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Research Paper

A cross-sectional survey of activities to support mental wellness during the COVID-19 pandemic

Aanchel Gupta^{a,b}, Joseph H. Puyat^{a,b,*}, Harmanpreet Ranote^a, Fidel Vila-Rodriguez^c,
Arminee Kazanjian^b

^a Centre for Health Evaluation and Outcome Sciences, Vancouver, British Columbia, Canada

^b School of Population and Public Health, University of British Columbia, Vancouver, British Columbia, Canada

^c Non-Invasive Neurostimulation Therapies Laboratory, Department of Psychiatry, University of British Columbia, Vancouver, Canada



ARTICLE INFO

Keywords:

Mental health
Activities
Survey
Covid-19
Pandemic
Exercise

ABSTRACT

Background: During the COVID-19 pandemic, public health restrictions such as social distancing, isolation and self-quarantine have been implemented for several months. Because of these restrictions, in-person contact with friends, family, and mental health supports had been limited, potentially impacting mental wellbeing.

Objectives: In this study, we examined the impact of the pandemic on the mental health of adults and investigated the types of activities people engage in to manage and maintain their mental health.

Methods: An online survey was circulated in Canada and had a total of 221 participants from September 24 to December 8, 2020.

Results: The majority of participants were females (73.2%), between the ages of 18 and 34 (51.1%), and employed full-time (56.1%). Individuals who are unemployed and those with an annual income less than \$25,000 had the highest scores in depression, anxiety and psychological distress. Around 19.4% of the sample scored above the cutpoint for depression, which is higher compared to a pre-pandemic population prevalence of 4.7%. Similarly, higher prevalence of anxiety and distress symptoms were observed: 16.3% of the sample had moderate anxiety symptoms compared to a pre-pandemic population prevalence of 11.6%; and 37.7% of the sample had moderate distress symptoms compared to a pre-pandemic population prevalence of 20%.

Conclusions: Our findings suggest that the COVID-19 pandemic has negatively impacted the mental health of many adults and that individuals engage in a wide range of activities that may maintain and promote mental wellness during the pandemic, such as exercising, reading, and listening to music.

1. Introduction

The COVID-19 pandemic and its associated public health restrictions have been in place for several months. Research on the immediate and short-term toll the pandemic has had on the mental health of adults is just beginning to be published, the lasting effects are currently unknown. Current research indicates that the global burden of mental health has worsened, leading to increases in mental health concerns due to disrupted travel plans, social isolation, and media information overload (Galea et al., 2020). Feelings of stress, anxiety, and loneliness are further exacerbated by mass home-confinement directives, which include quarantine and social isolation (Galea et al., 2020; Pfefferbaum and North, 2020). In addition to fear of sickness and death associated with the pandemic, other spheres of life have been impacted, such as the

closing of schools, companies, and public spaces, changes in work routines, and heightened insecurity from economic instability (Ornell et al., 2020).

The mental health consequences of the pandemic have also impacted many different groups, including those who have been in contact with the virus, those that are vulnerable to the virus, and those who are vulnerable to symptoms of mental health decline (Fiorillo and Gorwood, 2020). Young adults, particularly students in university or college, may experience pandemic related distress and anxiety due to the closure of campus, disruption of routines, delay in graduation, and the cessation of jobs and internships (Zhai and Du, 2020). Increased rates of depression, anxiety, post-traumatic stress disorder, and psychological distress have been identified worldwide as a direct result of the pandemic (Xiong et al., 2020). Additionally, symptoms of declining

* Corresponding author at: Centre for Health Evaluation and Outcome Sciences, Room 588- 1008 Burrard St, Vancouver, British Columbia V6Z 1Y6, Canada.

E-mail address: jpuyat@cheos.ubc.ca (J.H. Puyat).

<https://doi.org/10.1016/j.jadr.2021.100167>

Received 15 February 2021; Received in revised form 30 March 2021; Accepted 23 May 2021

Available online 12 June 2021

2666-9153/© 2021 The Author(s).

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mental health have been shown to be higher in population subgroups, including those who identify as LGBTQ2+, those with existing mental illnesses, individuals with disabilities, and Indigenous people (Canadian Mental Health Association, 2021).

