married (55.2%), over the age of 65 (61.5%), and with an annual income of \$49,999 or less (52.5%).

### Increased PA Levels

Those who increased their PA ([Table 5](#)) during the COVID-19 pandemic did so by coping positively with changes to day-to-day structure. Socio-demographics for those who increased include majority married (83.3%) and having an annual income over \$100,000 (50.0%). All ( $n = 6$ ) of those who increased identified as middle-aged adults aged 50–64 (100%).

## Results Summary

[Figure 1](#) depicts the relationships between commonly used keywords and significant themes. Isolation was the most commonly referenced word (>40) and was commonly associated with decreased or the same PA levels. Alternatively, walking and spending time outdoors was commonly cited for older adults who increased or had the same PA levels.

## Discussion

In this study, researchers sought to understand the impact of the COVID-19 pandemic on PA levels in adults aged 50 and older by identifying factors that affected PA levels 6 months into the pandemic. Overall, the majority interviewed maintained their pre-pandemic levels of PA at 6-months into the pandemic, with about 43% unable to maintain PA levels. A small percentage increased PA levels.

### Maintained PA Levels

The distribution of age for individuals who reported no change to activity levels was relatively consistent across age groups with the majority being aged 65 years or older with

**Table 2.** Changes in PA by Socio-demographics.

Characteristic	Decrease N (%)	No Change N (%)	Increase N (%)
<b>Age</b>			
50–64	37 (38.5)	46 (37.7)	6 (100)
65–85+	59 (61.5)	76 (62.3)	0 (0)
<b>Gender</b>			
Male	41 (42.7)	48 (40.7)	2 (33.3)
Female	55 (57.3)	70 (59.3)	4 (66.7)
<b>Income</b>			
Less than \$25,000	19 (23.2)	23 (20.0)	0 (0)
\$25,000 to \$34,999	6 (7.3)	11 (9.6)	0 (0)
\$35,000 to \$49,999	18 (22.0)	17 (14.8)	0 (0)
\$50,000 to \$74,999	17 (20.7)	29 (25.2)	1 (16.7)
\$75,000 to \$99,999	9 (11.0)	13 (11.3)	2 (33.3)
\$100,000 to \$124,999	7 (8.5)	10 (8.7)	3 (50.0)
\$125,000 or more	6 (7.3)	12 (10.4)	0 (0)
<b>Marital status</b>			
Married/Domestic partner	53 (55.2)	74 (60.7)	5 (83.3)
Widowed	21 (21.9)	25 (20.5)	1 (16.7)
Divorced	10 (10.4)	10 (8.2)	0 (0)
Other	12 (12.5)	13 (10.7)	0 (0)
<b>Race</b>			
Hispanic/Latinx	10 (10.4)	13 (10.7)	0 (0)
Black/African American	27 (28.1)	21 (17.4)	1 (16.7)
White	48 (50.0)	74 (61.2)	5 (83.3)
Other	11 (11.5)	13 (10.7)	0 (0)

**Table 3.** Subthemes and Select Quotes for Those who Maintained PA during COVID-19.

Central Theme: No Change in PA Levels (N=124, 54.6%)	
Subtheme	Select Quotes
Physically inactive lifestyle prior to COVID-19	<p>“I was not extremely active before COVID, so [my] daily routine has stayed the same.”</p> <p>-White female, 65-69 years</p> <p>“I don’t feel my activity level has changed much seeing as I stayed in the house regularly already.”</p> <p>-White female, 80-84 years</p>
Impact of persistent employment during the pandemic	<p>“yes, [there are] still lots of work demands.”</p> <p>-Hispanic/Latinx male, 50-54 years</p> <p>“I am the same as I have been before coronavirus. I worked before the pandemic, during the pandemic and still am working. I am very blessed because there is a lot of us that do not have jobs anymore.”</p> <p>-Black/African American male, 65-69 years</p> <p>“I am just as active since I’m still working. I am walking a little less lately because of it being cold. However, COVID-19 hasn’t stopped me from being active in any way.”</p> <p>-White female, 65-69 years</p> <p>“yes, [I am] still able to work and take walks.”</p> <p>-White male, 70-74 years</p>

(continued)

