BMJ Open

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Journal:	*BMJ Open*
Manuscript ID	bmjopen-2020-043805
Article Type:	Original research
Date Submitted by the Author:	17-Aug-2020

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Keywords:	Public health < INFECTIOUS DISEASES, COVID-19, MENTAL HEALTH

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Social, Financial and Psychological Stress during an Emerging Pandemic: Observations from a Population Survey in the acute phase of COVID-19

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Word count: 4489

Abstract

Introduction: The negative impacts of COVID-19 have rippled through every facet of society. Understanding the multifaceted impacts of this pandemic is crucial to identify the most critical needs and to inform targeted interventions. This population survey study aimed to investigate the acute phase of the COVID-19 outbreak in terms of perceived threats and concerns, occupational and financial impacts, social impacts and stress between April 3 and May 15, 2020. **Methods:** 6,040 participants are included in this report. A multivariate linear regression model was used to identify factors associated with stress changes (as measured by the Cohen's Perceived Stress Scale (PSS)) relative to pre-outbreak retrospective estimates. **Results:** On average, PSS scores increased from low stress levels before the outbreak to moderate stress levels during the outbreak ($p<0.001$). The independent factors associated with stress worsening were: having a mental disorder, female sex, having underage children, heavier alcohol consumption, working with the general public, shorter sleep duration, younger age, less time elapsed since the start of the outbreak, lower stress before the outbreak, worse symptoms that could be linked to COVID-19, lower coping skills, worse obsessive-compulsive symptoms related to germs and contamination, personalities loading on extraversion, conscientiousness and neuroticism, left wing political views, worse family relationships, and spending less time exercising and doing artistic activities. **Conclusion:** Cross-sectional analyses showed a significant increase from average low to moderate stress during the COVID-19 outbreak. Identified modifiable factors associated with increased stress may be informative for intervention development.

Keywords: COVID-19; Socioeconomic factors; Stress

Strengths and limitations of this study

1. Comprehensive picture of the psychological, financial and social impacts of the COVID-19 pandemic
2. Large population-based study with a lifespan perspective
3. Comparison of outbreak measures to pre-outbreak estimates allows for a better understanding of the extent to which COVID-19 disrupted people's daily lives, but may be sensitive to recall bias
4. Identification of modifiable factors associated with the psychological response to the pandemic

INTRODUCTION

An outbreak of Coronavirus Disease (COVID-19), a cluster of acute febrile respiratory illness, was first reported in Wuhan, China, in December 2019 (1). The World Health Organization declared a pandemic on March 11, 2020, after infections were reported in 110 countries and territories. As of June 4 2020, COVID-19 had spread to 216 countries and territories, infected 6,416,828 individuals, and caused 382,867 deaths worldwide (2). This pandemic has created profound economic and social disruption, with the potential for widespread psychological impacts. Given the lack of specific treatments for the prevention and management of the COVID-19 infection and the rapid acceleration of the virus transmission, the negative impacts of COVID-19 are rippling through every aspect of society (3). Markedly, guidelines and new regulations have been put in place to promote self-isolation in order to limit the spread of the virus. As a result, most inpatient and outpatient health services cut down non-essential services. Several offices and businesses asked their employees to work from home; others reduced work hours or terminated jobs. Schools and universities were closed with some of them offering distance education. Overall, the pandemic situation has changed core aspects of people's lives in a unique and complex manner.

Early COVID-19 studies from China, India, Brazil, Paraguay, and the United States indicated high levels of stress with associated sleep problems, poor life satisfaction, and mental illness (4–8). In the early phases of the COVID-19 pandemic, finding roughly 35% of 50,000 residents in China experiencing psychological distress (7). In San Francisco (US), there was an 8-fold increase (from 7% to 66%) in feeling distressed compared to before the pandemic (9). In Australia, almost 80% of survey respondents reported moderate to extreme levels of uncertainty about the future, half reported feeling lonely, and half reported moderate to extreme worry about their financial situation (10). Some financial stressors, such as employment loss, have also been associated with greater symptoms of depression and COVID-19 related concern (6). However, many of the previous studies did not estimate temporal changes before and during the outbreak, making it difficult to disentangle difficulties emerging in response to the outbreak from pre-existing ones. Also, many focused on isolated aspects of consequences of the COVID-19 outbreak without presenting a comprehensive picture and thus have limited capacity to identify potential factors modulating the range of psychological responses to the outbreak.

The nature and extent of the outbreak consequences are bound to differ considerably from one individual to the other and to be influenced by a range of demographic, occupational, and physical/mental health factors (7,10,11). There is thus a need for comprehensive investigations to identify potential factors modulating

psychological responses to this complex situation. Furthermore, most studies to date adopted a broad, representational sampling of adults, but increased efforts to reach individuals at elevated risk for negative outcomes and a lifespan perspective incorporating younger to older age ranges holds particular benefits in informing both prevention and intervention initiatives.

The current report presents the cohort characteristics and baseline observations from an ongoing longitudinal survey launched during the acute phase of the COVID-19 pandemic. Perceived threats and concerns, occupational, financial and social distancing behaviors, impacts on social life, as well as psychological stress changes relative to retrospective pre-outbreak estimates are reported.

METHODS

Study Design

A comprehensive longitudinal online survey was distributed via websites, social media, and multiple organizations and hospitals across Canada. This recruitment strategy (see supplementary section for details) was used to target three core groups: people with chronic mental or physical illnesses, healthcare providers, and the general population. While subsequent reports will focus on specific subgroups, the current report introduces the full cohort.

The sole inclusion criterion was to be 12 years of age and older. The survey was available in English and French, nested in a secured access online platform (www.qualtrics.com) and designed on a decisional tree structure. It included a set of validated questionnaires and custom-built questions pertaining to the pandemic (see supplementary section).

The survey was designed to address the following primary areas of interest: (1) Symptoms related to COVID-19 and rates of positive tests; (2) Physical and mental health conditions; (3) Access to healthcare services; (4) Social distancing practices; (5) Consequences of the outbreak for family, work-related and financial outcomes; (5) Factors and coping mechanisms that may be protective against adverse health, psychosocial, and financial impacts; (6) Organizational support, work resources and difficulties, degree of moral distress and moral resilience in healthcare staff. The survey also included general demographics and indices for geocoding and socioeconomic status. To enable future comparisons, questions were aligned wherever possible with previous surveys such as those used by Census Canada and recent COVID-19 surveys circulated in China (12,13). The survey included a briefer version for

health care workers and an adapted version for adolescents. At the start of the survey, participants were informed that they had the choice to skip items. Median completion time was 53.1 minutes (Interquartile range: 38.6 minutes).

Themes covered in the current report include: factors linked to the pandemic (e.g., testing, perceived threat and concerns); occupational and financial life; social life, and psychological stress. Retrospective questions were used to estimate temporal changes from "before the outbreak" (i.e. in the last month before the outbreak) to "during the outbreak" (i.e. in the seven days prior to filling out the survey). The survey was developed and conducted following guidelines from the Checklist for Reporting Results of Internet E-Surveys (14). Additional information about the survey and the psychometric properties of validated scales included are outlined in supplemental material.

Electronic informed consent was obtained from each participant. This study was approved by the Clinical Trials Ontario - Qualified Research Ethics Board via the Ottawa Health Science Network (Protocol #2131) and registered at ClinicalTrials.gov (NCT04369690).

Patient and Public Involvement

People from the general public, individuals with mental disorders and healthcare professionals were consulted during the survey development and testing phase. They were asked to provide feedback on the survey content, both in terms of prioritising the most important questions (thereby influencing outcome measures) and the clarity of questions formulation. They were also asked to comment on the survey format, notably in terms of the layout of the questions on the online platform, the general survey length, and carving out of distinct survey sections specifically targeting certain subgroups (thereby influencing the study design). These individuals were not directly involved in active recruitment or the dissemination plan for the study.

Primary outcome: Psychological stress

Respondents retrospectively assessed their stress levels on the Cohen's Perceived Stress Scale (PSS; 15) for the last month before the outbreak (i.e. pre-outbreak) and for the past 7 days (i.e. during the outbreak). PSS scores were analyzed continuously (i.e. scale of 0 to 40, estimated minimal clinically important relative change: 28%; 16), and categorically based on established thresholds: 0 to 13 (low stress), 14 to 26 (moderate stress), and 27 to 40 (high stress) and previously estimated minimal clinically important change corresponding to a 28% relative change (16).

Factors hypothesized *a priori* to be associated with stress changes were: pre-outbreak stress level, time

elapsed since the pandemic declaration by the WHO, age, sex, education level, total family income, employment status, working with the general public, political views, having underage children, having travelled abroad in the past 60 days, index reflective of the number and severity of potential COVID-19 symptoms (i.e. COVID-19 symptoms index), the Dimensional Obsessive-Compulsive Scale (DOCS) contamination subscale, Big5 personality subscales, Brief Resilient Coping Scale (BRCS), having a mental disorder, alcohol and drugs use, having a physical condition at risk for COVID-19, sleep duration, quality of family relationships, and amount of time spent outdoors, interacting with other people, following the news on COVID-19, and engaging in physical and artistic activities.

Analyses

Descriptive statistics were used to characterize survey respondents. To assess changes before and during the outbreak, Chi-squared analyses, paired t-tests/Wilcoxon tests, and McNemar-Bowker tests were used. A repeated measures ANOVA was used to assess the unadjusted cross-sectional temporal evolution of PSS change scores across the study period.

Multivariate linear regression was used to identify factors independently associated with PSS changes scores using the "enter" pairwise approach with the predictors listed above. To improve sample homogeneity, this model was run solely on the subgroup of Canadian respondents. A series of multivariate linear models were also run to assess the relation between changes in stress and each independent variable separately while accounting for pre-outbreak PSS scores. Analyses were done using the Statistical Package for Social Sciences (IBM SPSS Statistics for Windows, Version 23.0. Armonk, USA). Details on data cleaning procedures are provided in the supplementary material.

RESULTS

Survey and sample characteristics

Between April 3rd and May 15th (i.e. 23 to 65 days after the pandemic declaration by the WHO), 6,685 individuals consented to take part in this study and answered the first survey question. All 6,040 respondents who filled out the minimally sufficient portion of the survey (90.4% of those who answered the first question; see details in supplement) were included in the current report. 81.7% (4,933/6,040) respondents completed the entire survey.

Sample characteristics are presented in Table 1. Respondents ranged between 12 and 83 years old. Most respondents were middle-aged, female, Canadian (mostly from Ontario or Quebec), Caucasian, highly educated, lived in an urban residential area, had children, and were employed with a total yearly family income above $40,000. More than 50% reported having a physical illness known to be at risks for adverse COVID-19 outcomes, and about 30% had a diagnosis of a mental disorder.

Table 1. *Characteristics of the survey responders at the time of the survey completion*

	Total n	Missing values % (frequencies)	Mean+SD / % (Frequency)
Time since outbreak start (days)	6040	0.0 (0)	50.9±11.7
General demographics			
Age	6034	0.1 (6)	51.8±17.1
Biological Sex (Females)	6039	<0.1 (1)	70.3% (4248)
Gender / Sex Change	5480	9.3 (560)	
Male			31.6% (1730)
Female			67.1% (3676)
Transexual			0.2% (10)
Gender queer or expansive			0.9% (50)
Other			0.3% (14)
Current Location	6005	0.6 (35)	
Canada			97.3% (5845)
US			1.3% (79)
Others*			0.7% (40)
France			0.4% (26)
Australia			0.2% (15)
Ethnicity	5577	7.7 (463)	
Caucasian			86.6% (4832)
Others			5.6% (311)
Asian			3.4% (191)
First Nation, Metis or Inuk			2.1% (115)
Arab			1.2% (68)
Black			1.1% (60)
Non-Citizen (vs not)	5634	6.7 (406)	6.1% (343)
Political Views (Left-Wing / Right-Wing)	5167	14.5 (873)	44.8% (2313) / 14.6% (754)
Education	5495	0.8 (49)	
University certificate, diploma or degree			63.6% (3497)
College			21.8% (1197)
High school			14.8% (801)
Socioeconomic, occupational and living situation			
Total family income (< $40K/$40k to $100K/>$100K)	5601	7.3 (439)	11.1% (624)/ 40.6% (2272)/ 48.3% (2705)
Employment status	5958	1.4 (82)	
Unemployed/ Retired / Student			12.8% (764)/ 30.6% (1822) / 3.6% (213)
Employed			53.0% (3159)
Having work involves contact with the general public (vs not)	5779	4.3 (261)	14.3% (826)

Dwelling (House / Apartment or Condo)	5417	10.3 (623)	77.4% (4191) / 22.6% (1226)
Living situation (Alone / with another person / with multiple people)	5606	7.2 (434)	20.0% (1123)/ 44.2% (2478)/ 35.8 (2005)
Living area (Rural / Urban)	5565	7.9 (475)	11.8% (665) / 88.2% (4910)
Health and risks factors			
C19 Symptoms index (0-30 scale)	6040	0.0 (0)	2.1±3.6
Presence of Physical condition at risk for COVID-19† (vs not)	5629	6.8 (411)	52.1% (2934)
Sleep duration (hours; Before the outbreak/ During Outbreak)	4998	17.1 (1030)	7.3±1.2 / 7.2±1.5
Travelled abroad in last 60 days (vs not)	5548	8.1 (492)	11.0% (608)
Psychological Domain			
PSS scores (0-40 scale; Before the outbreak/ During Outbreak)	5132	15.0 (98)	12.9±6.8 / 14.9±8.3
DOCS - Contamination (0-20 scale)	4920	18.5 (1120)	6.1±3.7
Big 5 Subscales (2-10 scale)	4881	19.2 (1161)	
Extraversion			6.2±2.1
Agreeableness			7.4±1.7
Conscientiousness			7.8±1.8
Neuroticism			5.6±2.3
Openness to Experiences			6.9+1.9
Brief Resilient Coping Scale (4-20 scale)	4856	19.6 (1184)	14.7±2.9
Mental disorder diagnosis (vs not)	5607	7.2 (433)	29.0% (1626)
Social Domain			
Family Relationship (0-100 scale; Before the outbreak/ During Outbreak)	5328	9.5 (572)	79.5±19.9 / 74.7±25.4
Has underage children (vs not)	5731	5.1 (309)	17.2% (985)
Behavioral Domain			
Number of alcoholic drinks/week (Before the outbreak/ During Outbreak)	5557	7.9 (476)	4.1±6.5 / 4.8±6.9
Number of cannabis use/week (Before the outbreak/ During Outbreak)	5512	8.6 (518)	0.9±5.1 / 1.0±5.1
Spent 30min or less:	5612	7.1 (428)	
Outdoor			39.3% (2203)
Exercising			47.7% (2668)
Following C19 news			44.0% (2457)
Interacting with people in person			50.6% (2767)
Interacting with people virtually			39.5% (2194)
Doing an artistic activity			75.6% (4155)

Means, standard deviations (SD), frequencies and percentages (calculated on each item's total sample) for main sample characteristics Location Others: Armenia (n=1), Azerbaijan (n=1), Burkina (n=3), Congo (n=1), Czech Republic (n=1), Denmark (n=1), Germany (n=3), Ireland (n=1), Italy (n=1), Ivory Coast (n=1), Jamaica (n=1), Lebanon (n=1), Malaysia (n=1), Netherlands (n=3), New Zealand (n=1), Pakistan (n=1), Poland (n=1), Romania (n=2), Singapore (n=3), Spain (n=1), Sweden (n=1), United Kingdom (n=8), Vietnam (n=1), Other (n=1); Gender expansive: fluid/non-binary; Alcohol consumption (number of drinks per week); Cannabis consumption (number of times per week), Living area based on postal code. † Physical condition at risk for COVID-19: e.g. respiratory, cardiovascular or autoimmune conditions.

COVID-19 testing, perceived threats/concerns, and changes relative to before the outbreak

79.3% (4,790/6,040) respondents endorsed at least two symptoms that could be linked to COVID-19. 6.7% (404/6,028) of respondents said they had been tested for COVID-19. Of those, 4.5% (18/404) tested positive and 2.7% (11/404) awaited results. Of those who had not been tested, 4.7% (261/5,580) had contacted public health services to be tested. Within this group, 85.4% (222/260) were declined testing. Rates of declined testing were similar between rural (85.0%, 17/20) and urban areas (86.2%, 193/224; Chi-squared=0.02, p=0.886).

Amongst all respondents, 43.0% (2,505/5,829) estimated that a coronavirus infection would pose high to very high threat to their health and 32.8% (484/5,829) estimated moderate threat. A high to very high threat was estimated by 28.1% (1,589/5,653) for their financial situation, 41.5% (1611/3886) for their jobs or businesses, and 62.8% (3,645/5,802) for their country. Figure 1 shows the degree of concerns related to different secondary effects of the outbreak. Overall, the highest concerns pertained to one's children or relatives not coping well with the situation, closely followed by being unable to access medications or medical services. When asked when they expected the global situation to go back to normal, 37.2% (2158/5797) replied "I have no idea", 27.8% estimated after March 2021, 17.4% (1,011/5,797) by March 2021, 14.9% (861/5,797) by September 2020 and 2.7% (158/5,797) by June 2020. 30.4% (917/3,014) anticipated that their own personal situation would get back to normal before the global situation resolves, and 10.1% (304/3014) anticipated that it would take longer for their personal situation than for the global situation to get back to normal.

On average, when comparing pre-outbreak estimates and current states: sleep duration shortened ($Z=-4.9$, $p<0.001$, $r=0.07$), family relationships deteriorated ($Z=-13.4$, $p<0.001$, $r=0.18$), and weekly alcohol and cannabis consumption increased ($Z=-18.1$, $p<0.001$, $r=0.24$ and $Z=-18.1$, $p<0.001$, $r=0.10$). Specifically, 10.4% (579/5,563) of the sample over 16 years of age increased their weekly alcohol consumption by five drinks or more.

Occupational and Financial Impacts

Of the 356 student respondents (Table 1), 84.3% (300/356) reported that their school closed because of the outbreak. Within actively working respondents, 62.8% (2,028/3,228) were working from home, 9.8% (270/3,228) had increased work hours because of the outbreak, and 15.6% (505/3,228) had decreased work hours. 7.9% (254/3,228) underwent a salary decrease due to the outbreak, with an overall median salary reduction of 35%

(IQR=50). Of all respondents who were working in the month preceding the outbreak, 11.1% (306/2,764) saw their employment terminated because of the outbreak.

Rates of employment termination due to the outbreak or salary loss exceeding 35% were higher in those with a family income below $40k (41.4%, 82/198) compared to those with higher family income (12.6%, 316/2,503, χ^2=121.0, p<0.001), in people without a university degree (23.6%, 206/666) compared to in those with a university degree (11.0%; 211/1,913; χ^2=74.6, p<0.001), and in people with a diagnosis of a mental disorder (16.8%, 137/815) compared to those without (13.5%, 238/1,762; χ^2=4.9, p=0.027). Rates of employment termination/salary decrease were similar in females versus males (χ^2=2.3, p=0.132), Caucasians versus other ethnicities (χ^2=0.9, p=0.335), and people with or without physical illnesses (χ^2=0.1, p=0.719).

Across the entire sample, 64.5% (3,383/5,243) reported that their expenses had decreased since the start of the outbreak and 15.5% (811/5,243) reported an increase, with a mean estimated rise in health-related expenses of 10.4±20.3%, compared to 29.2±38.0% for food-related expenses.

Social Life

Family and other relationships

Half of parents with underage children (54.0%, 435/806) said that they or their partner were homeschooling. Most respondents estimated that the outbreak was being somewhat disruptive for the management of their work/study and family life (mean rating on a scale from "0 -Very disruptive" to "50- Not different from usual" and "100-Easier than Usual": 21.6±45.6).

The proportion of respondents interacting with their family more frequently since the start of the outbreak was significantly higher than the proportion of those who were interacting less frequently (p<0.001). The reverse pattern was found for interactions with friends (p<0.001). 40.0% (2,111/5,273) of respondents reported feeling more connected to their family during compared to before the outbreak, while 21.0% (1,107/5,273) felt less connected. This pattern was reversed for connectedness to friends, with 36.2 (1,885/5,210) reporting feeling less connected and 28.3% (1,474/5,210) feeling more connected. On average, relationships ratings with both family and friends during the outbreak significantly deteriorated compared to pre-outbreak estimates (Z=-10.9, p<0.001 and Z=-28.1, p<0.001).

Social Distancing

65.8% (3,638/5,530) of respondents were following at least one social distancing guideline at the time of filling out the survey, with 51.6% (2,851/5,530) maintaining a 2 meters distance from others, 46.3% (2,562/5,530) avoiding gatherings in person, 42.5% (2,352/5,530) not using public transport, 37.9% (2,097/5,530) not attending public areas, 35.4% (1,958/5,530) not going out of the home unless they had no choice (e.g. to go to a medical appointment), 29.5% (1,632/5,530) wearing a mask when leaving home, and 17.9% (991/5,530) having food/supplies delivered to their homes. A statistically significant proportion of individuals (between 57.7 to 89.0%) disengaged from some of the social distancing practices that they had initially followed since the start of the outbreak (all $p<0.001$).

Scores on the UCLA Loneliness Scale were significantly higher in individuals who were avoiding going out of their home ($Z=-2.2$, $p=0.027$), living alone ($Z=-4.7$, $p<0.001$), younger than 65 years of age ($Z=-6.8$, $p<0.001$), diagnosed with a mental disorder ($Z=-13.7$, $p<0.001$), or unemployed (Chi-squared=70.0, $p<0.001$). There was no significant difference in loneliness based on other social distancing practice, sex or whether one worked from home ($p>0.050$).

Psychological stress

PSS scores globally increased from 12.9±6.8 before the outbreak to 14.9±8.3 during the outbreak ($Z=-22.9$, $p<0.001$, $r=0.31$), which reflects a transition from low to moderate stress. Rates of individuals with PSS score in the high stress range increased from 3.8% (196/5,132) before the outbreak to 10.2% (535/5,261) during the outbreak (Figure 2). However, there was considerable heterogeneity in stress changes: a clinically meaningful increase in stress was noted in 30.3% of respondents, while 10.3% had a clinically meaningful reduction in stress.

Figure 3 depicts the temporal dynamics of stress changes based on the time at which respondents filled out the survey. Over the course of the study period, there was an overall attenuation of stress worsening on PSS change scores ($F(5,5097)=20.07$, $p<0.001$). There was a non-significant reduction in stress worsening between April 3rd and 10th, followed by a plateau which persisted until May 8th, after which there was a significant drop ($p\leq0.006$), compared to all preceding time periods.

In the multivariable linear regression model, the following variables were found to be significant independent factors linked to stress worsening (Table 2, right panel): shorter time elapsed since the start of the

outbreak, younger age, female sex, having left wing political views, work involving in-person contact with the general public, having underage children, worse COVID-19 symptoms index, shorter sleep duration, lower PSS scores before the outbreak, higher scores on the DOCS - Contamination subscale and on the extraversion, conscientiousness and neuroticism scales of the Big5, lower BRCS scores, having a mental disorder diagnosis, having had more than five alcoholic drinks in the past week, worse family relationships, and spending less time exercising and doing artistic activities.

When assessed on their own, the following factors were found to be predictive of worse increases in stress levels (while controlling for stress levels before the outbreak), but became non-significant when controlling for confounders in the global model (table 2; left panel): lower family income (stronger relationship for the lowest income level), consuming cannabis or other drugs, spending less time outdoors and more time interacting with people virtually. Being retired and having travelled abroad in the past 60 days, having a physical condition at risk for COVID-19, were associated with lower stress worsening.