In many parts of the world, the increased mental health burden caused by the COVID-19 pandemic was accompanied by severe shortage of mental health services and supports. In particular, in-person services provided by therapists and other mental health specialists as well as contact with various social support systems have been curtailed. This was largely a consequence of the need to control the pandemic, which led many public health agencies to implement various restrictions, such as lockdowns, physical distancing, isolation, and self-quarantine. Alternative and complementary methods for promoting mental well-being are therefore needed, particularly for the general population who are at risk of experiencing distress and various symptoms of mental disorders during pandemics.

Published studies have reported on the efficacy of various types activities that can promote mental wellness and resilience, such as physical activities or exercise, yoga, and relaxation (Puyat et al., 2020; Ransing et al., 2020; Thomas and Barbato, 2020; Zhang et al., 2020). Many of these activities can be performed at home and without the facilitation of a professional. However, there is a dearth of information on the range and types of activities that people generally engage in during a pandemic. Understanding the general population's pattern of activities that promote mental wellness is important and will inform current and future approaches to promoting and protecting the mental health of the population. In this study, we examined the pattern of activities that people engaged in during the Covid-19 pandemic and the self-reported impact of the pandemic on people's mental wellness.

2. Methods

2.1. Sample

The target population of the survey includes any adult living in Canada, with the exclusion of residents in Yukon, Nunavut, and the North West Territories. A total of 221 participants responded by the collection date of December 8, 2020.

2.2. Data collection

The survey instrument included demographic questions (i.e., age, sex, province of residence, etc.), mental health questionnaires, general questions about the impact of the pandemic on mental health, and questions about activities done during the pandemic. Mental health symptoms were assessed using the Patient Health Questionnaire (PHQ-9), the Generalized Anxiety Disorder Scale (GAD-7), and the Kessler Psychological Distress Scale (K10). Participants were also asked about mental health diagnoses in the previous two years, as well as how the pandemic has impacted their mental health. The last two questions of the survey asked participants to check off any leisure activities they engaged in during lockdown or public health restrictions as well as leisure activities they were likely to engage in during the next few months.

The survey was created and distributed using the Qualtrics platform. A website was created which contained a consent form and a link to the online survey. To increase response rates, an email invitation to complete the electronic survey was distributed to several universities and colleges, as well as cultural, community, and mental health organizations across Canada. Emails were sent from September 24, 2020 to November 6, 2020. A link to the website was also posted on social media platforms, including Facebook, Twitter, and LinkedIn. French versions of the consent form and survey were also available and distributed to organizations based in Quebec. Participants were able to enter a raffle to win one of 200 prizes at \$20 each as a form of compensation.

2.3. Statistical analysis

Descriptive statistics for age, sex and gender, ethnicity, employment status, highest level of education attained, and annual household income are reported. Some response to questions pertaining to sex/gender, racial/ethnic identification, education level, and employment status, were combined during analysis due to very low frequency counts. Summary data are provided as mean \pm SD for PHQ-9, GAD-7, and K10 scores. Between group differences in the mean scores for PHQ-9, GAD-7, and K10 scores were tested using unpaired t-tests and simple linear regression analyses for variables that have more than two categories.

3. Results

3.1. Sample characteristics

Table 1 displays the characteristics of the participants. The majority of participants were female (73.2%), between the ages of 18 and 34 (51.1%), and employed full-time (56.1%). Most participants had a minimum of a bachelor's degree at the time of survey completion, and the largest number of people reported an annual household income of \$100,00+ (32.6%). The most frequently reported provinces of residence include Alberta, British Columbia, Ontario, Quebec, and Manitoba. The most frequently reported racial or ethnic groups were white (50.6%), South Asian (22.6%), and Chinese (8.2%). The categories, however, are not mutually exclusive as individuals were able to indicate multiple racial/ethnic categories. Of the total sample, 15.7% reported that they had been diagnosed with a mental health condition in the previous two

Table 1
Characteristics of the Study Sample.