**Table 3.** (continued)

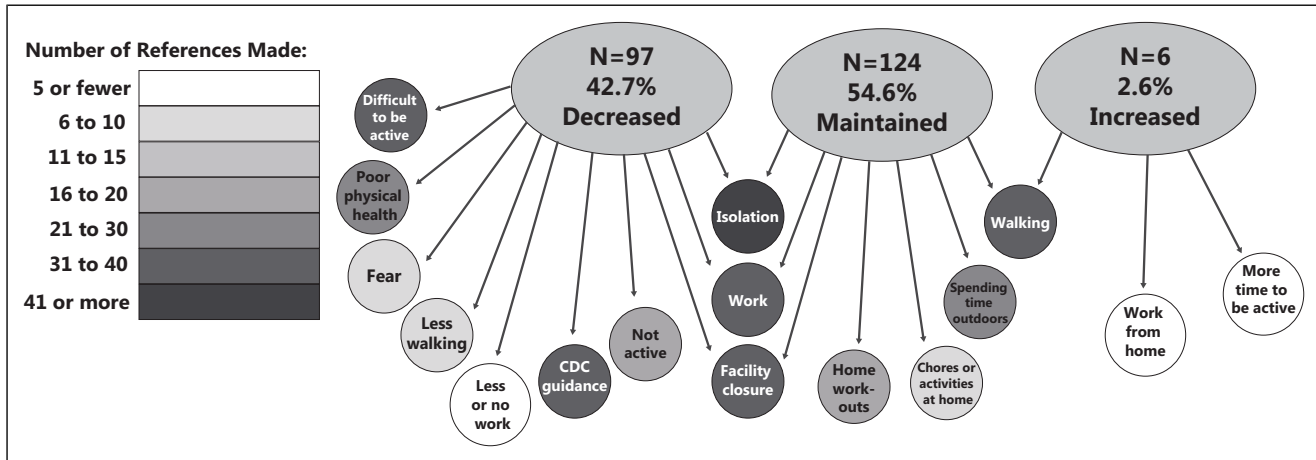
Ability to adapt PA and lifestyle (or already pursuing a lifestyle) to fit CDC recommendations	<p>“Yes, COVID-19 did not impact my activities because I still walk my dog regularly at the park.” -Asian female, 55-59 years</p>
	<p>“Yes, the activities I do to remain active don’t involve large groups of people. I’m not in danger of being exposed to COVID.” -Hispanic/Latinx female, 55-59 years</p>
	<p>“Yes because I still walk on my lunch breaks and on the treadmill at home.” -White female, 60-64 years</p>
	<p>“Yes I am. I do not go out as much because of coronavirus but I do my activities in my home. I do yard work, chores, and call my friends. I have life alert so I do not worry as much. The neighbors are constantly checking up on me which is very nice.” -White male, 70-74 years</p>
	<p>“Yes, due to COVID I feel a lot more hesitant with my walking in the public. I still do it quite consistently but it makes me wary.” -White male, 70-74 years</p>
	<p>“Yes, nothing has changed for me. I just wear a mask now.” -Black/African American female, 75-79 years</p>

**Table 4.** Subthemes and Select Quotes for Those who Decreased PA during COVID-19.

Central Theme: Increased PA (N = 6, 2.6%)	
Subthemes	Select Quotes
Ability to cope positively with changes to day-to-day structure	<p>“I would say I am more active during COVID because I have more time to exercise and walk around.” -White female, 55-59 years</p> <p>“I am probably more active than I was before COVID-19. I work a lot more now, and both of my jobs are physically demanding depending on the day. I feel like I get a good workout in at the end of every day because of all the running around I do.” -White male, 50-54 years</p> <p>“Yes, been more active to work in the house and work out more.” -Black/African American female, 55-59 years</p>

**Table 5.** Subthemes and Select Quotes for Those who Increased PA during COVID-19.

Central Theme: Increased PA (N = 6, 2.6%)	
Subthemes	Select Quotes
Ability to cope positively with changes to day-to-day structure	<p>“I am probably more active than I was before COVID-19. I work a lot more now, and both of my jobs are physically demanding depending on the day. I feel like I get a good workout in at the end of every day because of all the running around I do.” -White male, 50–54 years</p> <p>“I would say I am more active during COVID because I have more time to exercise and walk around.” -White female, 55–59 years</p> <p>“Yes, been more active to work in the house and work out more.” -Black/African American female, 55–59 years</p>



**Figure 1.** Word map highlighting critical terms for each central theme.

higher incomes. Primary reasons cited for maintained PA align with previous research demonstrating that lifestyle activities are a sustainable form of PA for older adults (DiPietro, 2001). Many older adults with already low PA levels did not attempt to increase their PA; i.e., their activity levels were already low before the start of the COVID-19 pandemic. This finding is consistent with previous research that has found that approximately 28% of adults 50 years and older are inactive (Watson et al., 2016), and approximately 55% of older adults 65 and over do not meet the PA guidelines (National Center for Health Statistics, 2021).