Table 2. *Coefficients of the predictive model for changes in stress*

		Single Predictor Variables					Full Model				
				95.0% CI					95.0% CI		
	n	B	SE	LL	UL	p	B	SE	LL	UL	p
Time since outbreak start (7 days)	5359	-0.55	0.01	-0.09	-0.07	<0.001	-0.18	0.01	-0.04	-0.01	0.002
General demographics											
Age (10 years)	5357	-0.96	0.01	-0.11	-0.09	<0.001	-0.52	0.01	-0.07	-0.04	<0.001
Male sex (female)	5358	-2.02	0.19	-2.38	-1.65	<0.001	-0.97	0.19	-1.35	-0.60	<0.001
Political Views (vs Center or Others)											
Left Wing	4657	0.85	0.20	0.47	1.24	<0.001	0.37	0.18	0.01	0.72	0.042
Right Wing	4657	0.21	0.28	-0.34	0.75	0.457	0.31	0.24	-0.17	0.79	0.206
Education: No university (vs university)	5327	-0.20	0.18	-0.55	0.16	0.277	-0.22	0.19	-0.59	0.14	0.230
Socioeconomic, occupational and living situation											
Total family income (vs >$100k)											
< $40k per year	5009	0.72	0.31	0.12	1.33	0.019	0.30	0.18	-0.05	0.65	0.094
$40 to $100k per year	5009	0.39	0.19	0.02	0.75	0.039	0.35	0.31	-0.25	0.95	0.256
Employment status (vs employed):											
Unemployed, on leave or student	5359	0.38	0.26	-0.13	0.88	0.144	0.07	0.26	-0.45	0.59	0.787
Retired	5359	-2.37	0.19	-2.75	-2.00	<0.001	-0.15	0.25	-0.64	0.34	0.544
Work contact with general public (vs not)	5189	1.76	0.26	1.26	2.26	<0.001	0.58	0.25	0.08	1.07	0.022
Living in apartment or condo (vs house)	4858	0.36	0.21	-0.05	0.77	0.089	-0.10	0.21	-0.50	0.31	0.631
Health and risks factors											
C19 Symptoms index (scale from 0 to 30)	5359	0.23	0.02	0.19	0.28	<0.001	0.14	0.02	0.09	0.19	<0.001
Physical condition at risk† (vs no condition at risk)	5342	-0.76	0.17	-1.09	-0.42	<0.001	0.15	0.18	-0.21	0.50	0.415
Sleep Duration (hours)	4804	-0.59	0.06	-0.1	-0.48	<0.001	-0.53	0.05	-0.64	-0.42	<0.001
Travelled abroad in last 60 days (vs no travel)	4960	-0.45	0.21	-0.86	-0.04	0.033	-0.19	0.26	-0.70	0.33	0.472
Psychological Domain											
Pre-outbreak PSS (0-40 scale)	4920	..	..	..	..	..	-0.44	0.02	-0.47	-0.41	<0.001
DOCS - Contamination (0-20 scale)	4717	0.47	0.02	0.43	0.52	<0.001	0.38	0.02	0.34	0.42	<0.001
Big 5 Personality (2-10 scale)											
Extraversion	4680	0.15	0.04	0.07	0.23	<0.001	0.13	0.04	0.06	0.21	0.001
Agreeableness	4681	0.00	0.05	-0.10	0.11	0.933	0.05	0.05	-0.05	0.14	0.319

Conscientiousness	4681	0.16	0.05	0.06	0.26	0.002	0.13	0.05	0.04	0.23	0.007
Neuroticism	4681	0.25	0.04	0.17	0.33	<0.001	0.35	0.05	0.25	0.44	<0.001
Openness to Experiences	4681	-0.01	0.05	-0.11	0.08	0.778	0.07	0.04	-0.02	0.16	0.116
Brief Resilient Coping Scale (4-20 scale)	1663	-0.17	0.03	-0.23	-0.11	<0.001	-0.24	0.03	-0.30	-0.17	<0.001
Mental disorder diagnosis (vs no diagnosis)	5326	2.34	0.20	1.95	2.74	<0.001	1.14	0.20	0.74	1.54	<0.001
Social Domain											
Family Relationship (per 10 units; 0-100 scale)	5028	-0.55	0.00	-0.06	-0.05	<0.001	-0.39	0.00	-0.05	-0.03	<0.001
Has underage children (vs no underage children)	5092	2.16	0.24	1.69	2.63	<0.001	0.89	0.23	0.43	1.34	<0.001
Behavioral Domain											
Weekly alcohol consumption (vs no drinks)											
1 to 5 drinks	5358	-0.18	0.21	-0.58	0.23	0.394	0.19	0.20	-0.20	0.57	0.344
More than 5 drinks	5358	0.15	0.21	-0.27	0.56	0.490	0.61	0.20	0.21	1.01	0.003
Weekly cannabis or illicit drugs use (vs no use)	5312	1.13	0.26	0.63	1.63	<0.001	0.45	0.25	-0.03	0.93	0.066
Spent 30min or less (vs more than 30min):											
Outdoor	5317	0.91	0.18	0.56	1.25	<0.001	0.07	0.19	-0.32	0.45	0.736
Exercising	5295	1.03	0.17	0.70	1.37	<0.001	0.49	0.19	0.12	0.87	0.010
Following COVID-19 news	5296	-0.25	0.17	-0.59	0.08	0.141	-0.24	0.17	-0.57	0.09	0.155
Social interactions in person	5201	0.14	0.17	-0.20	0.48	0.406	0.21	0.16	-0.11	0.53	0.205
Social interactions virtually	5277	-0.46	0.18	-0.80	-0.11	0.009	0.01	0.17	-0.33	0.34	0.969
Doing an artistic activity	5210	0.16	0.20	-0.23	0.56	0.421	0.50	0.19	0.12	0.88	0.010

Coefficients parameters for multiple linear regression models including only each single predictors and baseline stress (Left panel) and for the full model (right panel). B: Unstandardized coefficients (calculated per one unit for continuous variables, except for the time elapsed since the start of the outbreak, which was calculated for each 7 days, as well as age and family relationships which were calculated per 10 units). Units (for continuous variables) and reference groups (for categorical variables) are presented in parenthesis in the first column. SE: standard error of B, CI: confidence interval, LL: lower limit, UL: upper limit, Dimensional Obsessive Compulsive Scale (DOCS), Cohen's Perceived Stress Scale (PSS), Family Relationship rated on scale from "0-Very difficult/conflictual", "50-Neutral" to "100- Excellent". † Physical condition at risk for COVID-19: e.g. respiratory, cardiovascular or autoimmune conditions.

In exploratory analyses stratified by biological sex (see supplemental table 1), the following variables were found to be independent predictors of stress changes in females, but not in males: lesser time elapsed since the start of the outbreak, younger age, higher extraversion, conscientiousness and openness to experiences, having a current diagnosis of a mental disorder, having had more than 5 alcoholic drinks in the past week, and spending less time exercising and doing artistic activities. Conversely, the following variables were found to be independent predictors of stress changes in males, but not in females: work involving physical contact with the general public, having traveled in the past 60 days, and spending less time interacting with people virtually. The following variables remained significant independent predictors of higher stress worsening in both sexes: worse COVID-19 symptoms index, shorter sleep durations, lower PSS scores before the outbreak, higher scores on the DOCS - Contamination subscale, higher neuroticism scores on the Big5, lower scores on the BRCS, worse family relationships, and having underage children.

DISCUSSION

Results from this survey in 6,040 respondents suggests that the financial, social and psychological correlates of the COVID-19 outbreak may interact in a complex manner, and that they vary considerably across individuals. While some of our findings echo previous observations, we propose a more comprehensive integrated model of independent factors associated with worse stress responses to this pandemic.

In line with previous polls reporting that many people perceived the COVID-19 pandemic as a greater threat to the economy than to their health (17), we observed higher sense of threat related to external/global as opposed to more personal matters. Our observation of concerns about access to medical services are aligned with high rates of potential COVID-19 symptoms with low reported access to testing for COVID-19, a combination which may increase stress. Nearly 40% of respondents endorsing being uncertain about when the global situation would get back to normal. This contrasts with the 80% of Australians who reported moderate to extreme uncertainty about the future in a previous survey done in March and April 2020 (10). This difference could stem from temporal, cultural or public health variants.

Consistent with Canadian rates of employment which plummeted by about 11% from February to April 2020 (18), but lower than the 50% worldwide job losses anticipated by the UN labor agency (19), 11% of our respondents lost their job because of the outbreak and an additional 8% underwent salary cuts, with a non-trivial

median reduction in salary of 35%. Low income and the lack of a university degree were found to be major risk factors for adverse work and salary outcomes, a phenomenon that may further widen economic disparities. Similarly, reports in the US showed that 40% of people earning $40K or less lost their jobs due to the COVID-19 outbreak and that most of those who kept their job had a university degree (20). Importantly, the current study is to our knowledge the first one to identify having a mental disorder as a risk factor for employment termination during the outbreak. The psychological impacts of unemployment are likely to further worsen mental health in these individuals, and they may be at higher risks for subsequent unemployment (21). Therefore, this subgroup may face additional challenges not only to cope with the occupational and financial consequences of the pandemic, but also to find work after de-confinement, which highlights potential needs for targeted governmental relief packages and supporting programs to find work. Increased expanses since the start of the outbreak seemed to be most prominently related to food. Although concerns about lacking food were rather mild in the current sample, some respondents may have been stocking up in the context of supply disruption and/or facing increases in pricing for food (22).

In line with early COVID-19 reports from China describing major reductions in social contacts beyond the household (23), we observed increased interactions with family and decreased interactions with friends, which probably reflect social distancing. This change was accompanied by consistent changes in feelings of connectedness and, paradoxically, by a worsening in relationships quality. Together with previous observations of increased family violence during the pandemic (24), this stresses the need to better understand how close proximity in the context of confinement may create family tensions. Only 66% of respondents were following at least one social distancing guideline, a percentage similar to previously reported rates in a previous Canadian poll (25). Although the state of emergency still prevailed at the time of the survey, about 60-90% of respondents had been phasing out their social distancing practices. This raises considerable concerns since even a 20% increase in adherence to social distancing can contribute to slow the spread of COVID-19 (26).

We found a significant increase in stress co-occurring with the outbreak, with 30% of individuals undergoing clinically meaningful stress worsening. This is consistent with rates of moderate to severe stress reaching 20 to 27% in Asia, Europe, and Australia (7,10,27–30). As anticipated, more acute stress reactions were observed in the earlier phases of the outbreak, with a sharp drop shortly after the mortality peak in Canada was announced. These preliminary observations suggest that although the degree of stress worsening during the outbreak may have been phasing out for many individuals, two months after the pandemic declaration, stress levels were not

fully back to pre-outbreak levels. This supports the need for the development/promotion of self-help tools for stress management.

Having a current diagnosis of a mental disorder was found to be the strongest independent factor linked to stress worsening, a finding consistent with previous observations about pre-existing psychiatric conditions (7,10,27–30). This stresses the importance of further investigation in this group who may require more intensive stress management resources. Poorer coping skills and personality traits loading heavily on neuroticism, extraversion and conscientiousness were also associated with worse increases in stress. High neuroticism has previously been linked to maladaptive stress coping strategies (31). While personalities loading on conscientiousness are usually well-organized, goal-directed and more effective in dealing with stress, the uncertainty associated with this unprecedented outbreak may prevent them from relying on their usual coping strategies, leading to heightened stress. Since extraversion is characterized by a tendency to be active and sociable, social distancing measures probably contributed to worse stress responses in extraverted individuals. Accordingly, a Brazilian Covid-19 survey showed that higher extraversion was associated with lower engagement in social distancing practices, likely reflecting how challenging it is for extraverted individuals to reduce their social proximity (32). In line with our finding of an association between left-wing views and stress worsening, a recent Gallup poll in the US (33) found that liberals (as compared to conservatives) were more likely to worry about worst-case outcomes of the pandemic. Humans are known to outsource their understanding of the world to their political ingroup (34). The politicization of the crisis and associated media bias (with risk-preventive, pro-lockdown perspectives in the liberal media, and the conservative media appearing to take the crisis less seriously) is one possible explanation for worse pandemic-related distress in liberals.

Our results confirm that several factors previously linked to stress, such as female sex, younger age, having children, and having symptoms that could be linked to COVID-19 (7,10,11) independently contribute to stress worsening. While previous reports highlighted increased risks in healthcare workers (11), our findings suggest that this extends to other types of workers physically interacting with the public (e.g. people working in public transport, grocery stores). Importantly, the current study also identified some modifiable factors that were associated with lower stress responses. For instance, protecting a sufficient period for sleep, minimizing alcohol and drug consumption, promoting better family relationships, exercising, and doing artistic activities may be helpful. Sleep disturbances often emerge in response to external stressors and can further worsen physiological and psychological

stress responses (35). Since sleep is thought to contribute to emotional regulation (36), attenuating the adverse effects of the pandemic on sleep may enable better coping resources. In addition to the benefits of exercise on sleep, about 30 minutes of moderate-intensity aerobic exercise three times weekly may also boost mood and reduce psychological distress (37). Planning family activities that may help alleviate tensions and foster more positive relations, as well as creating some time and space for individuals to offset the challenges posed by sustained family proximity may also be relevant to manage stress. Appropriate home-schooling support, as well as better work adaptation for parents may also be required. Increased access to testing is likely to have the collateral effect of attenuating stress levels. Further investigations may be required to better understand if limiting the time spend on virtual interactions with people may also play a protective role against stress. From the current study, it is not possible to differentiate virtual interactions that may be related to work from those related to family/friends contacts. Also, the association with increased stress worsening and virtual communications may be in part driven by individuals seeking more frequent virtual contacts to alleviate their stress, but the cross-sectional nature of the current analyses does not allow to determine whether this is an effective strategy or not. There was also considerable sex-differences in factors associated with stress, which may call for the development of sex specific interventions.

The study has several important limitations. The observational nature of this study precludes any causality inference and recall bias may have affected retrospective estimates of pre-outbreak metrics. Generalizability is limited by the dissemination strategy and volunteer bias; although our demographic characteristics are consistent with other published surveys. The length and online nature of the survey may have prevented some individuals from completing it. Although our multivariate model corrected for this, data collection spanned over a month, a period during which we did observe dynamic changes in stress responses. This study also has several strengths, such as a relatively large sample size, the comprehensive set of factors assessed, and its launch in the acute phase of the outbreak.

CONCLUSION

Baseline data in 6,040 respondents who shared their experiences in the acute phase of the COVID-19 pandemic highlighted adverse financial, social and psychological outcomes. Our preliminary findings start to draw a comprehensive model integrating multiple independent factors of the stress responses to this pandemic. Modifiable risk factors identified could inform the development of targeted interventions and support. Populations at risk that should be targeted include: people with pre-existing mental disorders, parents of underage children, people with low

income, workers interacting with the general public, people with potential COVID-19 symptoms, and those with sleep disruptions.

ACKNOWLEDGMENTS

We wish to thank all the participants who gave their time to fill out this extensive survey during this period of turmoil. We also extend our gratitude to the individuals who kindly provided their comments on the survey content and format during the development stage, the ethics boards who rapidly and diligently provided insights on this project to enable a timely launch, the organizations who helped circulate the survey in their networks, and NIVA inc, for their advice on distribution strategies. We thank the Clinical Investigation Unit at the Ottawa Hospital Research Institute for assistance with participant recruitment.

COMPETING INTERESTS

All authors declare that no competing interests exist.

FUNDING

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

CONTRIBUTORSHIP STATEMENT

All co-authors were involved in the following: study conception and design, interpretation of data, revising the manuscript critically for the accuracy and important intellectual content, and final approval of the version to be published. All co-authors are accountable for all aspect of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. RR, TK, and JE were additionally involved in the participants' recruitment as site primary investigators. RR, MS, AN and TK were additionally involved in the following: analyses of data and drafting of the manuscript.

DATA SHARING STATEMENT

Proposals to access data from this study can be submitted to the corresponding author and may be made available upon data sharing agreement.

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FIGURES LEGENDS

Figure 1. *Level of concerns for potential secondary effects of the pandemic*

Mean level of concerns on a scale ranging from "0-Not concerned at all", to 50-Neutral" and "100- Very concerned". Error bars represent standard errors of the mean.

Figure 2. Transitions across stress levels relative to before the outbreak levels

Lasagna plot of the percentages (%) of respondents endorsing low, moderate and high stress levels (as per established severity threshold for the Cohen's Perceived Stress Scale (PSS)) in the retrospective assessment of their stress levels in the month prior to the start of the pandemic (i.e. Pre-outbreak) and in the past 7 days before filling out the survey (i.e. Outbreak). Dashed lines indicate the transition points between the 3 stress severity ranges. As compared to before the outbreak, 20.8% (1,063/5,103) of respondents had progressed to a higher stress range during the outbreak, and 7.0% (n=355/5,103) of respondents moved to a lower stress range

Figure 3. *Patterns of stress changes across time*

Average changes in score on the Cohen's Perceived Stress Scale (PSS) from pre-outbreak to during the outbreak (i.e. current PSS minus pre-outbreak PSS; higher scores indicating stress worsening) measured cross-sectionally across each time period of survey completion (each comprising 7 days starting on the date of the survey launch). Higher change scores reflect higher stress worsening relative to pre-outbreak stress levels. Error bars indicate the standard error of the mean. Sample sizes for each 7-day time period are as follows: April 3rd: n= 516, April 10th: n= 135, April 17th: n= 453, April 24th: n= 1035, May 1st: n= 936, May 8th: n= 2028. **p<0.001

Figure 1. *Level of concerns for potential secondary effects of the pandemic*

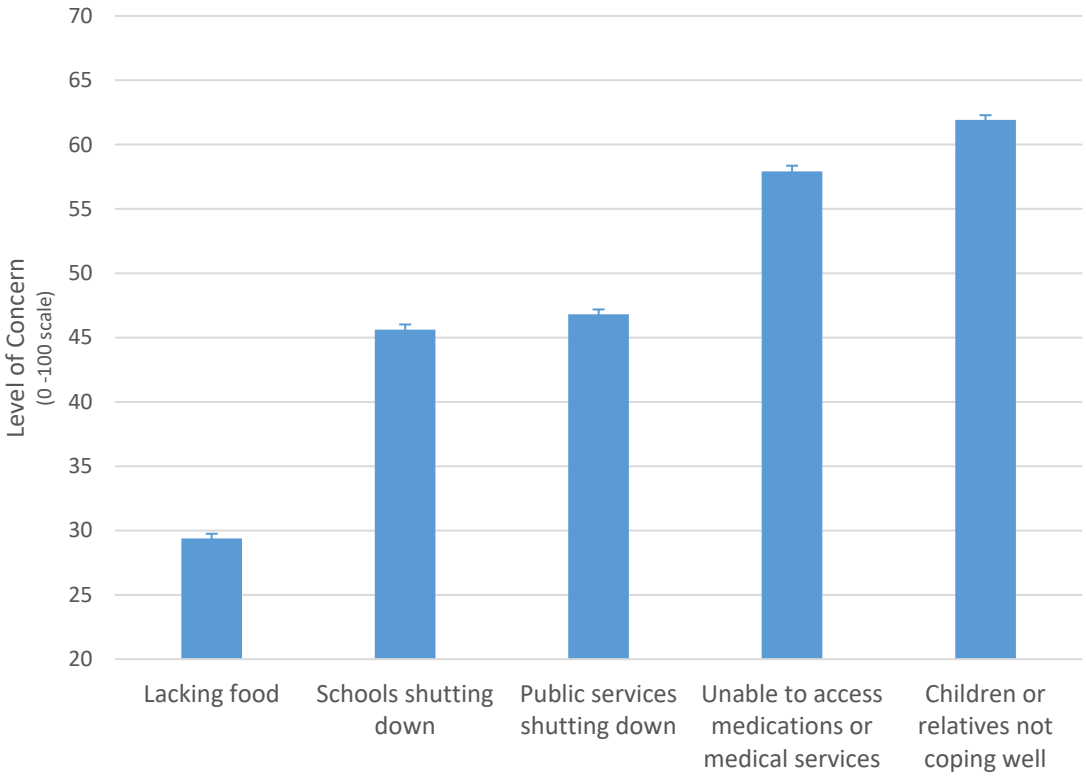


Figure 2. *Transitions across stress levels relative to before the outbreak levels*

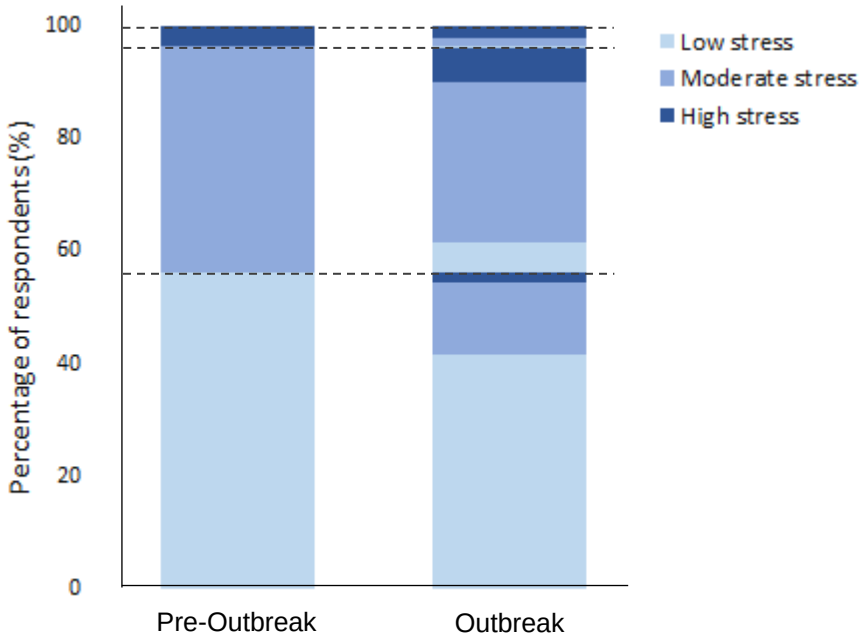
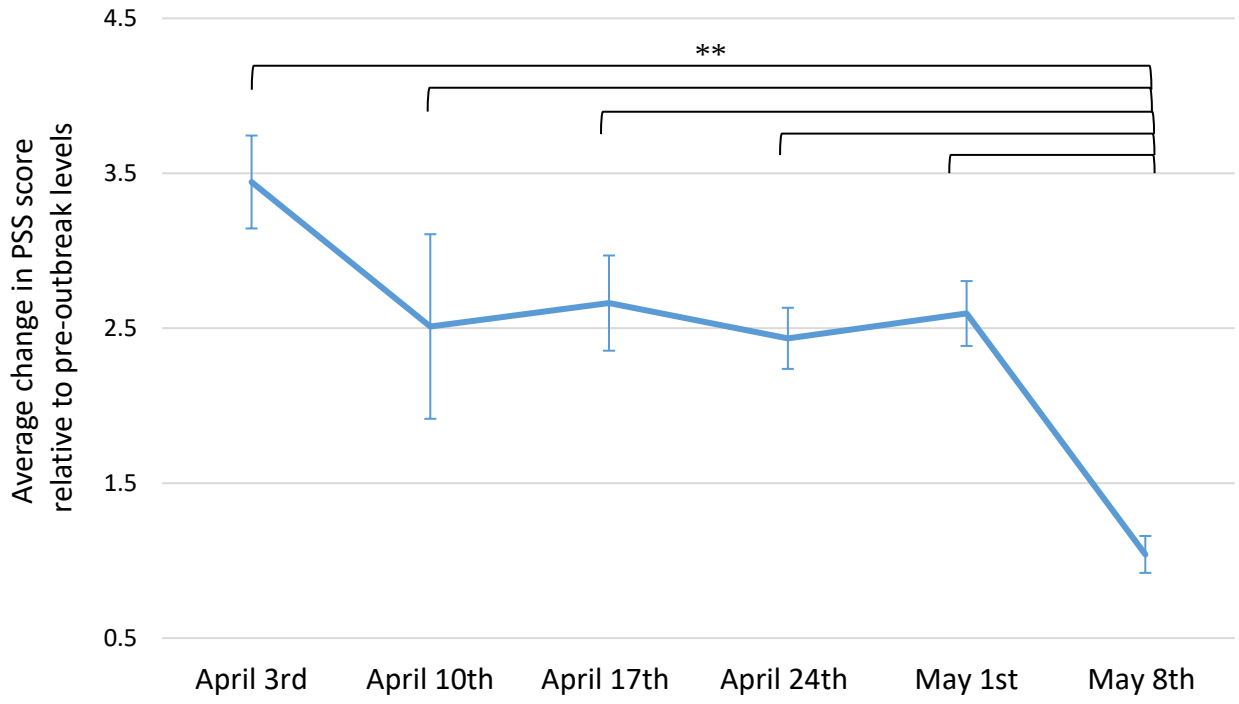


Figure 3. *Patterns of stress changes across time*



DATA SUPPLEMENT

Title: Social, Financial and Psychological Stress during an Emerging Pandemic: Observations from a Population Survey in the acute phase of COVID-19

Authors: Rebecca Robillard, Mysa Saad, Jodi D. Edwards, Elizaveta Solomonova, Marie-Helene Pennestri, Alexander Daros, Samuel Paul Louis Veissière, Lena Quilty, Karianne Dion, Ashley Nixon, Jennifer L. Phillips, Raj Bhatla, Edward Spilg, Roger Godbout, Bashour Yazji, Cynda Hylton Rushton, Wendy Gifford, Mamta Gautam, Addo Boafo, Tetyana Kendzerska,

1. Sex-stratified analyses: Supplemental table 1. Stress models stratified by sex

	Males					Females				
			95.0% CI					95.0% CI		
	n	B	LL	UL	p	n	B	LL	UL	p
Pre-outbreak PSS (Scale from 0 to 40)	1528	-.222	-.262	-.181	.000	3392	-.442	-.478	-.407	.000
Time elapsed since pandemic declaration (7days)	1643	-.119	-.294	.049	.168	3715	-.196	-.336	-.056	.006
Age (10years)	1643	-.140	-.360	.080	.203	3713	-.770	-.960	-.580	.000
Education level	1625	.023	-.459	.505	.926	3701	-.286	-.758	.186	.234
Total family income below 40k (vs above 40k)	1539	-.508	-1.354	.338	.239	3471	.306	-.399	1.011	.395
Employment status (vs employed):										
Lost job due to pandemic, unemployed, on leave or student	1643	.530	-.284	1.344	.202	3715	-.005	-.655	.645	.989
Retired	1643	-.308	-.963	.347	.357	3715	.248	-.408	.903	.459
Work involves contact with the general public (vs not)	1594	1.144	.340	1.948	.005	3594	.425	-.183	1.034	.171
Type of dwelling	1565	-.215	-.792	.361	.464	3292	.115	-.397	.627	.660
Has minor children (vs no minor children)	1547	1.557	.786	2.329	.000	3544	.744	.186	1.303	.009
Travelled abroad since January 2020 (vs no travel)	1597	.429	-.094	.951	.108	3362	-.261	-.766	.244	.312
C19 Symptoms index (scale from 0 to 30)	1643	.111	.039	.182	.002	3715	.141	.084	.198	.000
DOCS5 (scale from 0 to 20)	1547	.294	.228	.360	.000	3169	.450	.394	.506	.000
Diagnosis of a mental disorder (vs no diagnosis)	1637	.822	.208	1.436	.009	3688	1.901	1.418	2.385	.000
Weekly alcohol consumption (vs no drinks)										
1 to 5 drinks	1643	-.071	-.654	.511	.810	3714	.245	-.244	.733	.326
More than 5 drinks	1643	.142	-.412	.695	.616	3714	.999	.470	1.528	.000
Weekly cannabis or other drugs use (vs no use)	1632	.288	-.387	.962	.403	3679	.358	-.269	.984	.263
Physical condition at risk for COVID-19 (vs no condition at risk)	1639	.210	-.309	.728	.428	3702	.036	-.419	.492	.875
Sleep Duration (hours)	1539	-.393	-.554	-.231	.000	3264	-.583	-.720	-.446	.000
Family Relationship (per 10 units; 0-100 scale)	1607	-.310	-.410	-.210	.000	3420	-.440	-.520	-.350	.000
Spent 30min or less (vs more than 30min):										
Outdoor	1633	.237	-.323	.798	.406	3683	-.055	-.545	.436	.826
Exercising	1627	.377	-.141	.895	.154	3667	.578	.090	1.065	.020
Following C19 news	1626	-.502	-.968	-.036	.035	3669	-.228	-.657	.201	.297
Interacting with people in person	1600	.305	-.151	.761	.190	3600	.166	-.254	.585	.439
Interacting with people virtually	1617	-.459	-.919	.001	.051	3659	.298	-.137	.733	.179
Doing an artistic activity	1601	.517	-.066	1.101	.082	3608	.661	.194	1.129	.006

Coefficients parameters for multiple linear regression models in males (Left panel) and females (right panel). B: Unstandardized coefficients (calculated per one unit for continuous variables, except for the time elapsed since the start of the outbreak (calculated for each 7 days), and age and family relationships (per 10 units). CI: confidence interval, LL: lower limit, UL: upper limit, Dimensional Obsessive Compulsive Scale (DOCS), Cohen's Perceived Stress Scale (PSS), † Physical condition at risk for COVID-19: e.g. respiratory, cardiovascular or autoimmune conditions.