Characteristic	Frequency	Percentage
Age		
18 - 24	56	25.3
25 - 34	57	25.8
35 - 44	30	13.6
45 - 54	33	14.9
55+	43	19.5
Did not say	2	0.9
Sex/Gender		
Male	56	25.5
Female	161	73.2
Other	3	1.4
Racial/ethnic group		
White	123	54.2
Aboriginal	7	3.1
South Asian	55	24.2
East Asian	20	8.8
West Asian	6	2.6
Did not say	3	1.3
Other	13	5.7
Employment Status		
Employed full-time	124	56.1
Employed part-time	18	8.1
Unemployed/Unable to work	12	5.4
Student	50	22.6
Retired	13	5.9
Did not say	4	1.8
Education level		
High School Diploma or less	37	16.9
Bachelor's Degree (e.g. BA, BSc)	82	37.4
Master's Degree (e.g. MA, MSc)	47	21.5
Professional/Doctoral Degree (e.g. PhD, MD, DDS)	41	18.7
Other	12	5.5
Annual household income		
less than \$25,000	22	10.2
\$25,000 - \$50,000	25	11.6
\$50,000 - \$75,000	30	14.0
\$75,000 - \$100,000	40	18.6
\$100,000+	70	32.6
Did not say	28	3.0

years. The most frequently reported diagnoses were depression, anxiety, post-traumatic stress disorder, and attention deficit disorder.

3.2. Psychiatric symptoms and impact of pandemic

The highest mean depression scores are observed in individuals with a high school diploma or less (mean = 8.3). Individuals who are unemployed or not able to work, those that have an annual income less than \$25,000 and those that have an income between \$25,000 and \$50,000 had the highest mean anxiety scores of 8.0, 8.0, and 8.1 respectively. Similar to the anxiety scores, individuals who are unemployed or unable to work had a mean distress score of 25.1, and those than have an annual income of less than \$25,000 had a mean distress score of 24.1. Using the PHQ-9 scale as a measure of depression, 19.4% scored ≥ 10 , which is the cutpoint for moderate depression, and 9.5% scored ≥ 15 , the cutpoint for moderately severe depression. Using the GAD-7 scale as a measure of anxiety, 16.3% scored ≥ 11 , the cutpoint for moderate anxiety, and 7.0% scored ≥ 16 , the cutpoint for severe anxiety. Finally, using the K10 scale as a measure of psychological distress, 37.7% scored ≥ 20 , which indicates high psychological distress, and 10.8% scored ≥ 30 , an indication of severe psychological distress. The two cutpoints used for each scale were used as the first cutpoint had been shown to maximize specificity, while the second cutpoint had been shown to approximate prevalence (Kessler et al., 2003; Spitzer et al., 2006).

Table 2 demonstrates the association between demographic characteristics and mental health symptoms. Older individuals (45+) had significantly lower mental health symptom scores compared to younger individuals (18–24), and males had significantly lower mental health symptom scores compared to females. The table also shows significantly higher mental health symptoms scores for unemployed individuals and students compared to full-time employed individuals. Individuals with higher annual household incomes had significantly lower levels of mental health symptom scores compared to those who have lower income (less than \$25,000).

When asked to describe how the pandemic has impacted their mental health, 58.7% of participants felt that the pandemic has negatively impacted their mental health, 5.8% felt that the pandemic positively impacted their mental health, and 35.5% felt that the pandemic had no impact or very little impact on their mental health. Common themes from those who were negatively impacted included feelings of loneliness and isolation, stress, exacerbation of existing mental illness, and new symptoms of mental illness. Some individuals reported feelings of fear from getting sick or their friends and family getting sick, and some felt guilty about being safe and healthy. Other individuals reported feelings of social anxiety when spending time with people, which they did not experience before the pandemic. Most of the individuals who were positively impacted by the pandemic reported that the pandemic gave them more time for self-reflection and time with their loved ones.