Others remained active by spending more time outside, usually by walking, and shifting their PA to their home, while others maintained PA due to continued employment. Despite the potential for increased risk of contracting COVID-19 in the workplace, continuing to work may have been a protective factor in maintaining PA levels throughout the pandemic. Previous research has found that people in low-level occupations, many of which were deemed essential during the pandemic, were less sedentary and stood and stepped more than those in other occupations and those unemployed (Pulakka et al., 2018). However, it is unclear if older adults primarily continued to work on-site or transitioned to working from home by taking advantage of technology (Giménez-Nadal et al., 2020). Regardless, it is well established that working older adults experience better mental and physical health outcomes due to the sociability benefits of technology (Kachan et al., 2015). Based on these findings, more research is needed to understand how access to PA opportunities, as well as continued employment for older adults, can affect PA levels.

### Decreased PA Levels

Conversely, older adults who stopped working or worked less had lower PA levels. These findings are similar to those from a study of older adults that measured notable decreases in pandemic PA levels compared to levels before the pandemic

(Browne et al., 2020; Larson et al., 2021). Consistent with previous research on determinants of PA those who reported decreases, the majority were 65 years or older with lower income (D'Amore, et al., 2021). The present study gives further insight into factors contributing to decreased PA; older adults cited an inability to or difficulty with exercise as a primary reason for a decrease in PA from pre-pandemic levels. More specifically, older adults reported heeding recommendations related to curbing the spread of disease, which limited the number of places they could exercise. For example, to limit exposure to COVID-19, many stopped walking around stores, shopping, and going out to places to be active. Alternatively, other older adults cited difficulty in wearing a mask while exercising. One recommendation to address this barrier is to specify "older adults only" hours or to develop programming or virtual simulation for everyday errands and activities.

Isolation also caused decreases in PA during the pandemic. Older adults found that isolation lowered their motivation to exercise and their ability to find ways to maintain PA levels, especially when gyms, community centers, recreation rooms, etc., closed and providers canceled group fitness classes or group activities. Previous research shows that older adults prefer PA in a group setting (Beauchamp et al., 2007), which motivates increased PA frequency and intensity (Lindsay-Smith et al., 2019) and provides benefits from the social support (Maula et al., 2019). Further, engaging in group-setting PA provides an opportunity for socialization and using social relationships to continue completing PA (Maula et al., 2019; Zimmer et al., 2022). Simply put, without the environment and social structure to support PA, some older adults just stop or reduce PA.

### Increased PA Levels

A small proportion of the sample noted an increase in their PA compared to pre-pandemic levels, consistent with other pandemic-related PA research. For example, in a systematic review, very few studies found any significant increases in PA during the pandemic (Stockwell et al., 2021). Those who

increased PA, were higher income and in the age group 50–59 years, aligning with previous research that indicates adults and older adults with higher incomes have higher levels of PA and that PA tends to decrease with age (PLOW, et al., 2011; D'Amore, et al., 2021). While the proportion of those who increased PA during the pandemic is small, the emerging themes may be essential to inform and support increases in PA for other older adults. For example, older adults working from home may find a structure to their day that allows for more opportunities and flexibility to be active compared to both their previous routines and to non-working older adults reporting lower PA levels. A limited number of studies found increases in PA during the pandemic often related to household chores or gardening; however, a large review of research on PA during COVID concluded that these activities may not have contributed to an overall increase in PA (Stockwell et al., 2021).

### Limitations and Strengths

This study is limited by its purposive sampling methodology, creating a convenience sample that may have unforeseen biases. However, the method used resulted in a representative age-based sample for participating older adults. Additionally, the study is limited by using approximately 50 researchers to collect data, which may have introduced inconsistencies or biases. However, the diversity of researchers led to more diversity in the sample, which is racially and economically diverse. Lastly, the sample may not be generalizable nationwide, as most participants were from one Midwestern metropolitan area in the US.