2. Additional information about the survey

1.1 CHERRIES guidelines

In line with the CHERRIES guidelines, the survey data is stored in a secured access database (i.e. on a restricted access password protected server at the Royal Ottawa Mental Health Centre). The usability, decisional three, branching logic, and technical performance were tested with seven individuals prior to its launch. A "Save and Continue" feature was enabled, which placed a cookie on the participant's browser to keep track of survey progress and allowed participants to continue the survey at a later time. Furthermore, to avoid duplicates, distinct entries submitted from the same Internet Protocol address (IP address) within a 12-hour period were automatically marked and excluded from the analyses, but IP addresses were not stored. 26/6,040 (0.4%) duplicate entries identified by matching emails were found. In these cases, the final entry to be kept in the database was selected based first on completeness and then on recency. The mean number of items per page ranged between 4.6 and 6.5 per page depending of the paths followed on the decisional three structure. A completeness check system enabled to document the percentage of the survey completed for each participant.

Some of the CHERRIES recommendations could not be implemented. For instance, participation rate could not be calculated since the survey was freely circulated notably via newsletters and social media, which prevented from the research team to keep track of the number of people who may have seen the survey invitations. Participants were not able to review their responses at the end of the survey. However, they were able to change some of their responses through a "Back Button", except where responses were used as part of branching logic. Not all items had an "N/A" response option, notably to abide by the strict content of the validated questionnaires included. Responses were not forced; to follow guidelines from our research ethics committees, participants were free to skip any question (except age, which was necessary to determine eligibility to complete the survey). However, prompts appeared to warn participants that a response was skipped before moving to the next section.

1.2 Optional components

Consent was sought from all respondents to receive invitations to fill out follow-up surveys to monitor dynamic longitudinal changes prospectively across different phases of the outbreak (i.e., on a weekly, biweekly or monthly basis), and/or 3 and 6 months after the end of the outbreak. Respondents also had the option of linking the survey results to provincial health administrative data. Optional consent was also sought to link parent and adolescents survey data across parent-child dyads to enable finer analyses of family dynamics. Finally, respondents had the option of providing their Twitter and/or Facebook handles to help refine and apply new methods based on artificial intelligence to monitor the progression of the impacts of COVID-19 through social media data. Social media data will be collated retrospectively starting six months prior to study enrollment until six months after the end of the outbreak, therefore enabling to investigate changes in social media activity before, during, and after the outbreak. Of the 6040 respondents, 78.9% (4,765) agreed to be invited to do follow-up surveys, 63.0% (3,803) consented for their data to be linked to provincial health administrative data, and 17.7% (1,068) consented for social media linkage. Findings from these optional parts of the survey will be reported in subsequent reports.

1.3 Recruitment Strategy

The survey deployment network currently includes: The Royal Ottawa Mental Health Centre, the University of Ottawa Heart Institute, the Ottawa Hospital, the Children's Hospital of Eastern Ontario, Sunnybrook Health Sciences Centre, Southlake Regional Health Centre, and the Centre for Addiction and Mental Health. The survey link was circulated via the participating sites' websites, email lists and newsletters. "Permission to contact" registries from some of the participating hospitals (the Royal Ottawa Mental Health Centre, the University of Ottawa Heart Institute, the Ottawa Hospital, and the Centre for Addiction and Mental Health) and existing pools of research participants were also used to invite patients who consented to be contacted for research. Partnership for the diffusion of the survey was also established with organizations including: Canadian Nurses Association, Canadian Physiotherapy Association, Canadian Association of Occupational Therapists, Ontario Public Health, Ontario Medical Association, Ontario Psychiatric Association, Ontario Society of Occupational Therapists, Canadian Counselling and Psychotherapy Association, Ordre des Psychologues du Québec, Mood Disorders Society of Canada, Canadian Arthritis Patient Alliance, Patients for Patient Safety Canada, the COVID-19 Resources Canada Platform, and Sleep On It! Canada.

1.4 Data cleaning and supplemental notes

Based on items content, it was deemed that a minimally informative proportion of the survey was completed after the 83rd item (i.e. "Have you been tested for COVID-19?" Corresponding to a 1/3 completion rate for the survey).

All available data from the participants having reached at least this item were included in the analyses. Survey completion times were calculated for those with at least 75% completion rates and all data points longer than 7 hours were systematically excluded from completion time estimates. For all continuous variables, negative values were excluded and treated as missing data. For time estimates, data points larger than the possible time limit (e.g. 40 hours per day) were systematically excluded and treated as missing data (e.g. habitual number of hours of sleep per night; 29/5037 data points (0.6%)). Extreme improbable values were excluded: number of drinks or cannabis use per week >125 (alcohol: 2 data points, cannabis: 1 data point). The time elapsed since the start of the outbreak was defined by the number of days between the declaration of the pandemic by the World Health Organization and the date at which the survey was completed). All categorical variables included in the multivariate model had at least 10% of cases per category.

3. Brief description of primary measures of interest covered in this report

3.1 Demographic information

Demographic variables included age, sex, gender, ethnicity, current location and country(ies) of citizenship, employment status, occupation, living arrangements, parental status, level of education, political beliefs, religious practice, and total yearly family income.

3.2 COVID-19 testing, perceived threat and concerns

We asked the participants to report on their experiences around COVID-19 testing and diagnoses. They were also asked if they have any symptoms suggesting COVID-19 or other risk factors. An index of the number and severity of symptoms that have been associated with COVID-19 (i.e. C19 Symptoms index) was calculated by summing the severity ratings on a scale from 1:mild, 2:moderate and 3:severe for all symptoms endorsed on a list of 11 symptoms (please see "Detailed survey description" section below). The level of perceived threat related to COVID-19 for one's health, job or business, financial situation or country were rated on a five-point interval scale from very low to very high.

In addition, levels of concerns for several aspects of life, such as access to food or medical services were rated on a scale ranging from "0-Not concerned at all", to 50-Neutral" and "100- Very concerned". Respondents were also asked when they anticipated that the global situation and their personal situation would get back to normal.

3.3 Occupational and Financial Impacts

Consequences of the outbreak for school and work were documented, including school closure, working from home, being in contact with the general public, employment termination or salary reduction.

3.4 Impacts on Social Life

Rates of homeschooling and global assessment of work/study and family life management in the face of the outbreak were documented. The frequency of interactions, quality of relationships (with family, friends and work colleagues) and degree of connectedness were retrospectively estimated before the outbreak and at the time of the survey (i.e. during the outbreak). Respondents also indicated their adherence to various practices related to social distancing currently being followed at the time of filling out the survey and those who had been used earlier on after the start of the outbreak. To assess subjective feelings of loneliness and social isolation, the UCLA Loneliness Scale was administered (1).

4. Detailed Survey description (general adult version)

Text in grey represent items asked based on previous answers. The time scale of the following questionnaires was adjusted to align with the two study time points: i) "before the outbreak" (i.e. in the last month before the outbreak) and ii) "during the outbreak" (i.e. in the last seven days at the time of filling out the survey): Cohen's Perceived Stress Scale (PSS-10), Generalized Anxiety Disorder Scale (GAD-7), Quick Inventory of Depressive Symptomatology- Self Report, short version (QIDS-SR_{16}), Dimensional Obsessive Compulsive Scale – Germs and contamination subscale (DOCS), and the Pittsburgh Sleep Quality Index (PSQI).

Demographics

- *Age _____ years*
  If < 12 y.o. - "Thank you for your interest. Unfortunately, you cannot participate in this study."
  If < 16 y.o. – Directed to the Adolescent version
- Are you currently a resident physician or working as a health care professional or health care administrator?
  If No – Continue to general baseline survey described below
  If Yes – Please select which version of the survey you can do
  Regular survey for health care workers / administrators (about 20 to 65 minutes)
  If selected – Directed towards regular survey (with targeted questions for healthcare staff)
  Brief survey for health care workers / administrators (about 15-35 minutes)
  If selected – Directed towards Healthcare worker brief version

- Where are you currently living? *The house or apartment me or my family rent or own, Rehabilitation centre for youth in difficulty; retirement home, nursing home or long term care facilities, foster family, hospital, temporary accommodation: residence of other family, hotel, rooming/lodging house; camp, other: ___ {if temporary residence – Are you living in a temporary residence because of the outbreak? Y/N; If Rehabilitation centre for youth in difficulty; go to Adolescent version}*

- *Sex assigned at birth: Male, Female*
  - *If Female: Are you pregnant?*
- *Gender: Male, Female; Transsexual - female to male; Transsexual - male to female; Gender-queer; Gender-fluid; Gender non-binary; Other: _____*
- *Religious practice: Y/N {If yes: please specify: _____}*
- *Do you identify as (select all that applies):*
  - *First Nations (North American Indian)*
  - *Métis*
  - *Inuk (Inuit)*
  - *White*
  - *South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.)*
  - *Chinese*
  - *Black*
  - *Filipino*
  - *Latin American*
  - *Arab*
  - *Southeast Asian (e.g., Vietnamese, Cambodian, Laotian, Thai, etc.)*
  - *West Asian (e.g., Iranian, Afghan, etc.)*
  - *Korean*
  - *Japanese*
  - *Other — specify*
- Current country(ies) of citizenship: {list with other:____}
- Current location: {list with other:____}
  - If Canada selected: Current Province/Territory
- If your current location is not one of your countries of citizenship, for how long have you been in your current location?: ___ years ___months ___days
- Including yourself, how many persons currently live in your dwelling?

- Who is currently living in your dwelling: children, partner, husband/wife, mother, father, stepmother, stepfather, grandchild, brother/sister, other : _____
- **Do you have any children?**
  If Yes - {How many children? Ages (How old is your child (in years or months)? Are any of your children in shared custody??}
    If has a child between 12-18 years old:
    If you think that your child(ren) would be open to fill out the 'adolescent' version of this survey, would you agree for our research team to send you an email with the link to do this survey which you can transfer to your child(ren)? Y/N
      If yes (and if address not provided earlier) - Please provide your email address: ____
      If email entered- If your children agree to take part in this study, do you agree for the research team to link your answers to the answers of your children to enable a better analysis of family situations? If so, in addition to the survey link, we will also email you a unique anonymous "Family" code which your children will be able to enter in their survey in order to link it to yours. Your children will not be able to see your answers and you will not be able to see theirs. The research team will only be able to see that respondent 'X' is the child of respondent 'Y'. *Y / N*
    N.B. If you have any questions about this, please contact us at C19Survey@theroyal.ca.

- Are you the primary carer of a person with a disability of chronic illness? Y/N – **if yes: Is that person currently living: with you? On their own? In a specialized care facility?**
- Current residential postal code(s) or equivalent (3 first digits only): _____
- What type of dwelling do you live in?
  - *01: Single detached house*
  - *02: Semi-detached house*
  - *03: Row house or terrace*
  - *04: Apartment in a flat or Duplex*
  - *05: Apartment in a building that has five or more storeys*
  - *06: Apartment in a building that has fewer than five storeys*
  - *08: Mobile home or other movable dwelling*
  - *09: Other - Specify*
- How many rooms are there in your dwelling (the single unit in which you currently live)?

- Have you completed: high school diploma or equivalency certificate; college, CEGEP or other non-university certificate or diploma; university certificate, diploma or degree **(if so - below bachelor level, bachelor's degree, Master's degree, professional degree, doctorate degree)**

- Occupation In the last month before the outbreak :
  - Retired, Student **{If so – Did your school close because of the outbreak?** In how much **time** were you meant **to obtain degree** (e.g. graduating from high school or obtaining a diploma/certificate)**? What impacts does the outbreak have on classes and exams? Did you receive any financial support from a scholarship, bursary or fellowship in the current school year? If so, what was the total amount you received?}**, Employed, on leave **{for medical reasons, for familial reasons, other:___}, Other: _____**
  - **If employed is selected:**
    - Are you a health care worker or health care administrative staff?
    - **Self-employed? Job title? Usual number of work hours per week? Shiftwork (e.g. working in the evening or nighttime)? {if so- Is your shiftwork mostly: night shift, evening shift, rotating}; How often would you usually travel out of your country for work? ___/year**
    - **Current work status : working from usual workplace, working from home because of the pandemic, job has been terminated because of the pandemic, working hours were increased/decreased because of the pandemic, salary has been decreased because of the pandemic (if so- by how much was your salary decreased (estimate in percentage)?**
    - **Does your work currently involve: Contact (in person) with the general public? Contact (in person) with people at high risk for COVID-19 {i.e. elderly, chronic**

illnesses}? Contact (in person) with people who tested positive for COVID-19? Providing essential services (e.g. hospital, public transport, grocery store)?
If yes - *{Hospital, Fire Services, Public transport, Police, Grocery Store, Pharmacy, Gas Station, Public Transport, Other:_____ }*

- If retired is selected:
  - Are you coming back to work (or volunteering) to assist with the outbreak?
    - If Yes - Does your work involve: Contact (in person) with the general public? Contact (in person) with people at high risk for COVID-19 {i.e. elderly, chronic illnesses}? Contact (in person) with people who tested positive for COVID-19? Providing essential services (e.g. hospital, public transport, grocery store)?

If employed/student is selected:

- How would you rate the degree of school/work-related stress you are currently experiencing? *{0-Very low stress - - - - - - - - - - - - - 100 - very high stress}*
- How would you rate the degree of school/work-related stress you have been experiencing in the last month before the outbreak? *{0-Very low stress - - - - - - - - - - - - - 100 - very high stress}*

- Usual mode of transport (to go to work, do groceries, etc) before the outbreak:
  {Public transport, driving a car, walking, cycling, other:_____}
- Total yearly family income: _____
- How would you rate your political beliefs
  {1-5 scale of very left- to very right-wing views, with one 'other', please explain}

Questions pertaining to COVID-19

- When would you say that the outbreak started in the region where you have been staying for the last month? *Approximately… {DD/MM/YYYY}*

- Have you travelled outside of your country of residence since January 30th 2020?
  - If YES: When did you return? *{DD/MM/YYYY}* Where did you go? _____
- Has anyone currently living with you travelled outside of the country since January 30th 2020
  - If YES: When did they return? *{DD/MM/YYYY}* Where did they go? _____

Since the start of the Outbreak, dDid you have (please select all that applies or leave blank if you prefer not to answer this question) *{Mild, Moderate, Severe}*
Fever
Cough
Difficulty breathing or shortness of breath
Sore throat
Tiredness
Aches and pains
Nasal congestion
Runny nose
Sore throat
Diarrhea
Other symptoms you think could possibly be related to COVID-19 (Specify):

For any selected symptom: Still current?

Did anyone living with you have any symptoms that could be linked to COVID-19 (e.g. fever, cough, difficulty breathing, runny nose…) since the start of the outbreak? *Y/N / I prefer not to answer this question*

*If yes: Is this person currently awaiting testing? Yes
No
No, they have already been tested and are awaiting the

results
No, they have already been tested and were negative for COVID-19
No, they have already been tested and were positive for COVID-19
I don't know

Did anyone else in your family have any symptoms that could be linked to COVID-19 (e.g. fever, cough, difficulty breathing, runny nose…) since the start of the outbreak? *Y/N / I prefer not to answer this question*

***If yes: Is this person awaiting testing? Yes**
No
No, they have already been tested and are awaiting the results
No, they have already been tested and were negative for COVID-19
No, they have already been tested and were positive for COVID-19
I don't know

Is that person currently staying in hospital? Y/N

- Have you been tested for COVID-19? Y/N
  If YES - Were the results: positive, negative, don't know yet?
  How long ago did you find out? ___*months* ___*days*
  If NO - Have you reached out to health services to get assessed for COVID-19?
  If Yes: Have you been told that you cannot be tested? Y/N
  If yes: What reason was provided to decline your request to get tested?
  If No: How long have you been waiting? ___*months* ___*days*

If indicated children above:
- **For how long have your children been off from school? _____ *months* ___*days N/A***
- **Are your children receiving instruction from the school at a distance? Are you or your partner homeschooling?**

If indicated student or working above:
- **How is the outbreak affecting how you deal with your work/study and family life?**
  0 -Very disruptive 50- Not different from usual 100-Easier than Usual

- Are you currently living with anyone who works at the front-line (e.g. health care staff, first responders, laboratory technician)? Y/N
- Do you have any other relatives working at the front-line? Y/N

Please select all statements that apply to you (currently / Since the start of the outbreak):
- *Not going out of the home except if you really do not have a choice (e.g. to go to a medical appointment)*
- *Avoiding going out from a specific room in the home to avoid contamination from/to other people living in your home*
- *Not attending public areas*
- *Avoiding gathering in person with friend or family who do not live with you*
- *Not using public transportation (e.g. buses, subways, taxis)*
- *Having food/supplies delivered home or relying on food/supplies stocked in the home instead of running errands*
- *Wearing a mask (or covering mouth and nose with tissues) when having to leave the home*
- *Maintaining a 2 meter distance from others*
- *In mandatory quarantine (isolation imposed by medical staff)*

If selected - For how long? ___ *days*

- How serious do you think a coronavirus infection would be for your health?
  {Very high threat, High threat, Moderate threat, Low threat, Very low threat, Don't know}
- What level of threat do you think COVID-19 poses to:
  {Very high threat, High threat, Moderate threat, Low threat, Very low threat, Don't know}
  - *your job or business?*
  - *your country?*
  - *your financial situation?*
- How concerned are you about:
  {0-Not concerned at all Neutral 100- Very concerned}
  - *lacking food?*
  - *public services shutting down?*
  - *schools shutting down* (or staying closed for an extended period)*?*
  - *your children or relatives not coping well with the situation?*
  - *not being able to access medications or medical services?*
  - *Other:*_____
- When do you expect the global situation to go back to normal?
  {by June 2020, by September 2020, by March 2021, after March 2021, "I have no idea"}
- When do you think your life will get back to normal?
  {by June 2020, by September 2020, by March 2021, after March 2021, "I have no idea"}

- Did the outbreak overlap with a significant event in your life (e.g. wedding, funeral, break up, graduation…)? *Y/N*
  if yes – Please specify the nature if the event and the consequences: _____

- How frequently were you interacting with your family
  Past 7 days? *{daily, weekly, monthly, less often than monthly, N/A}*
  In the last month before the outbreak? *{daily, weekly, monthly, less often than monthly N/A }*
- How would you rate your relationship with your family
  Past 7 days? *{0-Very difficult/conflictual 50- Neutral 100- Excellent, N/A }*
  In the last month before the outbreak ? *{0-Very difficult/conflictual 50- Neutral 100- Excellent , N/A }*
- How frequently were you interacting with your friends
  Past 7 days? *{daily, weekly, monthly, less often than monthly, N/A }*
  In the last month before the outbreak ? *{daily, weekly, monthly, less often than monthly N/A }*
- How would you rate your relationship with your friends
  Past 7 days? *{0-Very difficult/conflictual 50- Neutral 100- Excellent N/A }*
  In the last month before the outbreak ? *{0-Very difficult/conflictual 50- Neutral 100- Excellent N/A }*
- How would you rate your relationship with work colleagues?
  Past 7 days? *{0-Very difficult/conflictual 50- Neutral 100- Excellent N/A }*
  In the last month before the outbreak ? *{1-Very difficult/conflictual 50- Neutral 100- Excellent N/A }*

How much do you agree with the following statements: Please select the circle that best describes your opinion on the continuum from 'strongly disagree' to 'strongly agree'.
{ (NA) - (strongly disagree) (neutral) (strongly agree)}

Since the beginning of the outbreak, I have experienced significant levels of support from:
- my family
- friends and acquaintances
- my employer, colleagues
- medical staff and other professionals
- my religious/spiritual community
- strangers
- internet-based communities

Since the beginning of the outbreak, I have reached out to offer help and support to:

- my family
- friends and acquaintances
- my colleagues
- my religious/spiritual community
- strangers
- internet-based communities

Compared to how you felt before the outbreak, to what degree do you currently feel connected to:
{(NA) - 0 (More disconnected) 50 (No Change) 100 (More connected)}

- Family
- Friends
- Work colleagues
- Religious/spiritual community
- Community at large (neighbors, strangers)

In the past 7 days, how much time per day have you been spending:

0 minutes / day
1-30 min / day
31-60 min / day
1-2 hours /day
2-4 hours /day
More than 4 hours /day

- Outdoors?
- Doing physical activity?
- Following COVID-19 updates in the media?
  If >than 0min: Where do you get your information about COVID-19*? {Newspaper, websites, YouTube, reddit, radio, television, social media (e.g. facebook, twitter), talking with other people}*
- Watching television, series or movies (excluding the news)
- Playing video games
- *Doing an artistic activity (music, drawing, etc) ?*
- Doing contemplative/spiritual practice (meditation, prayer, etc.)?
- Interacting with other people:
  - In person:
  - Virtually (e.g. phone, texting, Skype, Facetime etc):
    If >than 0min - What virtual communication means are you using? *phone, texting, video (e.g. Skype, Zoom, Facetime)*

- To what degree have your daily activities been affected by the outbreak in the past 7 days?
  {0- Negatively Affected 50- Not Really Affected 100 –Positively Affected}
- How many cigarettes per day were you smoking:
  In the past 7 days? in the last month before the outbreak?
  If >0 - Are you regularly smoking (please tick all that applies): standard cigarettes, electronic cigarettes (vaping)
- How many alcoholic drinks did you have (Consider a "drink" to be a can or bottle of beer, a glass of wine, one cocktail or a shot of hard liquor (like scotch, gin, or vodka)):
  Total number of drinks in the past 7 days? Number of drinks per week in the last month before the outbreak?
- How frequently were you taking cannabis products:
  Total number of times in the past 7 days? Number of times per week in the last month before the outbreak?
- How frequently were you taking illicit drugs (e.g. cocaine, amphetamines, mushrooms, ecstasy):
  Total number of times in the past 7 days? Number of times per week in the last month before the outbreak?
- *Did your overall stress level change since the start of the outbreak?*
  {0- greatly reduced 50-No change 100- Greatly increased}

- What coping strategy(ies) (i.e. actions or thought process used to try to tone down the impacts of a stressful situation) do you find most helpful to help you go through the current pandemic situation?