3.3. Self-Reported activities during the pandemic

Fig. 1 displays the reported activities clustered by activity type during the first and second wave of the pandemic. The first wave of the pandemic in Canada happened approximately between mid-March and the end of May 2020, while the second wave started around the beginning of October 2020 and ended around the end of February 2021 (Public Health Agency of Canada, 2021). Use of audiovisual media increased by 12.7 percentage points in the second wave compared to the first wave, while the proportion of those who engaged in physical activity decreased by 3.1 percentage points in the second wave, compared to the first wave. No changes were observed in reflective activities between the two waves. Finally, there was a 15.4% decrease in other activities during the second wave compared to the first wave.

Fig. 2 shows the range of activities people engaged in during the first and second wave of the pandemic. During the first wave of the

Table 2
Mean (SD) PHQ-9, GAD-7, K19 scores.

Characteristic	Mean (SD)		
	PHQ-9	GAD-7	K10
Total	7.0 (5.3)	5.8 (4.9)	19.3 (7.6)
Age			
18 - 24 (reference group)	8.6 (5.8)	7.5 (5.1)	21.6 (8.4)
25 - 34	7.1 (4.9)	5.9 (4.2)	19.3 (8.4)
35 - 44	7.0 (5.0)	*	19.3 (8.4)
45 - 54	6.2 (5.5)*	6.6 (5.7)	19.9 (8.7)
55+	5.1 (4.5)*	4.5 (4.9)	16.3 (5.2)*
Did not say	-	*	11.0 (9.3)
		3.8 (3.9)	18.9 (8.7)
		-	16.3 (5.2)*
			11.0 (9.3)
Gender			
Male	5.5 (4.6)*	4.6 (4.2)	17.8 (7.3)*
Female (reference group)	7.4 (5.4)	*	19.9 (8.7)
Other	9.0 (4.2)	6.2 (5.0)	14.3 (7.7)
		3.3 (3.5)	14.3 (7.7)
			14.3 (7.7)
			14.3 (7.7)
Employment Status			
Employed full-time (reference group)	6.0 (4.7)	5.0 (4.4)	18.0 (6.8)
Employed part-time	8.6 (6.3)*	5.4 (4.7)	20.7 (8.1)
Unemployed/Unable to work	10.0 (6.3)	8.0 (4.1)	25.4 (8.2)*
Student	*	7.7 (5.2)	21.2 (8.4)*
Retired	8.3 (5.6)*	6.5 (4.8)	16.4 (6.6)
Did not say	6.5 (4.8)	*	18.3 (9.2)
	7.7 (7.2)	4.5 (6.0)	16.4 (6.6)
		5.3 (9.2)	18.3 (9.2)
Education level			
High school diploma or less	8.3 (6.2)	7.1 (5.5)	21.3 (8.4)
Bachelor's degree (e.g. BA, BSc) (reference group)	7.5 (5.6)	5.7 (4.8)	19.1 (8.1)
Master's degree (e.g. MA, MSc)	6.3 (4.5)	5.3 (4.3)	19.1 (8.1)
Professional/Doctoral degree (e.g. PhD, MD, DDS)	5.4 (4.5)*	4.6 (4.7)	17.4 (6.9)
Other (please specify)	8.1 (3.9)	7.4 (5.0)	21.6 (7.2)
Annual household income			
less than \$25,000 (reference group)	11.0 (6.9)	8.0 (5.3)	24.1 (8.9)
\$25,000 – \$50,000	8.4 (3.2)*	8.1 (4.8)	22.3 (8.1)
\$50,000 – \$75,000	7.5 (5.9)*	6.2 (5.2)	19.6 (8.1)
\$75,000 – \$100,000	5.9 (4.4)*	4.5 (4.4)	17.8 (7.6)*
\$100,000+	5.8 (4.8)*	*	17.9 (7.6)*
Did not say	6.5 (5.4)*	5.0 (4.4)	18.1 (7.6)*
		*	17.9 (7.6)*
		5.3 (5.0)	18.1 (7.6)*
		*	18.1 (7.6)*

* denotes mean values that are statistically significant from the indicated reference group at $p \leq 0.05$.