### Conclusion

Major events such as a pandemic alter the rhythm of a person's life, disrupting habits that contribute positively or negatively to their health and well-being. The COVID-19 pandemic affected PA levels for people of all ages, including middle-aged and older adults. This study is important in that it underscores the risks to health and well-being when older adults do not meet PA recommendations (Carriedo et al., 2020). Findings from the study suggest that education and intervention aimed at maintaining and increasing PA levels amid a pandemic are needed. Education should emphasize how a physically active lifestyle can help establish resilience to illnesses, reduce poor physical health, and mitigate a pandemic's potential mental health toll. Interventions should focus on programming tailored to one's physical activity level (Grimes & Kachadoorian, 2022) and preferences such as virtual group fitness or safe outdoor opportunities that allow older adults to remain physically active and socially connected. These may be especially important as many older adults cited isolation as contributing to not being more active. It may also be essential to target age-specific groupings rather than all older adults, as research has found that older adults

prefer exercise classes with similar-aged peers (Beauchamp et al., 2007). Lastly, interventions should provide meaningful structure in an older adult's day through work or other obligations, which may be a promising strategy to increase PA.

### Acknowledgments

We would like to acknowledge students in the fall 2020 class of Health Issues and Ageing at the University of Missouri-Kansas City.

### Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding


The author(s) received no financial support for the research, authorship, and/or publication of this article.

### Ethical approval

All study procedures were approved by the University of Missouri-Kansas City Institutional Review Board.

### ORCID iDs

Maya Baughn  <https://orcid.org/0000-0002-7498-1687>

Amanda Grimes  <https://orcid.org/0000-0002-0132-1696>

Carol Kachadoorian  <https://orcid.org/0000-0003-3804-6867>

### References

- Amini, H., Habibi, S., Islamoglu, A. H., Isanejad, E., Uz, C., & Daniyari, H. (2021). COVID-19 pandemic-induced physical inactivity: The necessity of updating the Global Action Plan on Physical Activity 2018-2030. *Environmental Health and Preventive Medicine*, 26(1), 32. <https://doi.org/10.1186/s12199-021-00955-z>
- Beauchamp, M. R., Carron, A. V., McCutcheon, S., & Harper, O. (2007). Older adults' preferences for exercising alone versus in groups: Considering contextual congruence. *Annals of Behavioral Medicine*, 33(2), 200–206. <https://doi.org/10.1007/BF02879901>
- Browne, R. A. V., Macêdo, G. A. D., Cabral, L. L. P., Oliveira, G. T. A., Vivas, A., Fontes, E. B., Elsangedy, H. M., & Costa, E. C. (2020). Initial impact of the COVID-19 pandemic on physical activity and sedentary behavior in hypertensive older adults: An accelerometer-based analysis. *Experimental Gerontology*, 142, 111–121. MEDLINE <https://doi.org/10.1016/j.exger.2020.111121>
- Carriedo, A., Cecchini, J. A., Fernandez-Rio, J., & Méndez-Giménez, A. (2020). COVID-19, psychological well-being and physical activity levels in older adults during the nationwide lockdown in Spain. *The American Journal of Geriatric Psychiatry*, 28(11), 1146–1155. APA PsycInfo <https://doi.org/10.1016/j.jagp.2020.08.007>