- Has your household spending changed since the start of the outbreak?
  {Decreased / No change / Increased}
  - **If Increased By how much (in percentage (%))for health? for food? for other expenses? (please specify)**

In the last 7 days, how much have you been feeling like time seems to
{0 - Not at all to 100- Very Much}

- speed up (e.g. hours feel like minutes)
- slow down (e.g. days seem like weeks)
- stop (e.g. things seem frozen)

Physical health

- Have you ever had any of the following health problems (Please select all that applies): {Type 1-2 diabetes, respiratory disease {Asthma, chronic obstructive pulmonary disease (COPD) or hypoventilation}, Autoimmune disease (e.g. rheumatoid arthritis, lupus, inflammatory bowel disease (IBD), multiple sclerosis (MS), psoriasis), High blood pressure (hypertension), Heart disease or coronary artery disease (e.g., Heart failure, heart attack, myocardial infarction, atrial fibrillation, angina), Cerebrovascular disease (e.g., stroke, cerebral hemorrhage), High cholesterol (hypercholesterolaemia) or triglycerides, Thyroid disease, Severe infection (e.g., pneumonia, mononucleosis (glandular fever), mumps, tuberculosis, hepatitis),cancer, HIV/AIDS Other:*); For all selected options:* Please indicate which of your health problems are still current}

  - Has there been any worsening in your physical health since the start of the outbreak? Y/N
    If Yes – Please explain: _____

  - Has there been any changes in your medications (including changes in dosage) since the start of the outbreak?
    Yes No N/A
    If Yes - a) Please select all that applies:
    Adding a new medication
    No longer taking a medication
    Because I no longer need it; because it is uneasy/no possible to go to the pharmacy; because of financial constraints; Other: _____
    Dosage increase
    Dosage decrease
    Because I no longer need it; because it is uneasy/no possible to go to the pharmacy; because of financial constraints; Other: _____

    b) Did you discuss these changes with your doctor? Y/N

  - Are you currently taking (select all that applies):
    Antihypertensive medications (for ex.: calcium channel blockers, ACE inhibitors, angiotensin II receptor antagonists (ARBs), beta blockers)
    Antidepressant medications (for ex.: Zoloft (sertraline), Celexa (citalopram), Prozac (fluoxetine), Desyrel (trazodone), Lexapro (escitalopram), Cymbalta (duloxetine), Effexor XR (venlafaxine), Wellbutrin (bupropion))
    Antianxiety medications, Anxiolytics, Benzodiazepines (for ex: Rivotril (clonazepam), Xanax (alprazolam), Ativan (lorazepam))

  - Do you currently have any difficulty: seeing (even when wearing glasses or contact lenses)? hearing (even when using a hearing aid)? walking, using stairs, using your hands or fingers or doing other physical activities? learning, remembering or concentrating?

{Answer choice: No, Sometimes, Often, Always)

If selected current respiratory disease: Have you been using any of the following	*In the last month before the outbreak*	*Past 7 days*
Nebulizers Positive airway pressure treatment Inhaled corticosteroids Oral corticosteroids Asthma puffer		

Mental health

- Have you ever had a formal diagnosis of (Please select all that applies): *{General Anxiety Disorder, Social anxiety disorder, Specific phobia, Panic Disorder, Agoraphobia, Depression, Dysthimia, Seasonal affective disorder, Premenstrual dysphoric disorder, Bipolar Disorder (manic depressive disorder), Obsessive-compulsive or related disorders (e.g., OCD, hoarding, excoriation, trichotillomania), Post-Traumatic Stress Disorder (PTSD), Anorexia, Bulimia, Schizophrenia or other Psychotic Disorder, Personality disorder, Substance Use Disorder, Alcoholism, Substance use disorder (drug addiction), Gambling disorder, Somatoform disorder; Attention-deficit/hyperactivity disorder (ADHD), Other neurocognitive disorders (e.g., Alzheimer's disease, Parkinson's disease, vascular dementia, amnestic disorder). Please specify: For all selected options:* Please indicate which of your diagnoses are still current:*}*
- Have you previously been exposed to a major difficult or stressful event (for example: natural disaster, fire/explosion, transport accident, physical or sexual assault, combat/exposure to a war zone, life-threatening illness or injury...)? Y/N

Cohen's Perceived Stress Scale (PSS-10)

The 10 item PSS is used to quantify the perception of stress (2). Participants answer from a five-point Likert scale, with total scores ranging from 0 – 40, where higher scores indicate greater perceived stress (2). The Cronbach α and test-retest of the PSS-10 were both reported as greater than 0.70 (3).

The Quick Inventory of Depressive Symptomatology-Self Report, short version (QIDS-SR_{16})

The QIDS-SR_{16} is a questionnaire assessing the nine symptom domains of depression used in the DSM-IV. It contains 16 items for which respondents are asked to rate the severity of symptoms such as sleep disturbances (either reductions or increases in sleep), sadness, appetite and weight changes (either reductions or increases), and restlessness. Scores range from 1-27, with higher scores indicating more severe depression symptoms (4). The minimum clinically important difference for this questionnaire was found to be ≥ 28.5% (± 28.7%; 5). Based on a meta-analysis, the QIDS-SR_{16} was found to be unidimensional and to have an internal consistency (Cronbach's α) ranging from 0.69 to 0.89 (6). This questionnaire was included due to the low mood that may be associated with the imposed isolation.

Generalized Anxiety Disorder Scale (GAD-7)

The GAD-7 is a 7 items questionnaire, which is used to screen and assess severity of generalized anxiety disorder. Scores can range from 0 – 21, with a higher score indicating a greater severity. Internal consistency was found to be excellent (Cronbach α = 0.92) and test-retest reliability as good (intraclass correlation = 0.83). The GAD-7 was also found to have good sensitivity (89%) and specificity (82%; 7). The minimal clinically important difference on the GAD-7 was estimated at changes of 4 or greater (8). This questionnaire was included since several factors related to the pandemic can cause an increase in anxiety (e.g. isolation, the unknown, change).

Dimensional Obsessive-Compulsive Scale (Germs and contamination subscale)

The DOCS is a 20-item measure that measures the four dimensions of obsessive-compulsive symptoms (contamination, responsibility, unacceptable thoughts, symmetry) that have been identified in research (9). Test scores range from 0-80 (0-20 on each subscale). For the purpose of this study, only the contamination subscale, which relates to obsessions and cleaning compulsions, was used. Cronbach's α for the four subscales were in the good to excellent range (0.83-0.89) and test-retest correlations were considered to be of adequate stability for the total score (r = 0.66) and subscales (r = 0.55-0.66). Factorial validity was supported in both clinical (OCD and other anxiety disorders) and

nonclinical (undergraduate students) samples. The DOCS can distinguish individuals with OCD very well from nonclinical individuals, and quite well from individuals with other anxiety disorders. The DOCS can be used during the pandemic to identify new or pre-existing obsessive-compulsive symptoms exasperated by pandemic-related stress.

Big Five Personality Inventory, short version

The Big Five Inventory (short version), or BFI-10, is a 10-item questionnaire used to measure the Big Five Dimensions that was adapted from the BFI-44-item scales (10). Each scale (Extraversion, Neuroticism, Openness, Agreeableness, Conscientiousness) is comprised of two items. The four samples tested (US public and private university students, US dog owners, and German students) demonstrated that the BFI-10 scales differ from the BFI-44 scales in their part-whole correlations, with lower correlations for Openness (0.79) and Agreeableness (0.74), and higher ones for Extraversion (0.89), Neuroticism (0.86), and Conscientiousness (0.82). The test-retest stability showed respectable levels of 0.75 overall (0.72 for one US sample and 0.78 for German sample) and there was an average Cronbach's α of 0.75. The BFI-10 can be useful during the pandemic to measure peoples' personality traits and to observe whether certain traits are related to mental health challenges.

Brief Resilient Coping Scale (BRCS)

The BRCS is a 4-item measure, with scores ranging from 4-20, that aims to identify adaptive tendencies that individuals use to cope with stress (11). Cronbach's α for the combined samples (men and women diagnosed with rheumatoid arthritis) was 0.69 (ranging from 0.64-0.71). The test-retest reliability was $r = 0.71$ ($p < 0.001$). The BRCS is sensitive to changes in cognitive and behavioural resilient coping patterns as demonstrated by changes in BRCS scores after the intervention ($p < 0.05$). Under the current circumstances of living through a pandemic, this measure can capture the healthy strategies individuals are using to cope with stress that may be caused by new financial concerns, childcare arrangements, adapting to working from home, or caring for elderly family members or those who have compromised immune systems.

Sleep

- Have you ever had, a formal diagnosis [being told by a physician] of: *{Insomnia, Sleep-related breathing disorder (e.g. Sleep apnea), Restless legs syndrome, Narcolepsy, Nightmare Disorder, Non 24 Sleep Wake Disorder, Delayed Sleep Phase Syndrome, Advanced Sleep Phase Syndrome, Excessive daytime sleepiness or hypersomnia; For all selected options: Which of your diagnoses are still current? }*
- How would you assess your sleepiness during a typical day? *(By "sleepiness", we mean the strong tendency to doze off): {0- "no sleepiness" to 10 -"extremely sleepy"}*

Pittsburgh Sleep Quality Index (PSQI)

The PSQI is a 24-item questionnaire initially developed to assess sleep disturbances related to mood disorders and various clinical populations. It has seven components score with a range of 0-21 points. The questionnaire has been reported to have a high degree of internal consistency (Cronbach's $\alpha = 0.83$), as well as high sensitivity (89.6%) and specificity (86.5%) in distinguishing good and poor sleepers. Test-retest reliability was also found as high ($r = 0.85$, $p < 0.001$; 12). This questionnaire has been included because sleep can be influenced by several factors related to the pandemic (e.g. stress), as well as factors related to confinement (e.g. working from home with more flexible hours, family duties, etc.).

	Past 7 days	*In the last year*
How many times per week did you have bad dreams (negative dreams that do not wake you up) *{_____/week}* How intense were these bad dreams? {1 (not intense) 50 (moderately intense) 100 (extremely intense)} how many times per week did you have nightmares (negative dreams that wake up up) *{_____/week}*		

If ≥1 nightmare: How intense were these nightmares? {0 (not intense) 50 (moderately intense) 10 (extremely intense)} What level of distress are your nightmares causing? {0 (none) 50 (moderate) 100 (extreme)}		

Reduced Morningness-Eveningness Questionnaire (rMEQ)

The rMEQ assesses one's preferred timing for sleeping and waking up, as well as for doing various activities (e.g. intellectual, physical activities). Made with five items, the score can range from 4 – 25 and are sub-divided into 5 categories ranging from "definitely evening type" to "definitely morning type". The rMEQ correlated strongly with the MEQ ($r = 0.898$, $p < 0.00001$), and its five items ($r = 0.73$, $p < 0.001$), suggesting high reliability (13). A correlation was also found between rMEQ and the acrophase of motor activity ($r = -0.34$; $p < 0.001$), which suggest good external validity (14). The rMEQ was utilized due to the link between chronotype and mood as well as other behavioural variations, which have most likely been impacted by the pandemic.

If indicated a diagnosis of sleep disordered breathing:

Have you been using any of the following	*Past month before the outbreak*	*Past 7 days*
Positive Airway Pressure machine (e.g. CPAP; "breathing machine") Mandibular advancement device *Positional therapy* *Stimulant medication (e.g. modafinil)*		

Subsections for specific subgroups

Health care providers and administrative staff
(Based on Demographic section)

Position: *Resident Physician, Specialist physician, GP, allied health professional {Audiologist, Chiropodist/Podiatrist, Chiropractor, Dentist, Dietitian, Massage Therapist, Medical Laboratory Technologist, Medical Radiation Technologist, Midwife, Nurse, Occupational Therapist, Optician, Optometrist, Pharmacist, Pharmacy Technician, Physiotherapist, Psychologist, Respiratory Therapist, Speech-Language Pathologist, Other - Please specify: ____}, administrative staff {Medical Administrative Assistant, Medical Receptionist, Family Health Organization Administrator, Health Records Clerk, System Coordinator, Other - Please specify: ____}*

If Resident: "Program year": *{ PGY1 (postgraduate year 1) to PGY6 (postgraduate year 6)}*

Principal contact with patients:
inpatient {non-essential; essential; not sure}; outpatient {non-essential; essential; not sure}; both

Discipline: *Anatomical Pathology, Anesthesiology, Cardiology, Cardiovascular/Thoracic Surgery, Clinical Immunology/Allergy, Critical Care Medicine, Dermatology, Diagnostic Radiology, Emergency Medicine, Endocrinology/Metabolism, Family Medicine, Gastroenterology, General Internal Medicine, General/Clinical Pathology, Geriatrics, Hematology, Medical Biochemistry, Medical Genetics, Medical Microbiology and Infectious Diseases, Oncology, Nephrology, Neurosurgery, Nuclear Medicine, Obstetrics/Gynecology, Ophthalmology, Orthopedic Surgery, Otolaryngology, Pediatrics, Physical Medicine and Rehabilitation, Plastic Surgery, Psychiatry, Public Health and Preventive Medicine, Radiation Oncology, Respiratory Medicine/Respirology, Rheumatology, Urology, Other:* _____

Since the outbreak:
Have you been reallocated to work in a different unit or discipline? Y/N
If Yes - Please specify: _____
Have you been using virtual tools to connect with your patients or colleagues (e.g. phone, video): Y/N

If Yes - Please specify: _____

How satisfied are you with these tools? {0 Not at all 50 somewhat 100 Extremely}

If No – Why (please select all that applies)? {Not relevant for my current work, No/Insufficient resources available for this, This is not approved in my unit/hospital, I am not at ease with these methods, Other: _____}

To what degree do you agree with the following statements in relation to your work since the start of the outbreak?:

{Strongly agree, Somewhat agree, Neutral, Somewhat disagree, Strongly Disagree, N/A} - asking for before and after outbreak

Guidelines and instructions from my superiors are clear.
Instructions from my superiors change rapidly and it is difficult to keep track.
There are inconsistencies in instructions from my superiors making it hard to know what I should be doing.
I am receiving too many updates via email.
I have access to adequate personal protective equipment (PPE).
I have sufficient remote access to the information I need (e.g. patient files).
I am concerned I may develop COVID-19.
I am concerned I may pass COVID-19 to my patients/work colleagues.
I am concerned I may pass COVID-19 to my immediate family or others who live with me.

Measure of Moral Distress – Healthcare Professionals (MMD-HP)

A 27-item self-report questionnaire developed to assess moral distress (15). Participants rate each item on a 5-point Likert scale indicating the frequency of each situation ranging from 0 *(never)* to 4 *(very frequently)*. For each item, participants also rate how distressing the situation is when or if it occurs *(0 = never* and *4 = very distressing)*. The frequency score *(f)* is multiplied by the distress score *(d)* to obtain a composite score. An overall MMD-HP score is obtained by summing the composite item scores. Overall scores range from 0 to 432, with higher scores indicating higher levels of moral distress (15). The MMD-HP demonstrates high validity and strong internal consistency (Cronbach's $\alpha = 0.93$; 15). This questionnaire was included to assess the extent to which healthcare professionals have experienced moral distress since the COVID-19 outbreak.

Rushton Moral Resilience Scale (RMRS, Rushton et al, in preparation)

A 17-item self-report questionnaire developed to assess moral resilience. Participants are required to consider their response to challenging ethical situations in the past 3-months in their professional role. The RMRS consists of 4 subscales including: *response to moral adversity, personal Integrity, relational integrity,* and *moral efficacy*. Items are rated on a 4-point Likert scale, ranging from 1 *(disagree)* to 4 *(agree)*. The total RMRS score can be derived by computing the mean of all 17-items, with higher total scores indicating more resiliency. This questionnaire was included to assess moral resilience as it is an indicator of an individual's capacity to restore their integrity in response to moral complexities, setbacks, or distressing situations (e.g., COVID-19 outbreak). The instrument is currently in the process of validation.

Individuals with a current diagnosis of a mental/medical illness (based on Physical/Mental health sections)

A) If hospitalized (based on demographic section):

How many other people are sleeping in your hospital room?

This week, if you wanted, could you have:

- received visitors? {Yes, Yes, but only for a short time, No}
- Contacted your family or friends using virtual communications (e.g. via telephone, video camera (e.g. Skype, Zoom, Facetime)? {Yes, Yes, but only for a short time, No}
- Gone outside to take some fresh air: {Yes, Yes, but only for a short time, No}

- How frequently were you interacting with hospital staff
  Before the outbreak? *{N/A daily, weekly, monthly, less often than monthly}*
  In the last week? *{daily, weekly, monthly, less often than monthly}*
- How would you rate your relationship with hospital staff
  Before the outbreak? *{N/A 0-Very difficult/conflictual 50- Neutral 100- Excellent}*
  In the last week? *{0-Very difficult/conflictual 50- Neutral 100- Excellent}*
- How frequently were you interacting with other patients
  Before the outbreak? *{N/A daily, weekly, monthly, less often than monthly}*
  In the last week? *{daily, weekly, monthly, less often than monthly}*
- How would you rate your relationship with other patients
  Before the outbreak? *{N/A 0-Very difficult/conflictual 50- Neutral 100- Excellent}*
  In the last week? *{0-Very difficult/conflictual 50- Neutral 100- Excellent}*

B) If not hospitalized:
- have you ever stayed in hospital overnight?
  If yes - What was the approximate date of: last admission {DD/MM/YYY} discharge {{DD/MM/YYY}

- How many appointments have you been attending for your physical health in the last 6 months before the outbreak {daily, weekly, every 2 weeks, monthly, 2-5 times, once, none}

- How many appointments have you been attending for your physical health since the start of the outbreak? {daily, weekly, every 2 weeks, monthly, 2-5 times, once, none}
  If any - *Where these appointments: in person; over the phone; over the internet*

- How many appointments have you been attending for your mental health in the last 6 months before the outbreaks? {daily, weekly, every 2 weeks, monthly, 2-5 times, once, none}

- How many appointments have you been attending for your mental health since the start of the outbreak? {daily, weekly, every 2 weeks, monthly, 2-5 times, once, none}
  If any - *Where these appointments: in person; over the phone; over the internet*

- Are you doing anything on your own (not proposed by your doctor, therapist or health care provider) to improve your physical or mental health? Yes/No
  If yes – Please describe

Optional additional questionnaires

Revised Adult Attachment Scale (RAAS)

The RAAS is an 18-item, self-report measure used to assess individual differences in adult attachment style (16). It comprises 3 subscales: Close, which measures the extent to which a person is comfortable with closeness and intimacy; Depend, which measures the extent to which a person is comfortable depending on and trusting in others; and Anxiety, which measures the extent to which a person is concerned about being abandoned or unloved. Each subscale is scored on a scale of 1 (not at all characteristic of me) to 5 (very characteristic of me). The RAAS subscales have demonstrated acceptable to good internal consistency (Cronbach's alphas = 0.77-0.85) and good convergent validity. This scale was included as attachment to close others may change as a result of social distancing, virtual communication, and heightened anxiety during the pandemic.

UCLA Loneliness Scale (UCLA L-Scale – Version 3)

The UCLA L-Scale (version 3) was created to evaluate subjective feelings of social isolation and loneliness (1). This questionnaire has 20 items with a possible score range of 20 – 80, where higher scores indicate a greater degree of loneliness. The UCLA L-Scale has been found to have a good internal consistency (Cronbach α ranging from 0.89 - 0.94) and test-retest correlation (0.73; 1). Due to the imposed social distancing regulations that accompanied this pandemic, loneliness is likely to occur, which is why this questionnaire was included.

The Typical Dreams Questionnaire (TDQ)

The TDQ is used to better understand the dimensional structure of dreams. This instrument has previously been validated in a sample of undergraduate students across three Canadian universities (N=1181; 17) and in an online study (N=28,888; 17,18). In addition to the 56 items from the original questionnaire, we added 4 new themes to reflect potential themes and concerns directly associated with the pandemic. The original TDQ measures dream themes over the lifetime, but we have modified it to reflect dream themes in the *past 7 days* to accommodate the temporal structure of our study. The original results of the first TDQ study (17), and follow ups of the translated version in Germany (19) and in China (20) indicate a relative stability of predominant dream themes across ages and cultures. The instrument presents different dream themes and prompts participant to indicate how often they have experienced each of the dream themes on the following scale: 0=never; 1=once; 2=2-3 times; 3=4-10 times; 4=11+ times. Since dreams are influenced by daily life concerns and, in particular so by affectively charged personally significantly events, this questionnaire was included to capture the changes in dream content, specific to the pandemic.

Exeter Identity Transition Scales (EXITS)

An adapted version of the EXITS (21) was used to assess multiple group memberships. Four items measured multiple group memberships before the pandemic, four items measured the maintenance of group memberships since the pandemic, and four items measured the development new group memberships since the pandemic. Items were rated on a seven-point scale with item responses ranging from 1 (do not agree at all) to 7 (agree completely). The original EXITS demonstrated good to excellent internal consistency (Cronbach's α = 0.85-0.94) in a sample of adults recovering from stroke. The EXITS has also shown good convergent validity with another group membership measure. This instrument was included as the maintenance and development of group memberships during the pandemic may be affected by the transition to virtual communication.

Interpersonal Reactivity Index (IRI)

The IRI is a 28-item, self-report instrument designed to assess empathy (22). The IRI consists of four subscales: Perspective Taking, Fantasy, Empathic Concern, and Personal Distress. Each subscale includes seven items rated on a Likert-type scale ranging from 1 (does not describe me well) to 5 (describes me very well). The IRI has demonstrated acceptable internal consistency (Cronbach's alphas = 0.70-0.78) and good test-retest reliability (r_{males}= 0.61-0.79, $r_{females}$ = 0.62-0.81). Good convergent validity has also been shown by correlations with other validated measures of empathy. The IRI was included because empathy levels may be influenced by factors related to the pandemic (e.g., shared experience of struggle, rise in solidarity).

Liebowitz Social Anxiety Scale (LSAS)

A 24-item questionnaire developed to assess social anxiety by measuring both fear and avoidance across various situations (23). The LSAS is divided into 2 subscales addressing social interactional (11-items) and performance (13-items) situations (24). Each item depicts a situations and participant's level of fear and avoidance is rated on a 4-point Likert scale. The fear scale ratings range from 0 (no fear) to 3 (severe fear). The avoidance scale ratings are based on the percent of time a situation is avoided and range from 0 (never) to 3 (usually – 67 to 100%). The total fear and total avoidance scores are summed to obtain an overall total LSAS score. Higher scores indicate greater presence of social anxiety. The LSAS is a valid measure and demonstrates strong internal consistency (Cronbach's $\alpha = 0.96$; 24). This questionnaire was included to assess the presence of social anxiety in participants prior to the COVID-19 outbreak.

Peters et al. Delusions Inventory (PDI-21)

A 21-item self-report questionnaire developed to assess delusional symptoms (25). Each item is responded to using a "yes/no" format. The sum of the positive responses on each item provides a total score for a maximum score of 21. Higher scores indicate great delusional symptoms or proneness to paranoid thinking (26). For each item, there are also 3 subscales that measure degree of conviction, preoccupation, and distress. Each subscale is rated on a 5-point Likert scale ranging from 1 (not at all distressing) to 5 (very distressing). The PDI-21 demonstrates adequate internal consistency (Cronbach's $\alpha = 0.82$; 25). The test retest reliability is also high ($r = 0.78$, $p < 0.001$; 25). This questionnaire was included to assess delusional symptoms during the current pandemic situation. Delusional ideations are thought to have a strong social component (27) and may be exacerbated by sudden changes in social life, such as social distancing practices during the COVID-19 outbreak.

Smartphone Addiction Scale (SAS; items 3, 5, 8, 9)

The SAS is a 33-item, self-report measure designed to assess smartphone addiction (28). Items are rated on a six-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). Subscale scores are summed to create a total score (range = 33-198), with higher scores indicating a more serious smartphone addiction. The SAS has previously demonstrated excellent internal consistency (Cronbach's $\alpha = 0.97$), as well as good concurrent validity. This measure was included because smartphone use may increase as a result of limited activities and in-person interactions during the pandemic.

Cognitive emotion regulation questionnaire (CERQ)

The CERQ is a 36-item questionnaire, with scores ranging from 4-20, developed to measure cognitive emotion regulation strategies that individuals use in response to a stressful life event (29). It includes nine distinct subscales (self-blame, other-blame, rumination or focus on thought, catastrophizing, putting into perspective, positive refocusing, positive reappraisal, acceptance and refocus on planning). Good factorial validity and high Cronbach's α reliability coefficients were demonstrated, ranging from 0.75-0.87. Strong relationships were demonstrated between certain cognitive strategies (self-blame, rumination, catastrophizing, positive reappraisal) and symptoms of both depression and anxiety. Test-retest reliabilities of the subscales were considered adequate with values ranging from $r = 0.48$ to $r = 0.65$ ($p < 0.01$). The CERQ can be used during the pandemic to assess emotional problems people are experiencing, how they are coping, and to subsequently develop interventions.