pandemic, the top three reported activities were watching television or using streaming services, walking, and using social media. The top three activities that participants reported that they are likely to engage in during the second wave of the pandemic include watching television, walking, and exercising. The frequency of reported activities between the first and second wave of the pandemic remained quite consistent. Gardening, cycling, hiking, and jogging were reported less frequently as activities that individuals may do during the second wave. Mindfulness exercises or activities, meditation, and art were reported more

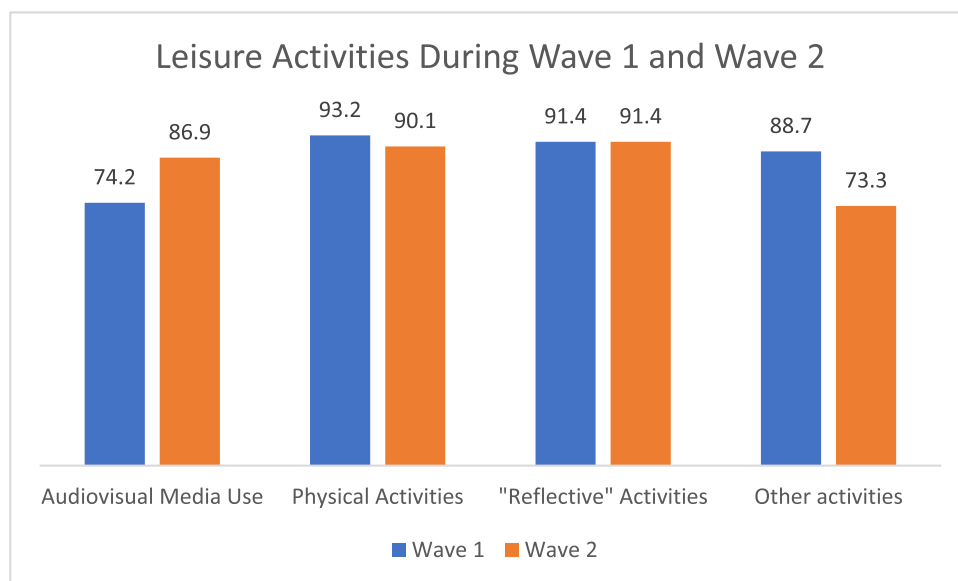


Fig. 1. Clustered self-reported activities during the first and second wave of the Covid-19 pandemic

Wave one values were derived from responses to the question, "Which of the following leisure activities did you engage in during lockdown or public health restrictions?" and wave two values responses were derived from responses to the question, "Which of the following leisure activities are you most likely to do or engage in during the next few months?" .

frequently as activities they are likely to engage in during the second wave compared to activities they did during the first wave.

Other reported activities include camping (1), other home activities (10) such as sewing, puzzles, and board games, other sports (7), such as golf and weightlifting, and connecting with others (5). These activities were similarly reported during both waves of the pandemic. Respondents could also specify the types of religious activities they reported during both waves of the pandemic. Of the 29 respondents that specified the type of religious activity during the first wave, 27.6% reported solitary religious activities such as prayer, 58.6% reported group activities including attending virtual church, and 13.8% reported both solitary and group activities. Of the 21 respondents that specified the type of religious activity they are likely to engage in during the second wave, 14.3% reported they would participate in solitary religious activities, 57.1% reported group activities, and 28.6% reported both.

Table 3 reports the mean depression, anxiety, and psychological distress scores by clustered activities between the first and second wave of the pandemic. In both waves of the pandemic, individuals who engaged in at least one physical activity had significantly lower depression, anxiety, and psychological distress scores compared to those who did not engage in physical activity. During the first wave, those who participated in at least one reflective activity or "other" activity had slightly higher mental health symptom scores compared to those who did not participate, but the mean difference in scores were not statistically significant.

4. Discussion

The objectives of this study were to understand the impact of the pandemic on the mental health of the general population, as well as learn about the types of activities that individuals are engaging in as a way to manage or maintain their mental wellbeing during the COVID-19 pandemic. The survey results indicate that in our sample the pandemic has had a negative impact on the mental health of many individuals, including a high prevalence of depression, anxiety, and distress compared to rates in the general population before the pandemic. From the results of the survey, there are a number of activities individuals are engaging in to promote their mental well-being, and some activities were reported more frequently during the second wave than during the first wave of the pandemic.