- Centers for Disease Control and Prevention (2021 November 29). *How to protect yourself & others*. [https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html?CDC\\_AA\\_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fprevent-getting-sick%2Fsocial-distancing.html#stay6ft](https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/prevention.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fprevent-getting-sick%2Fsocial-distancing.html#stay6ft)
- D'Amore, C., Bhatnagar, N., Kirkwood, R., Griffith, L. E., Richardson, J., & Beauchamp, M. (2021). Determinants of physical activity in older adults: An umbrella review protocol. *JBIE Evidence Synthesis*, *19*(10), 2883–2892. <https://doi.org/10.11124/JBIES-20-00292>
- DiPietro, L. (2001). Physical activity in aging: Changes in patterns and their relationship to health and function. *The Journals of Gerontology: Series A: Biological Sciences and Medical Sciences*, *56*(Suppl 2), 13–22. [https://doi.org/10.1093/gerona/56.suppl\\_2.13](https://doi.org/10.1093/gerona/56.suppl_2.13)
- Faulkner, J., O'Brien, W. J., McGrane, B., Wadsworth, D., Batten, J., Askew, C. D., Badenhorst, C., Byrd, E., Coulter, M., Draper, N., Elliot, C., Fryer, S., Hamlin, M. J., Jakeman, J., Mackintosh, K. A., McNarry, M. A., Mitchelmore, A., Murphy, J., Ryan-Stewart, H., & Lambrick, D. (2021). Physical activity, mental health and well-being of adults during initial COVID-19 containment strategies: A multi-country cross-sectional analysis. *Journal of Science and Medicine in Sport*, *24*(4), 320–326. APA PsycInfo <https://doi.org/10.1016/j.jsams.2020.11.016>
- Giménez-Nadal, J. I., Molina, J. A., & Velilla, J. (2020). Work time and well-being for workers at home: Evidence from the American time use survey. *International Journal of Manpower*, *41*(2), 184–206. <https://doi.org/10.1108/ijm-04-2018-0134>
- Goethals, L., Barth, N., Guyot, J., Hupin, D., Celarier, T., & Bongue, B. (2020). Impact of home quarantine on physical activity among older adults living at home during the COVID-19 pandemic: Qualitative Interview Study. *JMIR Aging*, *3*(1), e19007. MEDLINE <https://doi.org/10.2196/19007>
- Grimes, A., & Kachadoorian, C. (2022). Understanding physical activity differences among older adults: Validating a proposed typology of physical activity as a tool to increase physical activity by older adults. *Gerontology and Geriatric Medicine*, *8*, 1–9. <https://doi.org/10.1177/23337214221094187>
- Jennings, S. C., Manning, K. M., Bettger, J. P., Hall, K. M., Megan Pearson, MA, Catalin Mateas, BS, Brandon Briggs, CMS, Krisann Oursler, KMD, Erin Blanchard, MS, Cathy Lee, CMD, Steven Castle, MD, Valencia, W. M., Willy Valencia, MMD, Katzel, L. I., Leslie Katzel, IMD, Jamie Giffuni, MA, Teresa Kopp MBA, P., Michelle McDonald BA, O., Rebekah Harris PT, D., & Morey, M. C. (2020). Rapid transition to telehealth group exercise and functional assessments in response to COVID-19. *Gerontology and Geriatric Medicine*, *6*, 233372142098031. <https://doi.org/10.1177/2333721420980313>
- Kachan, D., Fleming, L. E., Christ, S., Muennig, P., Prado, G., Tannenbaum, S. L., Yang, X., Caban-Martinez, A. J., & Lee, D. J. (2015). Health status of older US workers and non-workers, national health interview survey, 1997–2011. Preventing chronic disease. *Public Health Research, Practice, and Policy*, *12*.
- Kakulla, B. (2021). *2021 tech trends and the 50+ : Top 10 biggest trends*. AARP Research. <https://doi.org/10.26419/res.00420.001>
- Kaur, H., Singh, T., Arya, Y. K., & Mittal, S. (2020). Physical fitness and exercise during the COVID-19 pandemic: A qualitative enquiry. *Frontiers in Psychology*, *11*, 590172. MEDLINE <https://doi.org/10.3389/fpsyg.2020.590172>
- Kotwal, A. A., Holt-Lunstad, J., Newmark, R. L., Cenzer, I., Smith, A. K., Covinsky, K. E., Escueta, D. P., Lee, J. M., & Perissinotto, C. M. (2021). Social isolation and loneliness among San Francisco Bay Area older adults during the COVID-19 shelter-in-place orders. *Journal of the American Geriatrics Society*, *69*(1), 20–29. APA PsycInfo <https://doi.org/10.1111/jgs.16865>
- Lage, A., Carrapatoso, S., Sampaio de Queiroz Neto, E., Gomes, S., Soares-Miranda, L., & Bohn, L. (2021). Associations between depressive symptoms and physical activity intensity in an older adult population during COVID-19 lockdown. *Frontiers in Psychology*, *12*, 644106. <https://doi.org/10.3389/fpsyg.2021.644106>
- Larson, E. A., Bader-Larsen, K. S., & Magkos, F. (2021). The effect of COVID-19-related lockdowns on diet and physical activity in older adults: A systematic review. *Aging & Disease*, *12*(8), 1935–1947. <https://doi.org/10.14336/AD.2021.0606>
- Lindsay-Smith, G., Eime, R., O'Sullivan, G., Harvey, J., & van Uffelen, J. G. Z. (2019). A mixed-methods case study exploring the impact of participation in community activity groups for older adults on physical activity, health and wellbeing. *BMC Geriatrics*, *19*(1), 243. MEDLINE <https://doi.org/10.1186/s12877-019-1245-5>
- Maula, A., LaFond, N., Orton, E., Iliffe, S., Audsley, S., Vedhara, K., & Kendrick, D. (2019). Use it or lose it: A qualitative study of the maintenance of physical activity in older adults. *BMC Geriatrics*, *19*(1), 349. <https://doi.org/10.1186/s12877-019-1366-x>
- Mueller, A. L., McNamara, M. S., & Sinclair, D. A. (2020). Why does COVID-19 disproportionately affect older people? *Aging*, *12*(10), 9959–9981. MEDLINE <https://doi.org/10.18632/aging.103344>
- National Center for Health Statistics. (2021, March 2). *Health, United States, 2019: Table 25*. <https://www.cdc.gov/nchs/healthcontents2019.htm>
- Plow, M. A., Allen, S. M., & Resnik, L. (2011). Correlates of physical activity among low-income older adults. *Journal of Applied Gerontology*, *30*(5), 629–642. <https://doi.org/10.1177/0733464810375685>
- Pulakka, A., Stenholm, S., Bosma, H., Schaper, N. C., Savelberg, H. H. C. M., Stehouwer, C. D. A., van der Kallen, C. J. H., Dagnelie, P. C., Sep, S. J. S., & Koster, A. (2018). Association between employment status and objectively measured physical activity and sedentary behavior—the Maastricht study. *Journal of Occupational and Environmental Medicine*, *60*(4), 309–315.