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BMJ Open

Social, Financial and Psychological Stress during an Emerging Pandemic: Observations from a Population Survey in the acute phase of COVID-19

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2020-043805.R1
Article Type:	Original research
Date Submitted by the Author:	08-Oct-2020

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Primary Subject Heading:	Public health
Secondary Subject Heading:	Mental health
Keywords:	Public health < INFECTIOUS DISEASES, COVID-19, MENTAL HEALTH

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Social, Financial and Psychological Stress during an Emerging Pandemic: Observations from a Population Survey in the acute phase of COVID-19

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Word count: 4524

Abstract

Introduction: The negative impacts of COVID-19 have rippled through every facet of society. Understanding the multifaceted impacts of this pandemic is crucial to identify the most critical needs and to inform targeted interventions. This population survey study aimed to investigate the acute phase of the COVID-19 outbreak in terms of perceived threats and concerns, occupational and financial impacts, social impacts and stress between April 3 and May 15, 2020. **Methods:** 6,040 participants are included in this report. A multivariate linear regression model was used to identify factors associated with stress changes (as measured by the Cohen's Perceived Stress Scale (PSS)) relative to pre-outbreak retrospective estimates. **Results:** On average, PSS scores increased from low stress levels before the outbreak to moderate stress levels during the outbreak ($p<0.001$). The independent factors associated with stress worsening were: having a mental disorder, female sex, having underage children, heavier alcohol consumption, working with the general public, shorter sleep duration, younger age, less time elapsed since the start of the outbreak, lower stress before the outbreak, worse symptoms that could be linked to COVID-19, lower coping skills, worse obsessive-compulsive symptoms related to germs and contamination, personalities loading on extraversion, conscientiousness and neuroticism, left wing political views, worse family relationships, and spending less time exercising and doing artistic activities. **Conclusion:** Cross-sectional analyses showed a significant increase from average low to moderate stress during the COVID-19 outbreak. Identified modifiable factors associated with increased stress may be informative for intervention development.

Keywords: COVID-19; Socioeconomic factors; Stress

Strengths and limitations of this study

1. Comprehensive picture of the psychological, financial and social impacts of the COVID-19 pandemic
2. Large population-based study with a lifespan perspective, but imperfect representativeness due to sampling bias
3. Comparison of outbreak measures to pre-outbreak estimates allows for a better understanding of the extent to which COVID-19 disrupted people's daily lives, but may be sensitive to recall bias
4. Identification of modifiable factors associated with the psychological response to the pandemic

INTRODUCTION

An outbreak of Coronavirus Disease (COVID-19), a cluster of acute febrile respiratory illness, was first reported in Wuhan, China, in December 2019 (1). The World Health Organization declared a pandemic on March 11, 2020, after infections were reported in 110 countries and territories. As of June 4 2020, COVID-19 had spread to 216 countries and territories, infected 6,416,828 individuals, and caused 382,867 deaths worldwide (2). This pandemic has created profound economic and social disruption, with the potential for widespread psychological impacts. Given the lack of specific treatments for the prevention and management of the COVID-19 infection and the rapid acceleration of the virus transmission, the negative impacts of COVID-19 are rippling through every aspect of society (3). Markedly, guidelines and new regulations have been put in place to promote self-isolation in order to limit the spread of the virus. As a result, most inpatient and outpatient health services cut down non-essential services. Several offices and businesses asked their employees to work from home; others reduced work hours or terminated jobs. Schools and universities were closed with some of them offering distance education. Overall, the pandemic situation has changed core aspects of people's lives in a unique and complex manner.

Early COVID-19 studies from China, India, Brazil, Paraguay, and the United States indicated high levels of stress with associated sleep problems, poor life satisfaction, and mental illness (4–8). Findings from a comparative study suggest that Western countries may have higher stress levels during the pandemic than Eastern countries, highlighting the needs for additional investigations in Western countries such as Canada (9). In the early phases of the COVID-19 pandemic, roughly 35% of 50,000 residents in China were experiencing psychological distress (7). In San Francisco (US), there was an 8-fold increase (from 7% to 66%) in feeling distressed compared to before the pandemic (10). In Australia, almost 80% of survey respondents reported moderate to extreme levels of uncertainty about the future, half reported feeling lonely, and half reported moderate to extreme worry about their financial situation (11). Some financial stressors, such as employment loss, have also been associated with greater symptoms of depression and COVID-19 related concern (6). However, many of the previous studies did not estimate temporal changes before and during the outbreak, making it difficult to disentangle difficulties emerging in response to the outbreak from pre-existing ones. Also, many focused on isolated aspects of consequences of the COVID-19 outbreak without presenting a comprehensive picture and thus have limited capacity to identify potential factors modulating the range of psychological responses to the outbreak.

The nature and extent of the outbreak consequences are bound to differ considerably from one individual to the other and to be influenced by a range of demographic, occupational, and physical/mental health factors (7,11,12). There is thus a need for comprehensive investigations to identify potential factors modulating psychological responses to this complex situation. Furthermore, most studies to date adopted a broad, representational sampling of adults, but increased efforts to reach individuals at elevated risk for negative outcomes and a lifespan perspective incorporating younger to older age ranges holds particular benefits in informing both prevention and intervention initiatives.

The current report presents the cohort characteristics and baseline observations from an ongoing longitudinal survey launched during the acute phase of the COVID-19 pandemic. Perceived threats and concerns, occupational, financial and social distancing behaviors, impacts on social life, as well as psychological stress changes relative to retrospective pre-outbreak estimates are reported.

METHODS

Study Design

A comprehensive longitudinal online survey was distributed via websites, social media, and multiple organizations and hospitals across Canada. This recruitment strategy (see supplementary section for details) was used to target three core groups: people with chronic mental or physical illnesses, healthcare providers, and the general population. While subsequent reports will focus on specific subgroups, the current report introduces the full cohort.

The sole inclusion criterion was to be 12 years of age and older. The survey was available in English and French, nested in a secured access online platform (www.qualtrics.com) and designed on a decisional tree structure. It included a set of validated questionnaires and custom-built questions pertaining to the pandemic (see supplementary section).

The survey was designed to address the following primary areas of interest: (1) Symptoms related to COVID-19 and rates of positive tests; (2) Physical and mental health conditions; (3) Access to healthcare services; (4) Social distancing practices; (5) Consequences of the outbreak for family, work-related and financial outcomes; (5) Factors and coping mechanisms that may be protective against adverse health, psychosocial, and financial impacts; (6) Organizational support, work resources and difficulties, degree of moral distress and moral resilience in healthcare

staff. The survey also included general demographics and indices for geocoding and socioeconomic status. To enable future comparisons, questions were aligned wherever possible with previous surveys such as those used by Census Canada and recent COVID-19 surveys circulated in China (13,14). The survey included a briefer version for health care workers and an adapted version for adolescents. At the start of the survey, participants were informed that they had the choice to skip items. Median completion time was 53.1 minutes (Interquartile range: 38.6 minutes).

Themes covered in the current report include: factors linked to the pandemic (e.g., testing, perceived threat and concerns); occupational and financial life; social life, and psychological stress. Retrospective questions were used to estimate temporal changes from "before the outbreak" (i.e. in the last month before the outbreak) to "during the outbreak" (i.e. in the seven days prior to filling out the survey). The survey was developed and conducted following guidelines from the Checklist for Reporting Results of Internet E-Surveys (15). Additional information about the survey and the psychometric properties of validated scales included are outlined in supplemental material.

Electronic informed consent was obtained from each participant. This study was approved by the Clinical Trials Ontario - Qualified Research Ethics Board via the Ottawa Health Science Network (Protocol #2131) and registered at ClinicalTrials.gov (NCT04369690).

Patient and Public Involvement

People from the general public, individuals with mental disorders and healthcare professionals were consulted during the survey development and testing phase. They were asked to provide feedback on the survey content, both in terms of prioritising the most important questions (thereby influencing outcome measures) and the clarity of questions formulation. They were also asked to comment on the survey format, notably in terms of the layout of the questions on the online platform, the general survey length, and carving out of distinct survey sections specifically targeting certain subgroups (thereby influencing the study design). These individuals were not directly involved in active recruitment or the dissemination plan for the study.

Primary outcome: Psychological stress

Respondents retrospectively assessed their stress levels on the Cohen's Perceived Stress Scale (PSS; 16) for the last month before the outbreak (i.e. pre-outbreak) and for the past 7 days (i.e. during the outbreak). PSS scores were analyzed continuously (i.e. scale of 0 to 40, estimated minimal clinically important relative change: 28%; 17), and categorically based on established thresholds: 0 to 13 (low stress), 14 to 26 (moderate stress), and 27 to 40 (high stress) and previously estimated minimal clinically important change corresponding to a 28% relative change (18).

Factors hypothesized *a priori* to be associated with stress changes were: pre-outbreak stress level, time elapsed since the pandemic declaration by the WHO, age, sex, education level, total family income, employment status, working with the general public, political views, having underage children, having travelled abroad in the past 60 days, index reflective of the number and severity of potential COVID-19 symptoms (i.e. COVID-19 symptoms index), the Dimensional Obsessive-Compulsive Scale (DOCS) contamination subscale, Big5 personality subscales, Brief Resilient Coping Scale (BRCS), having a mental disorder, alcohol and drugs use, having a physical condition at risk for COVID-19, sleep duration, quality of family relationships, and amount of time spent outdoors, interacting with other people, following the news on COVID-19, and engaging in physical and artistic activities.

Analyses

Descriptive statistics were used to characterize survey respondents. To assess changes before and during the outbreak, Chi-squared analyses, paired t-tests/Wilcoxon tests, and McNemar-Bowker tests were used. A repeated measures ANOVA was used to assess the unadjusted cross-sectional temporal evolution of PSS change scores across the study period.

Multivariate linear regression was used to identify factors independently associated with PSS changes scores using the "enter" pairwise approach with the predictors listed above. To improve sample homogeneity, this model was run solely on the subgroup of Canadian respondents. A series of multivariate linear models were also run to assess the relation between changes in stress and each independent variable separately while accounting for pre-outbreak PSS scores. Analyses were done using the Statistical Package for Social Sciences (IBM SPSS Statistics for Windows, Version 23.0. Armonk, USA). Details on data cleaning procedures are provided in the supplementary material.

RESULTS

Survey and sample characteristics

Between April 3rd and May 15th (i.e. 23 to 65 days after the pandemic declaration by the WHO, a period starting around the peak of the first wave in Canada where 900 to 2,000 new reported cases were deemed to emerge each week (19)), 6,685 individuals consented to take part in this study and answered the first survey question. All 6,040 respondents who filled out the minimally sufficient portion of the survey (90.4% of those who answered the

first question; see details in supplement) were included in the current report. 81.7% respondents completed the entire survey.

Sample characteristics are presented in Table 1. Respondents ranged between 12 and 83 years old. Most respondents were middle-aged, female, Canadian (mostly from Ontario or Quebec), Caucasian, highly educated, lived in an urban residential area, had children, and were employed with a total yearly family income above $40,000. More than 50% reported having a physical illness known to be at risks for adverse COVID-19 outcomes, and about 30% had a diagnosis of a mental disorder.

Table 1. *Characteristics of the survey responders at the time of the survey completion*

	Total n	Missing values % (frequencies)	Mean+SD / % (Frequency)
Time since outbreak start (days)	6040	0.0 (0)	50.9±11.7
General demographics			
Age	6034	0.1 (6)	51.8±17.1
Biological Sex (Females)	6039	<0.1 (1)	70.3% (4248)
Gender / Sex Change	5480	9.3 (560)	
Male			31.6% (1730)
Female			67.1% (3676)
Transexual			0.2% (10)
Gender queer or expansive			0.9% (50)
Other			0.3% (14)
Current Location	6005	0.6 (35)	
Canada			97.3% (5845)
US			1.3% (79)
Others*			0.7% (40)
France			0.4% (26)
Australia			0.2% (15)
Ethnicity	5577	7.7 (463)	
Caucasian			86.6% (4832)
Others			5.6% (311)
Asian			3.4% (191)
First Nation, Metis or Inuk			2.1% (115)
Arab			1.2% (68)
Black			1.1% (60)
Non-Citizen (vs not)	5634	6.7 (406)	6.1% (343)
Political Views (Left-Wing / Right-Wing)	5167	14.5 (873)	44.8% (2313) / 14.6% (754)
Education	5495	0.8 (49)	
University certificate, diploma or degree			63.6% (3497)
College			21.8% (1197)
High school			14.8% (801)
Socioeconomic, occupational and living situation			
Total family income (< $40K/$40k to $100K/>$100K)	5601	7.3 (439)	11.1% (624)/ 40.6% (2272)/ 48.3% (2705)
Employment status	5958	1.4 (82)	

Unemployed/ Retired / Student			12.8% (764)/ 30.6% (1822) / 3.6% (213)
Employed			53.0% (3159)
Having work involves contact with the general public (vs not)	5779	4.3 (261)	14.3% (826)
Dwelling (House / Apartment or Condo)	5417	10.3 (623)	77.4% (4191) / 22.6% (1226)
Living situation (Alone / with another person / with multiple people)	5606	7.2 (434)	20.0% (1123)/ 44.2% (2478)/ 35.8 (2005)
Living area (Rural / Urban)	5565	7.9 (475)	11.8% (665) / 88.2% (4910)
Health and risks factors			
C19 Symptoms index (0-30 scale)	6040	0.0 (0)	2.1±3.6
Presence of Physical condition at risk for COVID-19† (vs not)	5629	6.8 (411)	52.1% (2934)
Sleep duration (hours; Before the outbreak/ During Outbreak)	4998	17.1 (1030)	7.3±1.2 / 7.2±1.5
Travelled abroad in last 60 days (vs not)	5548	8.1 (492)	11.0% (608)
Psychological Domain			
PSS scores (0-40 scale; Before the outbreak / During Outbreak)	5132	15.0 (98)	12.9±6.8 / 14.9±8.3
DOCS - Contamination (0-20 scale)	4920	18.5 (1120)	6.1±3.7
Big 5 Subscales (2-10 scale)	4881	19.2 (1161)	
Extraversion			6.2±2.1
Agreeableness			7.4±1.7
Conscientiousness			7.8±1.8
Neuroticism			5.6±2.3
Openness to Experiences			6.9+1.9
Brief Resilient Coping Scale (4-20 scale)	4856	19.6 (1184)	14.7±2.9
Mental disorder diagnosis (vs not)	5607	7.2 (433)	29.0% (1626)
Social Domain			
Family Relationship (0-100 scale; Before the outbreak / During Outbreak)	5328	9.5 (572)	79.5±19.9 / 74.7±25.4
Has underage children (vs not)	5731	5.1 (309)	17.2% (985)
Behavioral Domain			
Number of alcoholic drinks/week (Before the outbreak / During Outbreak)	5557	7.9 (476)	4.1±6.5 / 4.8±6.9
Number of cannabis use/week (Before the outbreak / During Outbreak)	5512	8.6 (518)	0.9±5.1 / 1.0±5.1
Spent 30min or less:	5612	7.1 (428)	
Outdoor			39.3% (2203)
Exercising			47.7% (2668)
Following C19 news			44.0% (2457)
Interacting with people in person			50.6% (2767)
Interacting with people virtually			39.5% (2194)
Doing an artistic activity			75.6% (4155)

Means, standard deviations (SD), frequencies and percentages (calculated on each item's total sample) for main sample characteristics Location Others: Armenia (n=1), Azerbaijan (n=1), Burkina (n=3), Congo (n=1), Czech Republic (n=1), Denmark (n=1), Germany (n=3), Ireland (n=1), Italy (n=1), Ivory Coast (n=1), Jamaica (n=1), Lebanon (n=1), Malaysia (n=1), Netherlands (n=3), New Zealand (n=1), Pakistan (n=1), Poland (n=1), Romania (n=2), Singapore (n=3), Spain (n=1), Sweden (n=1), United Kingdom (n=8), Vietnam (n=1), Other (n=1); Gender expansive: fluid/non-binary; Alcohol consumption (number of drinks per week); Cannabis consumption (number of times per week), Living area based on postal code. † Physical condition at risk for COVID-19: e.g. respiratory, cardiovascular or autoimmune conditions.

COVID-19 testing, perceived threats/concerns, and changes relative to before the outbreak

79.3% of respondents endorsed at least two symptoms that could be linked to COVID-19. 6.7% of respondents said they had been tested for COVID-19. Of those, 4.5% tested positive and 2.7% awaited results. Of those who had not been tested, 4.7% had contacted public health services to be tested. Within this group, 85.4% were declined testing. Rates of declined testing were similar between rural (85.0%) and urban areas (86.2%; Chi-squared=0.02, p=0.886).

Amongst all respondents, 43.0% estimated that a coronavirus infection would pose high to very high threat to their health and 32.8% estimated moderate threat. A high to very high threat was estimated by 28.1% for their financial situation, 41.5%for their jobs or businesses, and 62.8% for their country. Figure 1 shows the degree of concerns related to different secondary effects of the outbreak. Overall, the highest concerns pertained to one's children or relatives not coping well with the situation, closely followed by being unable to access medications or medical services. When asked when they expected the global situation to go back to normal, 37.2% replied "I have no idea", 27.8% estimated after March 2021, 17.4% by March 2021, 14.9% by September 2020 and 2.7% by June 2020. 30.4% anticipated that their own personal situation would get back to normal before the global situation resolves, and 10.1% anticipated that it would take longer for their personal situation than for the global situation to get back to normal.

On average, when comparing pre-outbreak estimates and current states: sleep duration shortened ($Z=-4.9$, $p<0.001$, $r=0.07$), family relationships deteriorated ($Z=-13.4$, $p<0.001$, $r=0.18$), and weekly alcohol and cannabis consumption increased ($Z=-18.1$, $p<0.001$, $r=0.24$ and $Z=-18.1$, $p<0.001$, $r=0.10$). Specifically, 10.4% of the sample over 16 years of age increased their weekly alcohol consumption by five drinks or more.

Occupational and Financial Impacts

Within actively working respondents, 62.8% were working from home, 9.8% had increased work hours because of the outbreak, and 15.6% had decreased work hours. 7.9% underwent a salary decrease due to the outbreak, with an overall median salary reduction of 35% (IQR=50). Of all respondents who were working in the month preceding the outbreak, 11.1% saw their employment terminated because of the outbreak.

Rates of employment termination due to the outbreak or salary loss exceeding 35% were higher in those with a family income below $40k compared to those with higher family income (12.6%, $\chi^2=121.0$, $p<0.001$), in

people without a university degree (23.6%) compared to in those with a university degree (11.0%; χ^2=74.6, p<0.001), and in people with a diagnosis of a mental disorder (16.8%) compared to those without (13.5%,; χ^2=4.9, p=0.027). Rates of employment termination/salary decrease were similar in females versus males (χ^2=2.3, p=0.132), Caucasians versus other ethnicities (χ^2=0.9, p=0.335), and people with or without physical illnesses (χ^2=0.1, p=0.719).

Across the entire sample, 64.5% reported that their expenses had decreased since the start of the outbreak and 15.5% reported an increase, with a mean estimated rise in health-related expenses of 10.4±20.3%, compared to 29.2±38.0% for food-related expenses.

Social Life

Family and other relationships

Half of parents with underage children (54.0%) said that they or their partner were homeschooling. Most respondents estimated that the outbreak was being somewhat disruptive for the management of their work/study and family life (mean rating on a scale from "0 -Very disruptive" to "50- Not different from usual" and "100-Easier than Usual": 21.6±45.6).

The proportion of respondents interacting with their family more frequently since the start of the outbreak was significantly higher than the proportion of those who were interacting less frequently (p<0.001). The reverse pattern was found for interactions with friends (p<0.001). 40.0% of respondents reported feeling more connected to their family during compared to before the outbreak, while 21.0% felt less connected. This pattern was reversed for connectedness to friends, with 36.2% reporting feeling less connected and 28.3% feeling more connected. On average, relationships ratings with both family and friends during the outbreak significantly deteriorated compared to pre-outbreak estimates (Z=-10.9, p<0.001 and Z=-28.1, p<0.001).

Social Distancing

65.8% of respondents were following at least one social distancing guideline at the time of filling out the survey, with 51.6% maintaining a 2 meters distance from others, 46.3% avoiding gatherings in person, 42.5% not using public transport, 37.9% not attending public areas, 35.4% not going out of the home unless they had no choice (e.g. to go to a medical appointment), 29.5% wearing a mask when leaving home, and 17.9% having food/supplies delivered to their homes. A statistically significant proportion of individuals (between 57.7 to 89.0%) disengaged

from some of the social distancing practices that they had initially followed since the start of the outbreak (all $p<0.001$).

Psychological stress

PSS scores globally increased from 12.9±6.8 before the outbreak to 14.9±8.3 during the outbreak ($Z=-22.9$, $p<0.001$, $r=0.31$), which reflects a transition from low to moderate stress. Rates of individuals with PSS score in the high stress range increased from 3.8% before the outbreak to 10.2% during the outbreak (Figure 2). However, there was considerable heterogeneity in stress changes: a clinically meaningful increase in stress was noted in 30.3% of respondents, while 10.3% had a clinically meaningful reduction in stress.

Figure 3 depicts the temporal dynamics of stress changes based on the time at which respondents filled out the survey. Over the course of the study period, there was an overall attenuation of stress worsening on PSS change scores ($F(5,5097) =20.07$, $p<0.001$). There was a non-significant reduction in stress worsening between April 3rd and 10th, followed by a plateau which persisted until May 8th, after which there was a significant drop ($p\leq0.006$), compared to all preceding time periods.

In the multivariable linear regression model, the following variables were found to be significant independent factors linked to stress worsening (Table 2, right panel): shorter time elapsed since the start of the outbreak, younger age, female sex, having left wing political views, work involving in-person contact with the general public, having underage children, worse COVID-19 symptoms index, shorter sleep duration, lower PSS scores before the outbreak, higher scores on the DOCS - Contamination subscale and on the extraversion, conscientiousness and neuroticism scales of the Big5, lower BRCS scores, having a mental disorder diagnosis, having had more than five alcoholic drinks in the past week, worse family relationships, and spending less time exercising and doing artistic activities.

When assessed on their own, the following factors were found to be predictive of worse increases in stress levels (while controlling for stress levels before the outbreak), but became non-significant when controlling for confounders in the global model (table 2; left panel): lower family income (stronger relationship for the lowest income level), consuming cannabis or other drugs, spending less time outdoors and more time interacting with people virtually. Being retired and having travelled abroad in the past 60 days, having a physical condition at risk for COVID-19, were associated with lower stress worsening. Exploratory analyses stratified by biological sex are provided in supplemental materials.