Current literature indicates that the 12-month prevalence of major depression disorder in the Canadian population is approximately 4.7%

(Knoll and MacLennan, 2017), while anxiety disorders affect 11.6% of Canadians (Public Health Agency of Canada, 2015). Other literature has found that the prevalence of psychological distress in the general Canadian population is 20% (Caron and Liu, 2010). The overall prevalence of moderate depression, moderate anxiety, and high psychological distress in our sample at the time the survey was taken was found to be 19.4%, 16.35%, and 37.7% respectively. These values indicate that there is a higher prevalence of mental illness in our sample compared to the prevalence of mental illnesses in the general population before the pandemic.

Given that the survey sample consists mostly of individuals with higher socioeconomic status (SES), it is important to note the higher prevalence of symptoms of mental disorders found in this study. Generally, people with higher SES have better access to mental health resources, including mental health services and information that can help address mental health concerns. Despite the presence of a large proportion of people from higher SES, our sample still exhibited a higher degree of depression, anxiety, and psychological distress. This suggests that financial stability does not guarantee mental wellness when lack of social communication and connection persist. At the same time, our results show that symptoms of mental disorders are elevated in people with less education and income. This finding is consistent with studies showing those with lower income experience higher levels of depression and stress due to various factors, including lack of access to basic resources, safety concerns, and poor health behaviors (Meyer et al., 2014). Increased food insecurity and higher rates of unemployment brought about by the Covid-19 pandemic have exacerbated that negative impact of the pandemic on people of lower SES (Mathias et al., 2020; Pieh et al., 2020).

During the first wave of the pandemic, public health restrictions were in place for a period of about three months only. The second wave occurred approximately 7 months into the pandemic, which could have had more dire consequences as individuals have been isolated for a much longer time. Thus, prolonged social isolation and quarantine may have impacted the choice of activities between the first and second wave of the pandemic. Additionally, the change in activities participants reported as things they would do during the second wave could be due to the timing of the second wave in Canada. Activities that are completed predominantly outdoors such as gardening, cycling, hiking, and jogging were less frequently reported during the second wave, which began during the winter season in Canada and many of these activities cannot be done, particularly in colder provinces like Alberta and Ontario. On