- APA PsycInfo <https://doi.org/10.1097/JOM.0000000000001254>
- Shereen, M. A., Khan, S., Kazmi, A., Bashir, N., & Siddique, R. (2020). COVID-19 infection: Emergence, transmission, and characteristics of human coronaviruses. *Journal of Advanced Research*, 24, 91-98. <https://doi.org/10.1016/j.jare.2020.03.005>
- Son, J. S., Nimrod, G., West, S. T., Janke, M. C., Liechty, T., & Naar, J. J. (2021). Promoting older adults' physical activity and social well-being during COVID-19. *Leisure Sciences*, 43(1-2), 287-294. <https://doi.org/10.1080/01490400.2020.1774015>
- Stockwell, S., Trott, M., Tully, M., Shin, J., Barnett, Y., Butler, L., McDermott, D., Schuch, F., & Smith, L. (2021). Changes in physical activity and sedentary behaviours from before to during the COVID-19 pandemic lockdown: A systematic review. *BMJ Open Sport & Exercise Medicine*, 7(1), e000960. MEDLINE <https://doi.org/10.1136/bmjsem-2020-000960>
- U.S. Department of Health and Human Services (2018). *Physical activity guidelines for Americans* (2nd ed.).
- Viramgami, A., Pagdhune, A., Sarkar, K., & Balachandar, R. (2020). Occupational health and safety practices at workplace during COVID-19 pandemic (8, pp. 1-7). Academic Search Complete. *Journal of Comprehensive Health*
- Watson, K. B., Carlson, S. A., Gunn, J. P., Galuska, D. A., O'Connor, A., Greenlund, K. J., & Fulton, J. E. (2016). Physical inactivity among adults aged 50 Years and older—United States, 2014. *MMWR. Morbidity and Mortality Weekly Report*, 65(36), 954-958. MEDLINE <https://doi.org/10.15585/mmwr.mm6536a3>
- Whitehead, B. R., & Blaxton, J. M. (2017). Daily well-being benefits of physical activity in older adults: Does time or type matter? *The Gerontologist*, 57(6), 1062-1071. APA PsycInfo <https://doi.org/10.1093/geront/gnw250>
- WHO Director-General's opening remarks at the media briefing on COVID-19—11 March 2020 (2020). World Health Organization. <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19—11-march-2020>
- Williams, R. D. II, Shah, A., Doty, M. M., Fields, K., & FitzGerald, M. (2021). *The impact of COVID-19 on older adults: Findings from the 2021 international health policy survey of older adults*. <https://doi.org/10.26099/MQSP-169>
- Zimmer, C., McDonough, M. H., Hewson, J., Toohey, A. M., Din, C., Crocker, P. R. E., & Bennett, E. V. (2022). Social support among older adults in group physical activity programs. *Journal of Applied Sport Psychology*, 1-22. <https://doi.org/10.1080/10413200.2022.2055223>.