Table 2. *Coefficients of the predictive model for changes in stress*

		Single Predictor Variables					Full Model				
				95.0% CI					95.0% CI		
	n	B	SE	LL	UL	p	B	SE	LL	UL	p
Time since outbreak start (7 days)	5359	-0.55	0.01	-0.09	-0.07	<0.001	-0.18	0.01	-0.04	-0.01	0.002
General demographics											
Age (10 years)	5357	-0.96	0.01	-0.11	-0.09	<0.001	-0.52	0.01	-0.07	-0.04	<0.001
Male sex (female)	5358	-2.02	0.19	-2.38	-1.65	<0.001	-0.97	0.19	-1.35	-0.60	<0.001
Political Views (vs Center or Others)											
Left Wing	4657	0.85	0.20	0.47	1.24	<0.001	0.37	0.18	0.01	0.72	0.042
Right Wing	4657	0.21	0.28	-0.34	0.75	0.457	0.31	0.24	-0.17	0.79	0.206
Education: No university (vs university)	5327	-0.20	0.18	-0.55	0.16	0.277	-0.22	0.19	-0.59	0.14	0.230
Socioeconomic, occupational and living situation											
Total family income (vs >$100k)											
< $40k per year	5009	0.72	0.31	0.12	1.33	0.019	0.30	0.18	-0.05	0.65	0.094
$40 to $100k per year	5009	0.39	0.19	0.02	0.75	0.039	0.35	0.31	-0.25	0.95	0.256
Employment status (vs employed):											
Unemployed, on leave or student	5359	0.38	0.26	-0.13	0.88	0.144	0.07	0.26	-0.45	0.59	0.787
Retired	5359	-2.37	0.19	-2.75	-2.00	<0.001	-0.15	0.25	-0.64	0.34	0.544
Work contact with general public (vs not)	5189	1.76	0.26	1.26	2.26	<0.001	0.58	0.25	0.08	1.07	0.022
Living in apartment or condo (vs house)	4858	0.36	0.21	-0.05	0.77	0.089	-0.10	0.21	-0.50	0.31	0.631
Health and risks factors											
C19 Symptoms index (scale from 0 to 30)	5359	0.23	0.02	0.19	0.28	<0.001	0.14	0.02	0.09	0.19	<0.001
Physical condition at risk† (vs no condition at risk)	5342	-0.76	0.17	-1.09	-0.42	<0.001	0.15	0.18	-0.21	0.50	0.415
Sleep Duration (hours)	4804	-0.59	0.06	-0.1	-0.48	<0.001	-0.53	0.05	-0.64	-0.42	<0.001
Travelled abroad in last 60 days (vs no travel)	4960	-0.45	0.21	-0.86	-0.04	0.033	-0.19	0.26	-0.70	0.33	0.472
Psychological Domain											
Pre-outbreak PSS (0-40 scale)	4920	..	..	..	..	..	-0.44	0.02	-0.47	-0.41	<0.001
DOCS - Contamination (0-20 scale)	4717	0.47	0.02	0.43	0.52	<0.001	0.38	0.02	0.34	0.42	<0.001
Big 5 Personality (2-10 scale)											
Extraversion	4680	0.15	0.04	0.07	0.23	<0.001	0.13	0.04	0.06	0.21	0.001
Agreeableness	4681	0.00	0.05	-0.10	0.11	0.933	0.05	0.05	-0.05	0.14	0.319

Conscientiousness	4681	0.16	0.05	0.06	0.26	0.002	0.13	0.05	0.04	0.23	0.007
Neuroticism	4681	0.25	0.04	0.17	0.33	<0.001	0.35	0.05	0.25	0.44	<0.001
Openness to Experiences	4681	-0.01	0.05	-0.11	0.08	0.778	0.07	0.04	-0.02	0.16	0.116
Brief Resilient Coping Scale (4-20 scale)	1663	-0.17	0.03	-0.23	-0.11	<0.001	-0.24	0.03	-0.30	-0.17	<0.001
Mental disorder diagnosis (vs no diagnosis)	5326	2.34	0.20	1.95	2.74	<0.001	1.14	0.20	0.74	1.54	<0.001
Social Domain											
Family Relationship (per 10 units; 0-100 scale)	5028	-0.55	0.00	-0.06	-0.05	<0.001	-0.39	0.00	-0.05	-0.03	<0.001
Has underage children (vs no underage children)	5092	2.16	0.24	1.69	2.63	<0.001	0.89	0.23	0.43	1.34	<0.001
Behavioral Domain											
Weekly alcohol consumption (vs no drinks)											
1 to 5 drinks	5358	-0.18	0.21	-0.58	0.23	0.394	0.19	0.20	-0.20	0.57	0.344
More than 5 drinks	5358	0.15	0.21	-0.27	0.56	0.490	0.61	0.20	0.21	1.01	0.003
Weekly cannabis or illicit drugs use (vs no use)	5312	1.13	0.26	0.63	1.63	<0.001	0.45	0.25	-0.03	0.93	0.066
Spent 30min or less (vs more than 30min):											
Outdoor	5317	0.91	0.18	0.56	1.25	<0.001	0.07	0.19	-0.32	0.45	0.736
Exercising	5295	1.03	0.17	0.70	1.37	<0.001	0.49	0.19	0.12	0.87	0.010
Following COVID-19 news	5296	-0.25	0.17	-0.59	0.08	0.141	-0.24	0.17	-0.57	0.09	0.155
Social interactions in person	5201	0.14	0.17	-0.20	0.48	0.406	0.21	0.16	-0.11	0.53	0.205
Social interactions virtually	5277	-0.46	0.18	-0.80	-0.11	0.009	0.01	0.17	-0.33	0.34	0.969
Doing an artistic activity	5210	0.16	0.20	-0.23	0.56	0.421	0.50	0.19	0.12	0.88	0.010

Coefficients parameters for multiple linear regression models including only each single predictors and baseline stress (Left panel) and for the full model (right panel). B: Unstandardized coefficients (calculated per one unit for continuous variables, except for the time elapsed since the start of the outbreak, which was calculated for each 7 days, as well as age and family relationships which were calculated per 10 units). Units (for continuous variables) and reference groups (for categorical variables) are presented in parenthesis in the first column. SE: standard error of B, CI: confidence interval, LL: lower limit, UL: upper limit, Dimensional Obsessive Compulsive Scale (DOCS), Cohen's Perceived Stress Scale (PSS), Family Relationship rated on scale from "0-Very difficult/conflictual", "50-Neutral" to "100- Excellent". † Physical condition at risk for COVID-19: e.g. respiratory, cardiovascular or autoimmune conditions.

DISCUSSION

Results from this survey in 6,040 respondents suggests that the financial, social and psychological correlates of the COVID-19 outbreak may interact in a complex manner, and that they vary considerably across individuals. While some of our findings echo previous observations, we propose a more comprehensive integrated model of independent factors associated with worse stress responses to this pandemic.

In line with previous polls reporting that many people perceived the COVID-19 pandemic as a greater threat to the economy than to their health (20), we observed higher sense of threat related to external/global as opposed to more personal matters. Our observation of concerns about access to medical services are aligned with high rates of potential COVID-19 symptoms with low reported access to testing for COVID-19, a combination which may increase stress. Nearly 40% of respondents endorsed being uncertain about when the global situation would get back to normal. This contrasts with the 80% of Australians who reported moderate to extreme uncertainty about the future in a previous survey done in March and April 2020 (11). This difference could stem from temporal, cultural or public health variants.

Previous studies indicated that lower income is associated to higher incidences of COVID-19 infections (21), but such economic factors are also affecting many collateral effects of the pandemic. Consistent with Canadian rates of employment which plummeted by about 11% from February to April 2020 (22), but lower than the 50% worldwide job losses anticipated by the UN labor agency (23), 11% of our respondents lost their job because of the outbreak and an additional 8% underwent salary cuts, with a non-trivial median reduction in salary of 35%. Low income and the lack of a university degree were found to be major risk factors for adverse work and salary outcomes, a phenomenon that may further widen economic disparities. Similarly, reports in the US showed that 40% of people earning $40K or less lost their jobs due to the COVID-19 outbreak and that most of those who kept their job had a university degree (24). These figures are however much lower than those observed in developing countries, with about two-thirds of respondents to a survey circulated in Vietnam reporting decreased income (25). Importantly, the current study is to our knowledge the first one to identify having a mental disorder as a risk factor for employment termination during the outbreak. The psychological impacts of unemployment are likely to further worsen mental health in these individuals, and they may be at higher risks for subsequent unemployment (26). Therefore, this subgroup may face additional challenges not only to cope with the occupational and financial consequences of the pandemic, but also to find work after de-confinement, which highlights potential needs for

targeted governmental relief packages and supporting programs to find work. Increased expanses since the start of the outbreak seemed to be most prominently related to food. Although concerns about lacking food were rather mild in the current sample, some respondents may have been stocking up in the context of supply disruption and/or facing increases in pricing for food (27).

In line with early COVID-19 reports from China describing major reductions in social contacts beyond the household (28), we observed increased interactions with family and decreased interactions with friends, which probably reflect social distancing. This change was accompanied by consistent changes in feelings of connectedness and, paradoxically, by a worsening in relationships quality. Together with previous observations of increased family violence during the pandemic (29), this stresses the need to better understand how close proximity in the context of confinement may create family tensions. Only 66% of respondents were following at least one social distancing guideline, a percentage similar to previously reported rates in a previous Canadian poll (30). Although the state of emergency still prevailed at the time of the survey, about 60-90% of respondents had been phasing out their social distancing practices. This raises considerable concerns since even a 20% increase in adherence to social distancing can contribute to slow the spread of COVID-19 (31).

We found a significant increase in stress co-occurring with the outbreak, with 30% of individuals undergoing clinically meaningful stress worsening. This echoes findings from a recent systematic review (32) and is consistent with rates of moderate to severe stress reaching 20 to 27% in Asia, Europe, and Australia (7,11,33–37). As anticipated, more acute stress reactions were observed in the earlier phases of the outbreak, with a sharp drop shortly after the mortality peak in Canada was announced. These preliminary observations suggest that although the degree of stress worsening during the outbreak may have been phasing out for many individuals, two months after the pandemic declaration, stress levels were not fully back to pre-outbreak levels. This supports the need for the development/promotion of self-help tools for stress management.

Having a current diagnosis of a mental disorder was found to be the strongest independent factor linked to stress worsening, a finding consistent with previous observations about pre-existing psychiatric conditions (7,11,33–36). This stresses the importance of further investigation in this group who may require more intensive stress management resources. Poorer coping skills and personality traits loading heavily on neuroticism, extraversion and conscientiousness were also associated with worse increases in stress. High neuroticism has previously been linked to maladaptive stress coping strategies (38). While personalities loading on conscientiousness are usually well-

organized, goal-directed and more effective in dealing with stress, the uncertainty associated with this unprecedented outbreak may prevent them from relying on their usual coping strategies, leading to heightened stress. Since extraversion is characterized by a tendency to be active and sociable, social distancing measures probably contributed to worse stress responses in extraverted individuals. Accordingly, a Brazilian Covid-19 survey showed that higher extraversion was associated with lower engagement in social distancing practices, likely reflecting how challenging it is for extraverted individuals to reduce their social proximity (39). In line with our finding of an association between left-wing views and stress worsening, a recent Gallup poll in the US (40) found that liberals (as compared to conservatives) were more likely to worry about worst-case outcomes of the pandemic. Humans are known to outsource their understanding of the world to their political ingroup (41). The politicization of the crisis and associated media bias (with risk-preventive, pro-lockdown perspectives in the liberal media, and the conservative media appearing to take the crisis less seriously) is one possible explanation for worse pandemic-related distress in liberals.

Our results confirm that several factors previously linked to stress, such as female sex, younger age, having children, and having symptoms that could be linked to COVID-19 (e.g. 7,11,12,37,42–44) independently contribute to stress worsening. While previous reports highlighted high risks in healthcare workers (e.g. 12,45,46), our findings suggest that this extends to other types of workers physically interacting with the public (e.g. people working in public transport, grocery stores). Importantly, the current study also identified some modifiable factors that were associated with lower stress responses. For instance, protecting a sufficient period for sleep, minimizing alcohol and drug consumption, promoting better family relationships, exercising, and doing artistic activities may be helpful. Sleep disturbances often emerge in response to external stressors and can further worsen physiological and psychological stress responses (47). Since sleep is thought to contribute to emotional regulation (48), attenuating the adverse effects of the pandemic on sleep may enable better coping resources. In addition to the benefits of exercise on sleep, about 30 minutes of moderate-intensity aerobic exercise three times weekly may also boost mood and reduce psychological distress (49). Planning family activities that may help alleviate tensions and foster more positive relations, as well as creating some time and space for individuals to offset the challenges posed by sustained family proximity may also be relevant to manage stress. Appropriate home-schooling support, as well as better work adaptation for parents may also be required. Increased access to testing is likely to have the collateral effect of attenuating stress levels. Further investigations may be required to better understand if limiting the time spend on

virtual interactions with people may also play a protective role against stress. From the current study, it is not possible to differentiate virtual interactions that may be related to work from those related to family/friends contacts. Also, the association with increased stress worsening and virtual communications may be in part driven by individuals seeking more frequent virtual contacts to alleviate their stress, but the cross-sectional nature of the current analyses does not allow to determine whether this is an effective strategy or not. There was also considerable sex-differences in factors associated with stress, which may call for the development of sex specific interventions. Furthermore, although this was not investigated in the current report, other studies indicated that preventative measures and personal protective equipment may facilitate lower stress in relation to the pandemic (50,51). The potential of several lines of psychological interventions to mitigate the mental health impacts of the pandemic is also rapidly being highlighted (e.g. 52).

The study has several important limitations. The observational and cross-sectional nature of this study precludes any causality inference and recall bias may have affected retrospective estimates of pre-outbreak metrics. Representativeness (e.g. age distribution skewed towards middle-age, higher rates of females, highly educated individuals with high income status which are not representative of the global Canadian population) and generalizability are limited by the sample selection, dissemination strategy and volunteer bias; although our demographic characteristics are consistent with other published surveys. The length and online nature of the survey may have prevented some individuals from completing it. Although our multivariate model corrected for this, data collection spanned over a month, a period during which we did observe dynamic changes in stress responses. This study also has several strengths, such as a relatively large sample size, the comprehensive set of factors assessed, and its launch in the acute phase of the outbreak.

CONCLUSION

Baseline data in 6,040 respondents who shared their experiences in the acute phase of the COVID-19 pandemic highlighted adverse financial, social and psychological outcomes. Our preliminary findings start to draw a comprehensive model integrating multiple independent factors of the stress responses to this pandemic. Modifiable risk factors identified could inform the development of targeted interventions and support. Populations at risk that should be targeted include: people with pre-existing mental disorders, parents of underage children, people with low income, workers interacting with the general public, people with potential COVID-19 symptoms, and those with sleep disruptions.

ACKNOWLEDGMENTS

We wish to thank all the participants who gave their time to fill out this extensive survey during this period of turmoil. We also extend our gratitude to the individuals who kindly provided their comments on the survey content and format during the development stage, the ethics boards who rapidly and diligently provided insights on this project to enable a timely launch, the organizations who helped circulate the survey in their networks, and NIVA inc, for their advice on distribution strategies. We thank the Clinical Investigation Unit at the Ottawa Hospital Research Institute for assistance with participant recruitment.

COMPETING INTERESTS

All authors declare that no competing interests exist.

FUNDING

This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

CONTRIBUTORSHIP STATEMENT

RR, TK, and JE were involved in project administration and participants' recruitment as site primary investigators. RR, MS, AN and TK were additionally involved in the following: analyses of data and drafting of the manuscript. RR, MS, JE, ES, MP, AD, SV, LQ, KD, AN, JP, RJ, ES, RG, BY, CR, WG, MG, AB, RS and TK were involved in the following: study conception and design, interpretation of data, revising the manuscript critically for the accuracy and important intellectual content, and final approval of the version to be published. RR, MS, JE, ES, MP, AD, SV, LQ, KD, AN, JP, RJ, ES, RG, BY, CR, WG, MG, AB, RS and TK are accountable for all aspect of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

DATA SHARING STATEMENT

Proposals to access data from this study can be submitted to the corresponding author and may be made available upon data sharing agreement.

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FIGURES LEGENDS

Figure 1. *Level of concerns for potential secondary effects of the pandemic*

Mean level of concerns on a scale ranging from "0-Not concerned at all", to 50-Neutral" and "100- Very concerned". Error bars represent standard errors of the mean.

Figure 2. Transitions across stress levels relative to before the outbreak levels

Lasagna plot of the percentages (%) of respondents endorsing low, moderate and high stress levels (as per established severity threshold for the Cohen's Perceived Stress Scale (PSS)) in the retrospective assessment of their stress levels in the month prior to the start of the pandemic (i.e. Pre-outbreak) and in the past 7 days before filling out the survey (i.e. Outbreak). Dashed lines indicate the transition points between the 3 stress severity ranges. As compared to before the outbreak, 20.8% (1,063/5,103) of respondents had progressed to a higher stress range during the outbreak, and 7.0% (n=355/5,103) of respondents moved to a lower stress range

Figure 3. *Patterns of stress changes across time*

Average changes in score on the Cohen's Perceived Stress Scale (PSS) from pre-outbreak to during the outbreak (i.e. current PSS minus pre-outbreak PSS; higher scores indicating stress worsening) measured cross-sectionally across each time period of survey completion (each comprising 7 days starting on the date of the survey launch). Higher change scores reflect higher stress worsening relative to pre-outbreak stress levels. Error bars indicate the standard error of the mean. Sample sizes for each 7-day time period are as follows: April 3rd: n= 516, April 10th: n= 135, April 17th: n= 453, April 24th: n= 1035, May 1st: n= 936, May 8th: n= 2028. **p<0.001

Figure 1. *Level of concerns for potential secondary effects of the pandemic*

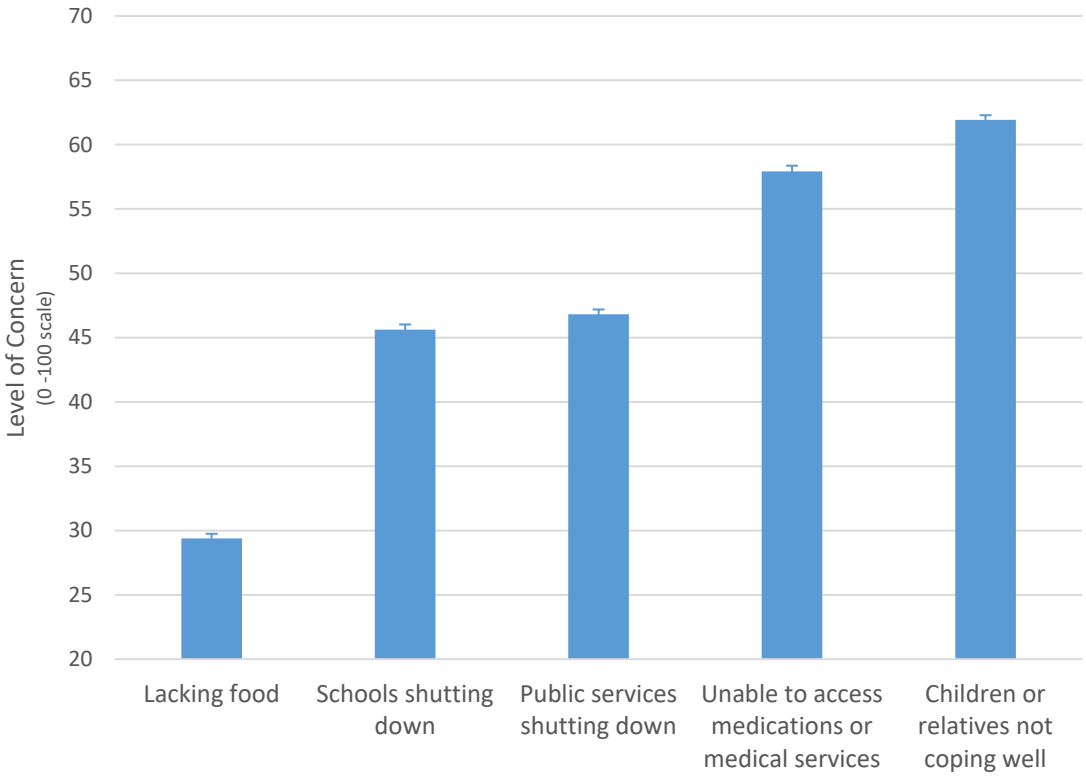


Figure 2. *Transitions across stress levels relative to before the outbreak levels*

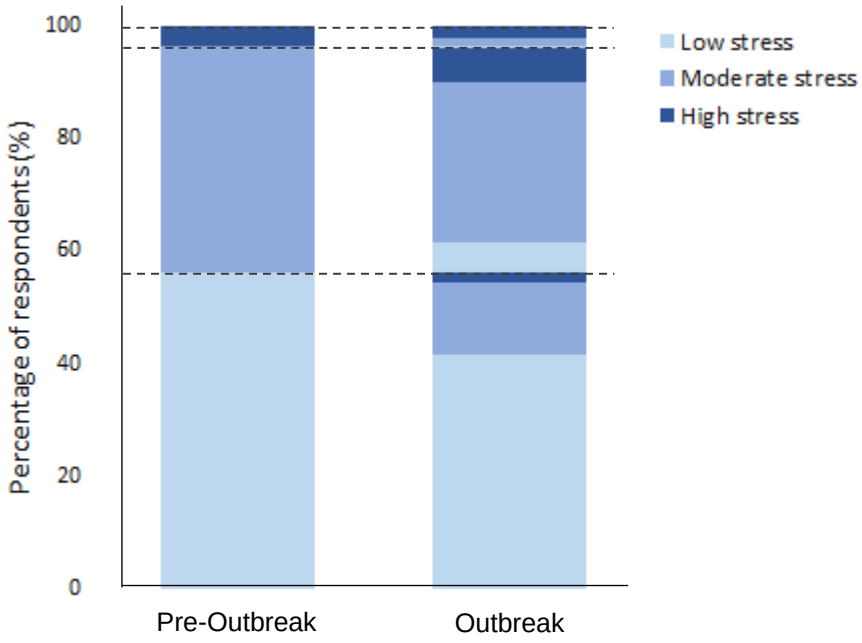
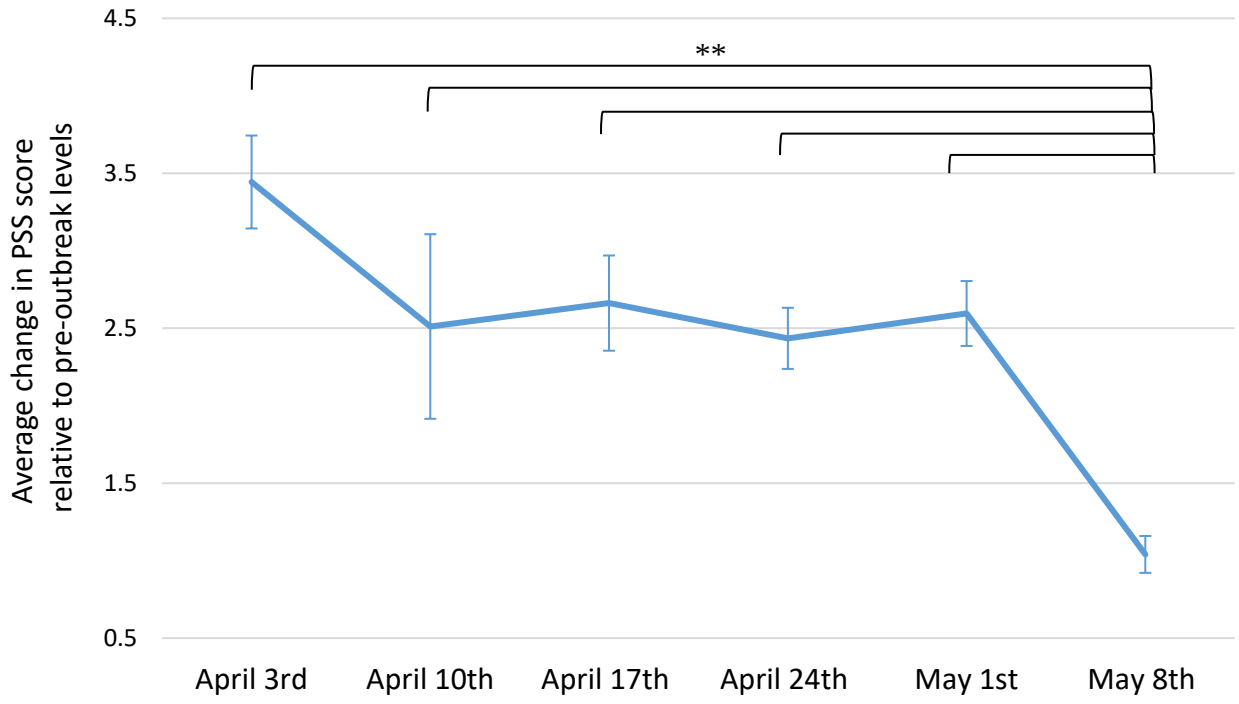


Figure 3. *Patterns of stress changes across time*



DATA SUPPLEMENT

Title: Social, Financial and Psychological Stress during an Emerging Pandemic: Observations from a Population Survey in the acute phase of COVID-19

Authors: Rebecca Robillard, Mysa Saad, Jodi D. Edwards, Elizaveta Solomonova, Marie-Helene Pennestri, Alexander Daros, Samuel Paul Louis Veissière, Lena Quilty, Karianne Dion, Ashley Nixon, Jennifer L. Phillips, Raj Bhatla, Edward Spilg, Roger Godbout, Bashour Yazji, Cynda Hylton Rushton, Wendy Gifford, Mamta Gautam, Addo Boafo, Tetyana Kendzerska

1. Supplemental results

A) Loneliness

Scores on the UCLA Loneliness Scale were significantly higher in individuals who were avoiding going out of their home ($Z=-2.2$, $p=0.027$), living alone ($Z=-4.7$, $p<0.001$), younger than 65 years of age ($Z=-6.8$, $p<0.001$), diagnosed with a mental disorder ($Z=-13.7$, $p<0.001$), or unemployed (Chi-squared=70.0, $p<0.001$). There was no significant difference in loneliness based on other social distancing practice, sex or whether one worked from home ($p>0.050$).

B) Sex-stratified analyses

In exploratory analyses stratified by biological sex (Supplemental table 1), the following variables were found to be independent predictors of stress changes in females, but not in males: lesser time elapsed since the start of the outbreak, younger age, higher extraversion, conscientiousness and openness to experiences, having a current diagnosis of a mental disorder, having had more than 5 alcoholic drinks in the past week, and spending less time exercising and doing artistic activities. Conversely, the following variables were found to be independent predictors of stress changes in males, but not in females: work involving physical contact with the general public, having traveled in the past 60 days, and spending less time interacting with people virtually. The following variables remained significant independent predictors of higher stress worsening in both sexes: worse COVID-19 symptoms index, shorter sleep durations, lower PSS scores before the outbreak, higher scores on the DOCS - Contamination subscale, higher neuroticism scores on the Big5, lower scores on the BRCS, worse family relationships, and having underage children.