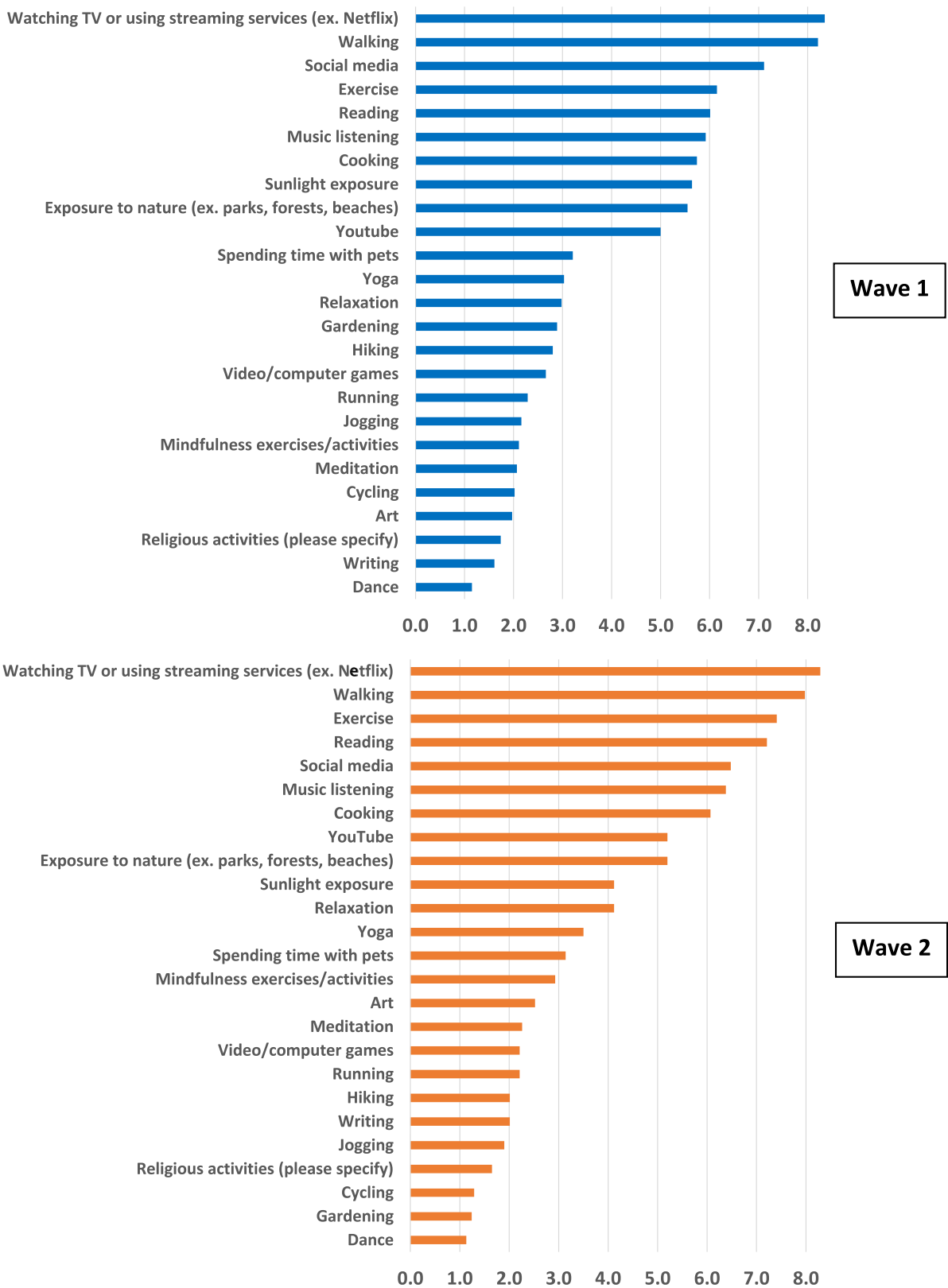


Fig. 2. Self-reported activities during the first and second wave of the Covid-19 pandemic
 Wave one values were derived from responses to the question, “Which of the following leisure activities did you engage in during lockdown or public health restrictions?” and wave two values responses were derived from responses to the question, “Which of the following leisure activities are you most likely to do or engage in during the next few months?”.

Table 3

Mean (SD) PHQ-9, GAD-7, K19 scores for clustered self-reported activities during the first and second wave of the Covid-19 pandemic.

Activity	Mean (SD)		
	PHQ-9	GAD-7	K10
1st Wave			
No audiovisual media use	7.7 (5.5)	6.4 (5.5)	20.3 (8.1)
At least one audiovisual media	6.8 (5.2)	5.5 (4.6)	19.0 (7.4)
Mean difference	0.9	0.9	1.3
No physical activity	12.8 (5.7)	11.0 (5.9)	28.4 (9.8)
At least one physical activity	6.7 (5.1)	5.5 (4.7)	18.8 (7.2)
Mean difference	6.1*	5.5*	9.6*
No reflective activities	6.1 (4.5)	4.9 (4.8)	18.5 (8.0)
At least one reflective activity	7.1 (5.3)	5.8 (4.9)	19.3 (7.6)
Mean difference	-1.0	-0.9	-0.8
No other activities	5.3 (5.6)	4.3 (4.6)	17.1 (7.6)
At least one other activity	7.2 (5.2)	5.9 (4.9)	19.5 (7.6)
Mean difference	-1.9	-1.7	-2.4
2nd Wave			
No audiovisual media use	8.1 (5.3)	7.1 (5.7)	20.0 (8.1)
At least one audiovisual media	6.9 (5.3)	5.6 (4.7)	19.2 (7.5)
Mean difference	1.2	1.5	0.8
No physical activity	12.5 (7.2)	10.1 (6.0)	28.0 (9.6)
At least one physical activity	6.6 (4.9)	5.4 (4.6)	18.6 (7.0)
Mean difference	5.9*	4.6*	9.4*
No reflective activities	6.4 (5.8)	7.3 (6.6)	19.7 (10.3)
At least one reflective activity	7.0 (5.2)	5.6 (4.7)	19.2 (7.4)
Mean difference	-0.6	1.6	0.5
No other activities	7.5 (5.5)	6.3 (5.3)	19.7 (7.9)
At least one other activity	6.8 (5.2)	5.6 (4.7)	19.1 (7.5)
Mean difference	0.6	0.7	0.6

* denotes mean differences that are statistically significant (p-value <0.05).