Supplemental table 1. Stress models stratified by sex

	Males					Females				
			95.0% CI					95.0% CI		
	n	B	LL	UL	p	n	B	LL	UL	p
Pre-outbreak PSS (Scale from 0 to 40)	1528	-.222	-.262	-.181	.000	3392	-.442	-.478	-.407	.000
Time elapsed since pandemic declaration (7days)	1643	-.119	-.294	.049	.168	3715	-.196	-.336	-.056	.006
Age (10years)	1643	-.140	-.360	.080	.203	3713	-.770	-.960	-.580	.000
Education level	1625	.023	-.459	.505	.926	3701	-.286	-.758	.186	.234
Total family income below 40k (vs above 40k)	1539	-.508	-1.354	.338	.239	3471	.306	-.399	1.011	.395
Employment status (vs employed):										
Lost job due to pandemic, unemployed, on leave or student	1643	.530	-.284	1.344	.202	3715	-.005	-.655	.645	.989
Retired	1643	-.308	-.963	.347	.357	3715	.248	-.408	.903	.459
Work involves contact with the general public (vs not)	1594	1.144	.340	1.948	.005	3594	.425	-.183	1.034	.171
Type of dwelling	1565	-.215	-.792	.361	.464	3292	.115	-.397	.627	.660
Has minor children (vs no minor children)	1547	1.557	.786	2.329	.000	3544	.744	.186	1.303	.009
Travelled abroad since January 2020 (vs no travel)	1597	.429	-.094	.951	.108	3362	-.261	-.766	.244	.312
C19 Symptoms index (scale from 0 to 30)	1643	.111	.039	.182	.002	3715	.141	.084	.198	.000
DOCS5 (scale from 0 to 20)	1547	.294	.228	.360	.000	3169	.450	.394	.506	.000
Diagnosis of a mental disorder (vs no diagnosis)	1637	.822	.208	1.436	.009	3688	1.901	1.418	2.385	.000
Weekly alcohol consumption (vs no drinks)										
1 to 5 drinks	1643	-.071	-.654	.511	.810	3714	.245	-.244	.733	.326
More than 5 drinks	1643	.142	-.412	.695	.616	3714	.999	.470	1.528	.000
Weekly cannabis or other drugs use (vs no use)	1632	.288	-.387	.962	.403	3679	.358	-.269	.984	.263
Physical condition at risk for COVID-19 (vs no condition at risk)	1639	.210	-.309	.728	.428	3702	.036	-.419	.492	.875
Sleep Duration (hours)	1539	-.393	-.554	-.231	.000	3264	-.583	-.720	-.446	.000
Family Relationship (per 10 units; 0-100 scale)	1607	-.310	-.410	-.210	.000	3420	-.440	-.520	-.350	.000
Spent 30min or less (vs more than 30min):										
Outdoor	1633	.237	-.323	.798	.406	3683	-.055	-.545	.436	.826
Exercising	1627	.377	-.141	.895	.154	3667	.578	.090	1.065	.020
Following C19 news	1626	-.502	-.968	-.036	.035	3669	-.228	-.657	.201	.297
Interacting with people in person	1600	.305	-.151	.761	.190	3600	.166	-.254	.585	.439
Interacting with people virtually	1617	-.459	-.919	.001	.051	3659	.298	-.137	.733	.179
Doing an artistic activity	1601	.517	-.066	1.101	.082	3608	.661	.194	1.129	.006

Coefficients parameters for multiple linear regression models in males (Left panel) and females (right panel). B: Unstandardized coefficients (calculated per one unit for continuous variables, except for the time elapsed since the start of the outbreak (calculated for each 7 days), and age and family relationships (per 10 units). CI: confidence interval, LL: lower limit, UL: upper limit, Dimensional Obsessive Compulsive Scale (DOCS), Cohen's Perceived Stress Scale (PSS), † Physical condition at risk for COVID-19: e.g. respiratory, cardiovascular or autoimmune conditions.

2. Additional information about the survey

1.1 CHERRIES guidelines

In line with the CHERRIES guidelines, the survey data is stored in a secured access database (i.e. on a restricted access password protected server at the Royal Ottawa Mental Health Centre). The usability, decisional three, branching logic, and technical performance were tested with seven individuals prior to its launch. A "Save and Continue" feature was enabled, which placed a cookie on the participant's browser to keep track of survey progress and allowed participants to continue the survey at a later time. Furthermore, to avoid duplicates, distinct entries submitted from the same Internet Protocol address (IP address) within a 12-hour period were automatically marked and excluded from the analyses, but IP addresses were not stored. 26/6,040 (0.4%) duplicate entries identified by matching emails were found. In these cases, the final entry to be kept in the database was selected based first on completeness and then on recency. The mean number of items per page ranged between 4.6 and 6.5 per page depending of the paths followed on the decisional three structure. A completeness check system enabled to document the percentage of the survey completed for each participant.

Some of the CHERRIES recommendations could not be implemented. For instance, participation rate could not be calculated since the survey was freely circulated notably via newsletters and social media, which prevented from the research team to keep track of the number of people who may have seen the survey invitations. Participants were not able to review their responses at the end of the survey. However, they were able to change some of their responses through a "Back Button", except where responses were used as part of branching logic. Not all items had an "N/A" response option, notably to abide by the strict content of the validated questionnaires included. Responses were not forced; to follow guidelines from our research ethics committees, participants were free to skip any question (except age, which was necessary to determine eligibility to complete the survey). However, prompts appeared to warn participants that a response was skipped before moving to the next section.

1.2 Optional components

Consent was sought from all respondents to receive invitations to fill out follow-up surveys to monitor dynamic longitudinal changes prospectively across different phases of the outbreak (i.e., on a weekly, biweekly or monthly basis), and/or 3 and 6 months after the end of the outbreak. Respondents also had the option of linking the survey results to provincial health administrative data. Optional consent was also sought to link parent and adolescents survey data across parent-child dyads to enable finer analyses of family dynamics. Finally, respondents had the option of providing their Twitter and/or Facebook handles to help refine and apply new methods based on artificial intelligence to monitor the progression of the impacts of COVID-19 through social media data. Social media data will be collated retrospectively starting six months prior to study enrollment until six months after the end of the outbreak, therefore enabling to investigate changes in social media activity before, during, and after the outbreak. Of the 6040 respondents, 78.9% (4,765) agreed to be invited to do follow-up surveys, 63.0% (3,803) consented for their data to be linked to provincial health administrative data, and 17.7% (1,068) consented for social media linkage. Findings from these optional parts of the survey will be reported in subsequent reports.

1.3 Recruitment Strategy

The survey deployment network currently includes: The Royal Ottawa Mental Health Centre, the University of Ottawa Heart Institute, the Ottawa Hospital, the Children's Hospital of Eastern Ontario, Sunnybrook Health Sciences Centre, Southlake Regional Health Centre, and the Centre for Addiction and Mental Health. The survey link was circulated via the participating sites' websites, email lists and newsletters. "Permission to contact" registries from some of the participating hospitals (the Royal Ottawa Mental Health Centre, the University of Ottawa Heart Institute, the Ottawa Hospital, and the Centre for Addiction and Mental Health) and existing pools of research participants were also used to invite patients who consented to be contacted for research. Partnership for the diffusion of the survey was also established with organizations including: Canadian Nurses Association, Canadian Physiotherapy Association, Canadian Association of Occupational Therapists, Ontario Public Health, Ontario Medical Association, Ontario Psychiatric Association, Ontario Society of Occupational Therapists, Canadian Counselling and Psychotherapy Association, Ordre des Psychologues du Québec, Mood Disorders Society of Canada, Canadian Arthritis Patient Alliance, Patients for Patient Safety Canada, the COVID-19 Resources Canada Platform, and Sleep On It! Canada.

1.4 Data cleaning and supplemental notes

Based on items content, it was deemed that a minimally informative proportion of the survey was completed after the 83rd item (i.e. "Have you been tested for COVID-19?" Corresponding to a 1/3 completion rate for the survey).

All available data from the participants having reached at least this item were included in the analyses. Survey completion times were calculated for those with at least 75% completion rates and all data points longer than 7 hours were systematically excluded from completion time estimates. For all continuous variables, negative values were excluded and treated as missing data. For time estimates, data points larger than the possible time limit (e.g. 40 hours per day) were systematically excluded and treated as missing data (e.g. habitual number of hours of sleep per night; 29/5037 data points (0.6%)). Extreme improbable values were excluded: number of drinks or cannabis use per week >125 (alcohol: 2 data points, cannabis: 1 data point). The time elapsed since the start of the outbreak was defined by the number of days between the declaration of the pandemic by the World Health Organization and the date at which the survey was completed). All categorical variables included in the multivariate model had at least 10% of cases per category.

3. Brief description of primary measures of interest covered in this report

3.1 Demographic information

Demographic variables included age, sex, gender, ethnicity, current location and country(ies) of citizenship, employment status, occupation, living arrangements, parental status, level of education, political beliefs, religious practice, and total yearly family income.

3.2 COVID-19 testing, perceived threat and concerns

We asked the participants to report on their experiences around COVID-19 testing and diagnoses. They were also asked if they have any symptoms suggesting COVID-19 or other risk factors. An index of the number and severity of symptoms that have been associated with COVID-19 (i.e. C19 Symptoms index) was calculated by summing the severity ratings on a scale from 1:mild, 2:moderate and 3:severe for all symptoms endorsed on a list of 11 symptoms (please see "Detailed survey description" section below). The level of perceived threat related to COVID-19 for one's health, job or business, financial situation or country were rated on a five-point interval scale from very low to very high.

In addition, levels of concerns for several aspects of life, such as access to food or medical services were rated on a scale ranging from "0-Not concerned at all", to 50-Neutral" and "100- Very concerned". Respondents were also asked when they anticipated that the global situation and their personal situation would get back to normal.

3.3 Occupational and Financial Impacts

Consequences of the outbreak for school and work were documented, including school closure, working from home, being in contact with the general public, employment termination or salary reduction.

3.4 Impacts on Social Life

Rates of homeschooling and global assessment of work/study and family life management in the face of the outbreak were documented. The frequency of interactions, quality of relationships (with family, friends and work colleagues) and degree of connectedness were retrospectively estimated before the outbreak and at the time of the survey (i.e. during the outbreak). Respondents also indicated their adherence to various practices related to social distancing currently being followed at the time of filling out the survey and those who had been used earlier on after the start of the outbreak. To assess subjective feelings of loneliness and social isolation, the UCLA Loneliness Scale was administered (1).

4. Detailed Survey description (general adult version)

Text in grey represent items asked based on previous answers. The time scale of the following questionnaires was adjusted to align with the two study time points: i) "before the outbreak" (i.e. in the last month before the outbreak) and ii) "during the outbreak" (i.e. in the last seven days at the time of filling out the survey): Cohen's Perceived Stress Scale (PSS-10), Generalized Anxiety Disorder Scale (GAD-7), Quick Inventory of Depressive Symptomatology- Self Report, short version (QIDS-SR_{16}), Dimensional Obsessive Compulsive Scale – Germs and contamination subscale (DOCS), and the Pittsburgh Sleep Quality Index (PSQI).

Demographics

- *Age _____ years*
  If < 12 y.o. - "Thank you for your interest. Unfortunately, you cannot participate in this study."
  If < 16 y.o. – Directed to the Adolescent version
- Are you currently a resident physician or working as a health care professional or health care administrator?
  If No – Continue to general baseline survey described below
  If Yes – Please select which version of the survey you can do
  Regular survey for health care workers / administrators (about 20 to 65 minutes)
  If selected – Directed towards regular survey (with targeted questions for healthcare staff)
  Brief survey for health care workers / administrators (about 15-35 minutes)
  If selected – Directed towards Healthcare worker brief version

- Where are you currently living? *The house or apartment me or my family rent or own, Rehabilitation centre for youth in difficulty; retirement home, nursing home or long term care facilities, foster family, hospital, temporary accommodation: residence of other family, hotel, rooming/lodging house; camp, other: ___ {if temporary residence – Are you living in a temporary residence because of the outbreak? Y/N; If Rehabilitation centre for youth in difficulty; go to Adolescent version}*

- *Sex assigned at birth: Male, Female*
  - *If Female: Are you pregnant?*
- *Gender: Male, Female; Transsexual - female to male; Transsexual - male to female; Gender-queer; Gender-fluid; Gender non-binary; Other: _____*
- *Religious practice: Y/N {If yes: please specify: _____}*
- *Do you identify as (select all that applies):*
  - *First Nations (North American Indian)*
  - *Métis*
  - *Inuk (Inuit)*
  - *White*
  - *South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.)*
  - *Chinese*
  - *Black*
  - *Filipino*
  - *Latin American*
  - *Arab*
  - *Southeast Asian (e.g., Vietnamese, Cambodian, Laotian, Thai, etc.)*
  - *West Asian (e.g., Iranian, Afghan, etc.)*
  - *Korean*
  - *Japanese*
  - *Other — specify*
- Current country(ies) of citizenship: {list with other:____}
- Current location: {list with other:____}
  - If Canada selected: Current Province/Territory
- If your current location is not one of your countries of citizenship, for how long have you been in your current location?: ___ years ___months ___days
- Including yourself, how many persons currently live in your dwelling?

- Who is currently living in your dwelling: children**,** partner, husband/wife, mother, father, stepmother, stepfather, grandchild, brother/sister, other : _____
- **Do you have any children?**
  If Yes - {How many children? Ages (How old is your child (in years or months)? Are any of your children in shared custody??}
    If has a child between 12-18 years old:
    If you think that your child(ren) would be open to fill out the 'adolescent' version of this survey, would you agree for our research team to send you an email with the link to do this survey which you can transfer to your child(ren)? Y/N
      If yes (and if address not provided earlier) - Please provide your email address: ____
      If email entered- If your children agree to take part in this study, do you agree for the research team to link your answers to the answers of your children to enable a better analysis of family situations? If so, in addition to the survey link, we will also email you a unique anonymous "Family" code which your children will be able to enter in their survey in order to link it to yours. Your children will not be able to see your answers and you will not be able to see theirs. The research team will only be able to see that respondent 'X' is the child of respondent 'Y'. *Y / N*
    N.B. If you have any questions about this, please contact us at C19Survey@theroyal.ca.

- Are you the primary carer of a person with a disability of chronic illness? Y/N – **if yes: Is that person currently living: with you? On their own? In a specialized care facility?**
- Current residential postal code(s) or equivalent (3 first digits only): _____
- What type of dwelling do you live in?
  - *01: Single detached house*
  - *02: Semi-detached house*
  - *03: Row house or terrace*
  - *04: Apartment in a flat or Duplex*
  - *05: Apartment in a building that has five or more storeys*
  - *06: Apartment in a building that has fewer than five storeys*
  - *08: Mobile home or other movable dwelling*
  - *09: Other - Specify*
- How many rooms are there in your dwelling (the single unit in which you currently live)?

- Have you completed: high school diploma or equivalency certificate; college, CEGEP or other non-university certificate or diploma; university certificate, diploma or degree **(if so - below bachelor level, bachelor's degree, Master's degree, professional degree, doctorate degree)**

- Occupation In the last month before the outbreak :
  - Retired, Student **{If so – Did your school close because of the outbreak?** In how much **time** were you meant **to obtain degree** (e.g. graduating from high school or obtaining a diploma/certificate)**? What impacts does the outbreak have on classes and exams? Did you receive any financial support from a scholarship, bursary or fellowship in the current school year? If so, what was the total amount you received?}**, Employed, on leave **{for medical reasons, for familial reasons, other:___}, Other: _____**
  - **If employed is selected:**
    - Are you a health care worker or health care administrative staff?
    - **Self-employed? Job title? Usual number of work hours per week? Shiftwork (e.g. working in the evening or nighttime)? {if so- Is your shiftwork mostly: night shift, evening shift, rotating}; How often would you usually travel out of your country for work? ___/year**
    - **Current work status : working from usual workplace, working from home because of the pandemic, job has been terminated because of the pandemic, working hours were increased/decreased because of the pandemic, salary has been decreased because of the pandemic (if so- by how much was your salary decreased (estimate in percentage)?**
    - **Does your work currently involve: Contact (in person) with the general public? Contact (in person) with people at high risk for COVID-19 {i.e. elderly, chronic**

illnesses}? Contact (in person) with people who tested positive for COVID-19? Providing essential services (e.g. hospital, public transport, grocery store)?
If yes - *{Hospital, Fire Services, Public transport, Police, Grocery Store, Pharmacy, Gas Station, Public Transport, Other:_____ }*

- **If retired is selected:**
  - Are you coming back to work (or volunteering) to assist with the outbreak?
    - **If Yes - Does your work involve: Contact (in person) with the general public? Contact (in person) with people at high risk for COVID-19 {i.e. elderly, chronic illnesses}? Contact (in person) with people who tested positive for COVID-19? Providing essential services (e.g. hospital, public transport, grocery store)?**

If employed/student is selected:

- **How would you rate the degree of school/work-related stress you are currently experiencing?** *{0-Very low stress - - - - - - - - - - - - - 100 - very high stress}*
- **How would you rate the degree of school/work-related stress you have been experiencing in the last month before the outbreak?** ***{0-Very low stress - - - - - - - - - - - - - 100 - very high stress}***

- Usual mode of transport (to go to work, do groceries, etc) before the outbreak:
  {Public transport, driving a car, walking, cycling, other:_____}
- Total yearly family income: _____
- How would you rate your political beliefs
  {1-5 scale of very left- to very right-wing views, with one 'other', please explain}

Questions pertaining to COVID-19

- When would you say that the outbreak started in the region where you have been staying for the last month? *Approximately… {DD/MM/YYYY}*

- Have you travelled outside of your country of residence since January 30th 2020?
  - **If YES: When did you return? *{DD/MM/YYYY}* Where did you go? _____**
- Has anyone currently living with you travelled outside of the country since January 30th 2020
  - **If YES: When did they return? *{DD/MM/YYYY}* Where did they go? _____**

Since the start of the Outbreak, dDid you have (please select all that applies or leave blank if you prefer not to answer this question) *{Mild, Moderate, Severe}*
Fever
Cough
Difficulty breathing or shortness of breath
Sore throat
Tiredness
Aches and pains
Nasal congestion
Runny nose
Sore throat
Diarrhea
Other symptoms you think could possibly be related to COVID-19 (Specify):

For any selected symptom: Still current?

Did anyone living with you have any symptoms that could be linked to COVID-19 (e.g. fever, cough, difficulty breathing, runny nose…) since the start of the outbreak? *Y/N / I prefer not to answer this question*

***If yes: Is this person currently awaiting testing? Yes**
No
No, they have already been tested and are awaiting the

results
No, they have already been tested and were negative for COVID-19
No, they have already been tested and were positive for COVID-19
I don't know

Did anyone else in your family have any symptoms that could be linked to COVID-19 (e.g. fever, cough, difficulty breathing, runny nose…) since the start of the outbreak? *Y/N / I prefer not to answer this question*

***If yes: Is this person awaiting testing? Yes**
No
No, they have already been tested and are awaiting the results
No, they have already been tested and were negative for COVID-19
No, they have already been tested and were positive for COVID-19
I don't know

Is that person currently staying in hospital? Y/N

- Have you been tested for COVID-19? Y/N
  If YES - Were the results: positive, negative, don't know yet?
  How long ago did you find out? ___*months* ___*days*
  If NO - Have you reached out to health services to get assessed for COVID-19?
  If Yes: Have you been told that you cannot be tested? Y/N
  If yes: What reason was provided to decline your request to get tested?
  If No: How long have you been waiting? ___*months* ___*days*
  If indicated children above:
  - **For how long have your children been off from school? _____ *months* ___*days N/A***
  - **Are your children receiving instruction from the school at a distance? Are you or your partner homeschooling?**

  If indicated student or working above:
  - **How is the outbreak affecting how you deal with your work/study and family life?**
    0 -Very disruptive 50- Not different from usual 100-Easier than Usual

- Are you currently living with anyone who works at the front-line (e.g. health care staff, first responders, laboratory technician)? Y/N
- Do you have any other relatives working at the front-line? Y/N

Please select all statements that apply to you (currently / Since the start of the outbreak):

- *Not going out of the home except if you really do not have a choice (e.g. to go to a medical appointment)*
- *Avoiding going out from a specific room in the home to avoid contamination from/to other people living in your home*
- *Not attending public areas*
- *Avoiding gathering in person with friend or family who do not live with you*
- *Not using public transportation (e.g. buses, subways, taxis)*
- *Having food/supplies delivered home or relying on food/supplies stocked in the home instead of running errands*
- *Wearing a mask (or covering mouth and nose with tissues) when having to leave the home*
- *Maintaining a 2 meter distance from others*
- *In mandatory quarantine (isolation imposed by medical staff)*

If selected - For how long? ___ *days*

- How serious do you think a coronavirus infection would be for your health?
  {Very high threat, High threat, Moderate threat, Low threat, Very low threat, Don't know}
- What level of threat do you think COVID-19 poses to:
  {Very high threat, High threat, Moderate threat, Low threat, Very low threat, Don't know}
  - *your job or business?*
  - *your country?*
  - *your financial situation?*
- How concerned are you about:
  {0-Not concerned at all Neutral 100- Very concerned}
  - *lacking food?*
  - *public services shutting down?*
  - *schools shutting down* (or staying closed for an extended period)*?*
  - *your children or relatives not coping well with the situation?*
  - *not being able to access medications or medical services?*
  - *Other:*_____
- When do you expect the global situation to go back to normal?
  {by June 2020, by September 2020, by March 2021, after March 2021, "I have no idea"}
- When do you think your life will get back to normal?
  {by June 2020, by September 2020, by March 2021, after March 2021, "I have no idea"}

- Did the outbreak overlap with a significant event in your life (e.g. wedding, funeral, break up, graduation…)? *Y/N*
  if yes – Please specify the nature if the event and the consequences: _____

- How frequently were you interacting with your family
  Past 7 days? *{daily, weekly, monthly, less often than monthly, N/A}*
  In the last month before the outbreak? *{daily, weekly, monthly, less often than monthly N/A }*
- How would you rate your relationship with your family
  Past 7 days? *{0-Very difficult/conflictual 50- Neutral 100- Excellent, N/A }*
  In the last month before the outbreak ? *{0-Very difficult/conflictual 50- Neutral 100- Excellent , N/A }*
- How frequently were you interacting with your friends
  Past 7 days? *{daily, weekly, monthly, less often than monthly, N/A }*
  In the last month before the outbreak ? *{daily, weekly, monthly, less often than monthly N/A }*
- How would you rate your relationship with your friends
  Past 7 days? *{0-Very difficult/conflictual 50- Neutral 100- Excellent N/A }*
  In the last month before the outbreak ? *{0-Very difficult/conflictual 50- Neutral 100- Excellent N/A }*
- How would you rate your relationship with work colleagues?
  Past 7 days? *{0-Very difficult/conflictual 50- Neutral 100- Excellent N/A }*
  In the last month before the outbreak ? *{1-Very difficult/conflictual 50- Neutral 100- Excellent N/A }*

How much do you agree with the following statements: Please select the circle that best describes your opinion on the continuum from 'strongly disagree' to 'strongly agree'.
{ (NA) - (strongly disagree) (neutral) (strongly agree)}

Since the beginning of the outbreak, I have experienced significant levels of support from:
- my family
- friends and acquaintances
- my employer, colleagues
- medical staff and other professionals
- my religious/spiritual community
- strangers
- internet-based communities

Since the beginning of the outbreak, I have reached out to offer help and support to:

- my family
- friends and acquaintances
- my colleagues
- my religious/spiritual community
- strangers
- internet-based communities

Compared to how you felt before the outbreak, to what degree do you currently feel connected to:
{(NA) - 0 (More disconnected) 50 (No Change) 100 (More connected)}

- Family
- Friends
- Work colleagues
- Religious/spiritual community
- Community at large (neighbors, strangers)

In the past 7 days, how much time per day have you been spending:

0 minutes / day
1-30 min / day
31-60 min / day
1-2 hours /day
2-4 hours /day
More than 4 hours /day

- Outdoors?
- Doing physical activity?
- Following COVID-19 updates in the media?
  If >than 0min: Where do you get your information about COVID-19*? {Newspaper, websites, YouTube, reddit, radio, television, social media (e.g. facebook, twitter), talking with other people}*
- Watching television, series or movies (excluding the news)
- Playing video games
- *Doing an artistic activity (music, drawing, etc) ?*
- Doing contemplative/spiritual practice (meditation, prayer, etc.)?
- Interacting with other people:
  - In person:
  - Virtually (e.g. phone, texting, Skype, Facetime etc):
    If >than 0min - What virtual communication means are you using? *phone, texting, video (e.g. Skype, Zoom, Facetime)*

- To what degree have your daily activities been affected by the outbreak in the past 7 days?
  {0- Negatively Affected 50- Not Really Affected 100 –Positively Affected}
- How many cigarettes per day were you smoking:
  In the past 7 days? in the last month before the outbreak?
  If >0 - Are you regularly smoking (please tick all that applies): standard cigarettes, electronic cigarettes (vaping)
- How many alcoholic drinks did you have (Consider a "drink" to be a can or bottle of beer, a glass of wine, one cocktail or a shot of hard liquor (like scotch, gin, or vodka)):
  Total number of drinks in the past 7 days? Number of drinks per week in the last month before the outbreak?
- How frequently were you taking cannabis products:
  Total number of times in the past 7 days? Number of times per week in the last month before the outbreak?
- How frequently were you taking illicit drugs (e.g. cocaine, amphetamines, mushrooms, ecstasy):
  Total number of times in the past 7 days? Number of times per week in the last month before the outbreak?
- *Did your overall stress level change since the start of the outbreak?*
  {0- greatly reduced 50-No change 100- Greatly increased}

- What coping strategy(ies) (i.e. actions or thought process used to try to tone down the impacts of a stressful situation) do you find most helpful to help you go through the current pandemic situation?

- Has your household spending changed since the start of the outbreak?
  {Decreased / No change / Increased}
  - **If Increased By how much (in percentage (%))for health? for food? for other expenses? (please specify)**

In the last 7 days, how much have you been feeling like time seems to
{0 - Not at all to 100- Very Much}

- speed up (e.g. hours feel like minutes)
- slow down (e.g. days seem like weeks)
- stop (e.g. things seem frozen)

Physical health

- Have you ever had any of the following health problems (Please select all that applies): {Type 1-2 diabetes, respiratory disease {Asthma, chronic obstructive pulmonary disease (COPD) or hypoventilation}, Autoimmune disease (e.g. rheumatoid arthritis, lupus, inflammatory bowel disease (IBD), multiple sclerosis (MS), psoriasis), High blood pressure (hypertension), Heart disease or coronary artery disease (e.g., Heart failure, heart attack, myocardial infarction, atrial fibrillation, angina), Cerebrovascular disease (e.g., stroke, cerebral hemorrhage), High cholesterol (hypercholesterolaemia) or triglycerides, Thyroid disease, Severe infection (e.g., pneumonia, mononucleosis (glandular fever), mumps, tuberculosis, hepatitis),cancer, HIV/AIDS Other:)*; For all selected options:* Please indicate which of your health problems are still current}

  - Has there been any worsening in your physical health since the start of the outbreak? Y/N
    If Yes – Please explain: _____

  - Has there been any changes in your medications (including changes in dosage) since the start of the outbreak?
    Yes No N/A
    If Yes - a) Please select all that applies:
    Adding a new medication
    No longer taking a medication
    Because I no longer need it; because it is uneasy/no possible to go to the pharmacy; because of financial constraints; Other: _____
    Dosage increase
    Dosage decrease
    Because I no longer need it; because it is uneasy/no possible to go to the pharmacy; because of financial constraints; Other: _____

    b) Did you discuss these changes with your doctor? Y/N

  - Are you currently taking (select all that applies):
    Antihypertensive medications (for ex.: calcium channel blockers, ACE inhibitors, angiotensin II receptor antagonists (ARBs), beta blockers)
    Antidepressant medications (for ex.: Zoloft (sertraline), Celexa (citalopram), Prozac (fluoxetine), Desyrel (trazodone), Lexapro (escitalopram), Cymbalta (duloxetine), Effexor XR (venlafaxine), Wellbutrin (bupropion))
    Antianxiety medications, Anxiolytics, Benzodiazepines (for ex: Rivotril (clonazepam), Xanax (alprazolam), Ativan (lorazepam))

  - Do you currently have any difficulty: seeing (even when wearing glasses or contact lenses)? hearing (even when using a hearing aid)? walking, using stairs, using your hands or fingers or doing other physical activities? learning, remembering or concentrating?

{Answer choice: No, Sometimes, Often, Always)

If selected current respiratory disease: Have you been using any of the following	*In the last month before the outbreak*	*Past 7 days*
Nebulizers Positive airway pressure treatment Inhaled corticosteroids Oral corticosteroids Asthma puffer		

Mental health

- Have you ever had a formal diagnosis of (Please select all that applies): *{General Anxiety Disorder, Social anxiety disorder, Specific phobia, Panic Disorder, Agoraphobia, Depression, Dysthimia, Seasonal affective disorder, Premenstrual dysphoric disorder, Bipolar Disorder (manic depressive disorder), Obsessive-compulsive or related disorders (e.g., OCD, hoarding, excoriation, trichotillomania), Post-Traumatic Stress Disorder (PTSD), Anorexia, Bulimia, Schizophrenia or other Psychotic Disorder, Personality disorder, Substance Use Disorder, Alcoholism, Substance use disorder (drug addiction), Gambling disorder, Somatoform disorder; Attention-deficit/hyperactivity disorder (ADHD), Other neurocognitive disorders (e.g., Alzheimer's disease, Parkinson's disease, vascular dementia, amnestic disorder). Please specify: For all selected options:* Please indicate which of your diagnoses are still current:*}*
- Have you previously been exposed to a major difficult or stressful event (for example: natural disaster, fire/explosion, transport accident, physical or sexual assault, combat/exposure to a war zone, life-threatening illness or injury...)? Y/N

Cohen's Perceived Stress Scale (PSS-10)

The 10 item PSS is used to quantify the perception of stress (2). Participants answer from a five-point Likert scale, with total scores ranging from 0 – 40, where higher scores indicate greater perceived stress (2). The Cronbach α and test-retest of the PSS-10 were both reported as greater than 0.70 (3).

The Quick Inventory of Depressive Symptomatology-Self Report, short version (QIDS-SR_{16})

The QIDS-SR_{16} is a questionnaire assessing the nine symptom domains of depression used in the DSM-IV. It contains 16 items for which respondents are asked to rate the severity of symptoms such as sleep disturbances (either reductions or increases in sleep), sadness, appetite and weight changes (either reductions or increases), and restlessness. Scores range from 1-27, with higher scores indicating more severe depression symptoms (4). The minimum clinically important difference for this questionnaire was found to be ≥ 28.5% (± 28.7%; 5). Based on a meta-analysis, the QIDS-SR_{16} was found to be unidimensional and to have an internal consistency (Cronbach's α) ranging from 0.69 to 0.89 (6). This questionnaire was included due to the low mood that may be associated with the imposed isolation.

Generalized Anxiety Disorder Scale (GAD-7)

The GAD-7 is a 7 items questionnaire, which is used to screen and assess severity of generalized anxiety disorder. Scores can range from 0 – 21, with a higher score indicating a greater severity. Internal consistency was found to be excellent (Cronbach α = 0.92) and test-retest reliability as good (intraclass correlation = 0.83). The GAD-7 was also found to have good sensitivity (89%) and specificity (82%; 7). The minimal clinically important difference on the GAD-7 was estimated at changes of 4 or greater (8). This questionnaire was included since several factors related to the pandemic can cause an increase in anxiety (e.g. isolation, the unknown, change).

Dimensional Obsessive-Compulsive Scale (Germs and contamination subscale)

The DOCS is a 20-item measure that measures the four dimensions of obsessive-compulsive symptoms (contamination, responsibility, unacceptable thoughts, symmetry) that have been identified in research (9). Test scores range from 0-80 (0-20 on each subscale). For the purpose of this study, only the contamination subscale, which relates to obsessions and cleaning compulsions, was used. Cronbach's α for the four subscales were in the good to excellent range (0.83-0.89) and test-retest correlations were considered to be of adequate stability for the total score (r = 0.66) and subscales (r = 0.55-0.66). Factorial validity was supported in both clinical (OCD and other anxiety disorders) and

nonclinical (undergraduate students) samples. The DOCS can distinguish individuals with OCD very well from nonclinical individuals, and quite well from individuals with other anxiety disorders. The DOCS can be used during the pandemic to identify new or pre-existing obsessive-compulsive symptoms exasperated by pandemic-related stress.

Big Five Personality Inventory, short version

The Big Five Inventory (short version), or BFI-10, is a 10-item questionnaire used to measure the Big Five Dimensions that was adapted from the BFI-44-item scales (10). Each scale (Extraversion, Neuroticism, Openness, Agreeableness, Conscientiousness) is comprised of two items. The four samples tested (US public and private university students, US dog owners, and German students) demonstrated that the BFI-10 scales differ from the BFI-44 scales in their part-whole correlations, with lower correlations for Openness (0.79) and Agreeableness (0.74), and higher ones for Extraversion (0.89), Neuroticism (0.86), and Conscientiousness (0.82). The test-retest stability showed respectable levels of 0.75 overall (0.72 for one US sample and 0.78 for German sample) and there was an average Cronbach's α of 0.75. The BFI-10 can be useful during the pandemic to measure peoples' personality traits and to observe whether certain traits are related to mental health challenges.

Brief Resilient Coping Scale (BRCS)

The BRCS is a 4-item measure, with scores ranging from 4-20, that aims to identify adaptive tendencies that individuals use to cope with stress (11). Cronbach's α for the combined samples (men and women diagnosed with rheumatoid arthritis) was 0.69 (ranging from 0.64-0.71). The test-retest reliability was $r = 0.71$ ($p < 0.001$). The BRCS is sensitive to changes in cognitive and behavioural resilient coping patterns as demonstrated by changes in BRCS scores after the intervention ($p < 0.05$). Under the current circumstances of living through a pandemic, this measure can capture the healthy strategies individuals are using to cope with stress that may be caused by new financial concerns, childcare arrangements, adapting to working from home, or caring for elderly family members or those who have compromised immune systems.

Sleep

- Have you ever had, a formal diagnosis [being told by a physician] of: *{Insomnia, Sleep-related breathing disorder (e.g. Sleep apnea), Restless legs syndrome, Narcolepsy, Nightmare Disorder, Non 24 Sleep Wake Disorder, Delayed Sleep Phase Syndrome, Advanced Sleep Phase Syndrome, Excessive daytime sleepiness or hypersomnia; For all selected options: Which of your diagnoses are still current? }*
- How would you assess your sleepiness during a typical day? *(By "sleepiness", we mean the strong tendency to doze off): {0- "no sleepiness" to 10 -"extremely sleepy"}*

Pittsburgh Sleep Quality Index (PSQI)

The PSQI is a 24-item questionnaire initially developed to assess sleep disturbances related to mood disorders and various clinical populations. It has seven components score with a range of 0-21 points. The questionnaire has been reported to have a high degree of internal consistency (Cronbach's $\alpha = 0.83$), as well as high sensitivity (89.6%) and specificity (86.5%) in distinguishing good and poor sleepers. Test-retest reliability was also found as high ($r = 0.85$, $p < 0.001$; 12). This questionnaire has been included because sleep can be influenced by several factors related to the pandemic (e.g. stress), as well as factors related to confinement (e.g. working from home with more flexible hours, family duties, etc.).

	Past 7 days	*In the last year*
How many times per week did you have bad dreams (negative dreams that do not wake you up) *{_____/week}* How intense were these bad dreams? {1 (not intense) 50 (moderately intense) 100 (extremely intense)} how many times per week did you have nightmares (negative dreams that wake up up) *{_____/week}*		

If ≥1 nightmare: How intense were these nightmares? {0 (not intense) 50 (moderately intense) 10 (extremely intense)} What level of distress are your nightmares causing? {0 (none) 50 (moderate) 100 (extreme)}		

Reduced Morningness-Eveningness Questionnaire (rMEQ)

The rMEQ assesses one's preferred timing for sleeping and waking up, as well as for doing various activities (e.g. intellectual, physical activities). Made with five items, the score can range from 4 – 25 and are sub-divided into 5 categories ranging from "definitely evening type" to "definitely morning type". The rMEQ correlated strongly with the MEQ ($r = 0.898$, $p < 0.00001$), and its five items ($r = 0.73$, $p < 0.001$), suggesting high reliability (13). A correlation was also found between rMEQ and the acrophase of motor activity ($r = -0.34$; $p < 0.001$), which suggest good external validity (14). The rMEQ was utilized due to the link between chronotype and mood as well as other behavioural variations, which have most likely been impacted by the pandemic.

If indicated a diagnosis of sleep disordered breathing:

Have you been using any of the following	*Past month before the outbreak*	*Past 7 days*
Positive Airway Pressure machine (e.g. CPAP; "breathing machine") Mandibular advancement device *Positional therapy* *Stimulant medication (e.g. modafinil)*		

Subsections for specific subgroups

Health care providers and administrative staff
(Based on Demographic section)

Position: *Resident Physician, Specialist physician, GP, allied health professional {Audiologist, Chiropodist/Podiatrist, Chiropractor, Dentist, Dietitian, Massage Therapist, Medical Laboratory Technologist, Medical Radiation Technologist, Midwife, Nurse, Occupational Therapist, Optician, Optometrist, Pharmacist, Pharmacy Technician, Physiotherapist, Psychologist, Respiratory Therapist, Speech-Language Pathologist, Other - Please specify: ____}, administrative staff {Medical Administrative Assistant, Medical Receptionist, Family Health Organization Administrator, Health Records Clerk, System Coordinator, Other - Please specify: ____}*

If Resident: "Program year": *{ PGY1 (postgraduate year 1) to PGY6 (postgraduate year 6)}*

Principal contact with patients:
inpatient {non-essential; essential; not sure}; outpatient {non-essential; essential; not sure}; both

Discipline: *Anatomical Pathology, Anesthesiology, Cardiology, Cardiovascular/Thoracic Surgery, Clinical Immunology/Allergy, Critical Care Medicine, Dermatology, Diagnostic Radiology, Emergency Medicine, Endocrinology/Metabolism, Family Medicine, Gastroenterology, General Internal Medicine, General/Clinical Pathology, Geriatrics, Hematology, Medical Biochemistry, Medical Genetics, Medical Microbiology and Infectious Diseases, Oncology, Nephrology, Neurosurgery, Nuclear Medicine, Obstetrics/Gynecology, Ophthalmology, Orthopedic Surgery, Otolaryngology, Pediatrics, Physical Medicine and Rehabilitation, Plastic Surgery, Psychiatry, Public Health and Preventive Medicine, Radiation Oncology, Respiratory Medicine/Respirology, Rheumatology, Urology, Other: _____*

Since the outbreak:
Have you been reallocated to work in a different unit or discipline? Y/N
If Yes - Please specify: _____
Have you been using virtual tools to connect with your patients or colleagues (e.g. phone, video): Y/N

If Yes - Please specify: _____

How satisfied are you with these tools? {0 Not at all 50 somewhat 100 Extremely}

If No – Why (please select all that applies)? {Not relevant for my current work, No/Insufficient resources available for this, This is not approved in my unit/hospital, I am not at ease with these methods, Other: _____}

To what degree do you agree with the following statements in relation to your work since the start of the outbreak?:

{Strongly agree, Somewhat agree, Neutral, Somewhat disagree, Strongly Disagree, N/A} - asking for before and after outbreak

Guidelines and instructions from my superiors are clear.
Instructions from my superiors change rapidly and it is difficult to keep track.
There are inconsistencies in instructions from my superiors making it hard to know what I should be doing.
I am receiving too many updates via email.
I have access to adequate personal protective equipment (PPE).
I have sufficient remote access to the information I need (e.g. patient files).
I am concerned I may develop COVID-19.
I am concerned I may pass COVID-19 to my patients/work colleagues.
I am concerned I may pass COVID-19 to my immediate family or others who live with me.

Measure of Moral Distress – Healthcare Professionals (MMD-HP)

A 27-item self-report questionnaire developed to assess moral distress (15). Participants rate each item on a 5-point Likert scale indicating the frequency of each situation ranging from 0 *(never)* to 4 *(very frequently)*. For each item, participants also rate how distressing the situation is when or if it occurs *(0 = never* and *4 = very distressing)*. The frequency score *(f)* is multiplied by the distress score *(d)* to obtain a composite score. An overall MMD-HP score is obtained by summing the composite item scores. Overall scores range from 0 to 432, with higher scores indicating higher levels of moral distress (15). The MMD-HP demonstrates high validity and strong internal consistency (Cronbach's $\alpha = 0.93$; 15). This questionnaire was included to assess the extent to which healthcare professionals have experienced moral distress since the COVID-19 outbreak.

Rushton Moral Resilience Scale (RMRS, Rushton et al, in preparation)

A 17-item self-report questionnaire developed to assess moral resilience. Participants are required to consider their response to challenging ethical situations in the past 3-months in their professional role. The RMRS consists of 4 subscales including: *response to moral adversity*, *personal Integrity*, *relational integrity*, and *moral efficacy*. Items are rated on a 4-point Likert scale, ranging from 1 *(disagree)* to 4 *(agree)*. The total RMRS score can be derived by computing the mean of all 17-items, with higher total scores indicating more resiliency. This questionnaire was included to assess moral resilience as it is an indicator of an individual's capacity to restore their integrity in response to moral complexities, setbacks, or distressing situations (e.g., COVID-19 outbreak). The instrument is currently in the process of validation.

Individuals with a current diagnosis of a mental/medical illness (based on Physical/Mental health sections)

A) If hospitalized (based on demographic section):

How many other people are sleeping in your hospital room?

This week, if you wanted, could you have:

- received visitors? {Yes, Yes, but only for a short time, No}
- Contacted your family or friends using virtual communications (e.g. via telephone, video camera (e.g. Skype, Zoom, Facetime)? {Yes, Yes, but only for a short time, No}
- Gone outside to take some fresh air: {Yes, Yes, but only for a short time, No}

- How frequently were you interacting with hospital staff
  Before the outbreak? *{N/A daily, weekly, monthly, less often than monthly}*
  In the last week? *{daily, weekly, monthly, less often than monthly}*
- How would you rate your relationship with hospital staff
  Before the outbreak? *{N/A 0-Very difficult/conflictual 50- Neutral 100- Excellent}*
  In the last week? *{0-Very difficult/conflictual 50- Neutral 100- Excellent}*
- How frequently were you interacting with other patients
  Before the outbreak? *{N/A daily, weekly, monthly, less often than monthly}*
  In the last week? *{daily, weekly, monthly, less often than monthly}*
- How would you rate your relationship with other patients
  Before the outbreak? *{N/A 0-Very difficult/conflictual 50- Neutral 100- Excellent}*
  In the last week? *{0-Very difficult/conflictual 50- Neutral 100- Excellent}*

B) If not hospitalized:
- have you ever stayed in hospital overnight?
  If yes - What was the approximate date of: last admission {DD/MM/YYY} discharge {{DD/MM/YYY}

- How many appointments have you been attending for your physical health in the last 6 months before the outbreak {daily, weekly, every 2 weeks, monthly, 2-5 times, once, none}

- How many appointments have you been attending for your physical health since the start of the outbreak? {daily, weekly, every 2 weeks, monthly, 2-5 times, once, none}
  If any - *Where these appointments: in person; over the phone; over the internet*

- How many appointments have you been attending for your mental health in the last 6 months before the outbreaks? {daily, weekly, every 2 weeks, monthly, 2-5 times, once, none}

- How many appointments have you been attending for your mental health since the start of the outbreak? {daily, weekly, every 2 weeks, monthly, 2-5 times, once, none}
  If any - *Where these appointments: in person; over the phone; over the internet*

- Are you doing anything on your own (not proposed by your doctor, therapist or health care provider) to improve your physical or mental health? Yes/No
  If yes – Please describe

Optional additional questionnaires

Revised Adult Attachment Scale (RAAS)

The RAAS is an 18-item, self-report measure used to assess individual differences in adult attachment style (16). It comprises 3 subscales: Close, which measures the extent to which a person is comfortable with closeness and intimacy; Depend, which measures the extent to which a person is comfortable depending on and trusting in others; and Anxiety, which measures the extent to which a person is concerned about being abandoned or unloved. Each subscale is scored on a scale of 1 (not at all characteristic of me) to 5 (very characteristic of me). The RAAS subscales have demonstrated acceptable to good internal consistency (Cronbach's alphas = 0.77-0.85) and good convergent validity. This scale was included as attachment to close others may change as a result of social distancing, virtual communication, and heightened anxiety during the pandemic.

UCLA Loneliness Scale (UCLA L-Scale – Version 3)

The UCLA L-Scale (version 3) was created to evaluate subjective feelings of social isolation and loneliness (1). This questionnaire has 20 items with a possible score range of 20 – 80, where higher scores indicate a greater degree of loneliness. The UCLA L-Scale has been found to have a good internal consistency (Cronbach α ranging from 0.89 - 0.94) and test-retest correlation (0.73; 1). Due to the imposed social distancing regulations that accompanied this pandemic, loneliness is likely to occur, which is why this questionnaire was included.

The Typical Dreams Questionnaire (TDQ)

The TDQ is used to better understand the dimensional structure of dreams. This instrument has previously been validated in a sample of undergraduate students across three Canadian universities (N=1181; 17) and in an online study (N=28,888; 17,18). In addition to the 56 items from the original questionnaire, we added 4 new themes to reflect potential themes and concerns directly associated with the pandemic. The original TDQ measures dream themes over the lifetime, but we have modified it to reflect dream themes in the *past 7 days* to accommodate the temporal structure of our study. The original results of the first TDQ study (17), and follow ups of the translated version in Germany (19) and in China (20) indicate a relative stability of predominant dream themes across ages and cultures. The instrument presents different dream themes and prompts participant to indicate how often they have experienced each of the dream themes on the following scale: 0=never; 1=once; 2=2-3 times; 3=4-10 times; 4=11+ times. Since dreams are influenced by daily life concerns and, in particular so by affectively charged personally significantly events, this questionnaire was included to capture the changes in dream content, specific to the pandemic.

Exeter Identity Transition Scales (EXITS)

An adapted version of the EXITS (21) was used to assess multiple group memberships. Four items measured multiple group memberships before the pandemic, four items measured the maintenance of group memberships since the pandemic, and four items measured the development new group memberships since the pandemic. Items were rated on a seven-point scale with item responses ranging from 1 (do not agree at all) to 7 (agree completely). The original EXITS demonstrated good to excellent internal consistency (Cronbach's α = 0.85-0.94) in a sample of adults recovering from stroke. The EXITS has also shown good convergent validity with another group membership measure. This instrument was included as the maintenance and development of group memberships during the pandemic may be affected by the transition to virtual communication.

Interpersonal Reactivity Index (IRI)

The IRI is a 28-item, self-report instrument designed to assess empathy (22). The IRI consists of four subscales: Perspective Taking, Fantasy, Empathic Concern, and Personal Distress. Each subscale includes seven items rated on a Likert-type scale ranging from 1 (does not describe me well) to 5 (describes me very well). The IRI has demonstrated acceptable internal consistency (Cronbach's alphas = 0.70-0.78) and good test-retest reliability (r_{males}= 0.61-0.79, $r_{females}$ = 0.62-0.81). Good convergent validity has also been shown by correlations with other validated measures of empathy. The IRI was included because empathy levels may be influenced by factors related to the pandemic (e.g., shared experience of struggle, rise in solidarity).

Liebowitz Social Anxiety Scale (LSAS)

A 24-item questionnaire developed to assess social anxiety by measuring both fear and avoidance across various situations (23). The LSAS is divided into 2 subscales addressing social interactional (11-items) and performance (13-items) situations (24). Each item depicts a situations and participant's level of fear and avoidance is rated on a 4-point Likert scale. The fear scale ratings range from 0 (no fear) to 3 (severe fear). The avoidance scale ratings are based on the percent of time a situation is avoided and range from 0 (never) to 3 (usually – 67 to 100%). The total fear and total avoidance scores are summed to obtain an overall total LSAS score. Higher scores indicate greater presence of social anxiety. The LSAS is a valid measure and demonstrates strong internal consistency (Cronbach's $\alpha = 0.96$; 24). This questionnaire was included to assess the presence of social anxiety in participants prior to the COVID-19 outbreak.

Peters et al. Delusions Inventory (PDI-21)

A 21-item self-report questionnaire developed to assess delusional symptoms (25). Each item is responded to using a "yes/no" format. The sum of the positive responses on each item provides a total score for a maximum score of 21. Higher scores indicate great delusional symptoms or proneness to paranoid thinking (26). For each item, there are also 3 subscales that measure degree of conviction, preoccupation, and distress. Each subscale is rated on a 5-point Likert scale ranging from 1 (not at all distressing) to 5 (very distressing). The PDI-21 demonstrates adequate internal consistency (Cronbach's $\alpha = 0.82$; 25). The test retest reliability is also high ($r = 0.78$, $p < 0.001$; 25). This questionnaire was included to assess delusional symptoms during the current pandemic situation. Delusional ideations are thought to have a strong social component (27) and may be exacerbated by sudden changes in social life, such as social distancing practices during the COVID-19 outbreak.

Smartphone Addiction Scale (SAS; items 3, 5, 8, 9)

The SAS is a 33-item, self-report measure designed to assess smartphone addiction (28). Items are rated on a six-point Likert scale ranging from 1 (strongly disagree) to 6 (strongly agree). Subscale scores are summed to create a total score (range = 33-198), with higher scores indicating a more serious smartphone addiction. The SAS has previously demonstrated excellent internal consistency (Cronbach's $\alpha = 0.97$), as well as good concurrent validity. This measure was included because smartphone use may increase as a result of limited activities and in-person interactions during the pandemic.

Cognitive emotion regulation questionnaire (CERQ)

The CERQ is a 36-item questionnaire, with scores ranging from 4-20, developed to measure cognitive emotion regulation strategies that individuals use in response to a stressful life event (29). It includes nine distinct subscales (self-blame, other-blame, rumination or focus on thought, catastrophizing, putting into perspective, positive refocusing, positive reappraisal, acceptance and refocus on planning). Good factorial validity and high Cronbach's α reliability coefficients were demonstrated, ranging from 0.75-0.87. Strong relationships were demonstrated between certain cognitive strategies (self-blame, rumination, catastrophizing, positive reappraisal) and symptoms of both depression and anxiety. Test-retest reliabilities of the subscales were considered adequate with values ranging from $r = 0.48$ to $r = 0.65$ ($p < 0.01$). The CERQ can be used during the pandemic to assess emotional problems people are experiencing, how they are coping, and to subsequently develop interventions.

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