Wave one values were derived from responses to the question, "Which of the following leisure activities did you engage in during lockdown or public health restrictions?" and wave two values were derived from responses to the question, "Which of the following leisure activities are you most likely to do or engage in during the next few months?"

the other hand, the decrease in the use of social media could be due to social media burnout, a phenomenon likely exacerbated by the pandemic (Shiozawa and Uchida, 2020).

Current research points to the potential impact of various types of activities on mental health during the pandemic. A number of studies examine the efficacy of exercise as an intervention to improve mental illnesses, such as depression and anxiety; physical activity has been shown to be a protective factor against developing depression and anxiety (Zulyniak et al., 2020; Cusimano and Vandenberg, 2020; Ozdemir et al., 2020). Additionally, the type of physical activity may differentiate the relationship between exercise and mental health outcomes, and some research indicates that physical activity performed during leisure time is positively associated with mental health (White et al., 2017). Activities such as yoga, dance, swimming, Zumba, and exergames have been shown to improve anxiety, mood, and social and emotional wellbeing (Chtourou et al., 2020), while variation in physical activity has been shown to be positively correlated with mental wellbeing during the pandemic (Maugeri et al., 2020). Home-based alternative methods for engaging in movement are even more important during the pandemic, as they provide a safe alternative to public gyms and in-person group fitness classes. Some research related to religious activities during the pandemic suggests that activities such as mantra repetition can be used to manage mental health conditions and build resilience (Oman et al., 2020).

This study has limitations commonly associated with survey studies, including the inability to offer causal inferences. Also, we were able to obtain only 221 respondents in spite of our efforts to recruit a larger sample. The abrupt timeframe of the study as a condition of the study funding, as well as the context of lockdown and fear of illness exacerbating stress and anxiety was further magnified in this study. Thus, approaches to increase response rates were unsuccessful. Additionally,

baseline measurements for the PHQ-9, GAD-7, and K10 scales were not obtained, which limits our conclusions pertaining to the impact of COVID-19 on mental health. Nevertheless, given the prevalence of depression, anxiety, and psychological distress found in this study are more than double the prevalence in the general population before the pandemic, it is likely that this increase is at least partly due to the pandemic.

5. Conclusion

This study adds to the growing evidence on the negative impact of the Covid-19 pandemic on mental health and contributes to knowledge about activities that people engage in during a pandemic. Our findings show that people do engage in a wide-range of activities, such as watching TV, exercising, reading, and listening to music. Many of these activities can help maintain mental wellness during a pandemic and should be promoted along with key messages about staying home.

Contributors

AG contributed to the conceptualization, data collection, analysis, interpretation of results and writing of the manuscript. JHP contributed to the conceptualization, analysis, interpretation of results and writing of the manuscript. HR contributed to the analysis, interpretation of results and drafting of the manuscript. FVR contributed to the conceptualization, interpretation of results and drafting of the manuscript. AK contributed to the conceptualization, interpretation of results and drafting of the manuscript. All authors approved the final version of the manuscript.

Funding

This study was funded by a Canadian Institutes of Health Research (CIHR) Knowledge Synthesis grant awarded to the team led by Dr. Joseph H. Puyat (#202005CMS-442772-CMV-CAAA-186414).

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

JHP is supported by a Scholar Award from the British Columbia Michael Smith Foundation for Health Research Scholar Award (MSFHR Grant ID# 18299).

All inferences, opinions, and conclusions drawn in this study are those of the authors, and do not reflect the opinions or policies of CIHR or MSFHR.

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