Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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A portrait of the early and differential mental health impacts of the COVID-19 pandemic in Canada: Findings from the first wave of a nationally representative cross-sectional survey

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ABSTRACT

Evidence on the population-level mental health impacts of COVID-19 are beginning to amass; however, to date, there are significant gaps in our understandings of *whose* mental health is most impacted, how the pandemic is contributing to widening mental health inequities, and the coping strategies being used to sustain mental health.

The first wave of a repeated cross-sectional monitoring survey was conducted between May 14–29, 2020 to assess the mental health impacts of the pandemic and to identify the disproportionate impacts on populations or groups identified as experiencing increased risks due to structural vulnerability and pre-existing health and social inequities. Respondents included a nationally representative probability sample (n = 3000) of Canadian adults 18 years and older.

Overall, Canadian populations are experiencing a deterioration in mental health and coping due to the pandemic. Those who experience health, social, and/or structural vulnerabilities due to pre-existing mental health conditions, disability, income, ethnicity, sexuality, and/or gender are more likely to endorse mental health deterioration, challenging emotions, and difficulties coping.

This monitoring study highlights the differential mental health impacts of the pandemic for those who experience health, social, and structural inequities. These data are critical to informing responsive, equity-oriented public health, and policy responses in real-time to protect and promote the mental health of those most at risk during the pandemic and beyond.

1. Background

Novel coronavirus disease (COVID-19), an acute respiratory infection caused by the coronavirus SARS-nCoV-2, was first identified in late 2019. In March 2020, the World Health Organization (WHO) declared COVID-19 a global pandemic (World Health Organization, 2020), while research and theoretical investigations have been documenting the far-reaching morbidity and mortality consequences. Data are also beginning to identify disproportionate impacts and growing health and social disparities among specific populations and groups, primarily related to the social determinants of health (Baqui et al., 2020; Haynes et al., 2020; Laurencin and McClinton, 2020; Poteat et al., 2020; Power et al., 2020; Zhang and Schwartz, 2020). The social determinants of health, which comprise the everyday conditions in which we live, include gender, race

Abbreviations: CMHA, Canadian Mental Health Association; UBC, University of British Columbia.

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and ethnicity, sexual orientation, disability status, and resources such as employment and income, food and housing, and social supports (Canadian Mental Health Association, 2020). Access to the social determinants of health is often constrained by structural vulnerabilities, which are risks imposed by systems of power and oppression that create and maintain sociocultural, economic, and political inequities (Farmer, 2001).

For example, racialized and Indigenous communities (Laurencin and McClinton, 2020), (Poteat et al., 2020) and people living in poverty (The World Bank, 2020) are populations whose physical health outcomes have been disproportionately impacted by the COVID-19 virus. Additionally, while empirical investigations on the disproportionate impacts of the virus due to other vulnerabilities are in progress, compelling evidence from the broader literature suggests that COVID-19 will have a greater adverse effect on those experiencing other health, social, and structural inequities related to gender, sexual orientation, and mental health and disability status, for example (Casey, 2019; Douglas et al., 2020). These vulnerabilities often intersect, contributing to compounding inequities and risk (Douglas et al., 2020).

In addition to physical health repercussions, evidence on the population-level mental health impacts of the pandemic is beginning to amass. Available data indicate significant increases in the prevalence of adverse mental health outcomes, including feelings of low mood and worry through to clinically significant experiences of depression, anxiety, and suicidal thoughts and behaviours (Angus Reid Institute, 2020). Indeed, the mental health consequences of COVID-19 are being characterized as the "4th wave" of the pandemic and are projected to be responsible for the largest, most enduring health footprint (see Fig. 1) (Tseng, 2020), with the number of people impacted expected to rise dramatically in the short- and long-term (Haynes et al., 2020; Douglas et al., 2020). People with pre-existing mental health conditions are particularly at-risk (Campion et al., 2020).

Not unlike the physical health consequences, growth in the prevalence of mental health challenges amid the pandemic illustrates how profoundly population-level mental health is shaped by the social determinants of health. The marked increase in mental health challenges has been attributed to weeks of physical distancing and isolation measures, increasing rates of unemployment, economic uncertainty, loss of childcare, disproportionate and gendered caregiving, housing instability, and food insecurity (Van Lancker and Parolin, 2020; Canadian Human Rights Commission, 2020).

In Canada, several polls have examined the mental health impacts of the pandemic, demonstrating growing mental health concerns across the nation (Angus Reid Institute, 2020; Morneau Shepell, 2020; Findlay and Arim, 2020). For example, in April 2020, 50% of Canadians reported that their mental health had worsened during the pandemic, with over 40% noting that they were worried and/or anxious (Angus Reid Institute, 2020). In May 2020, Statistics Canada noted a 14% decline since 2018 in the proportion of the population identifying their mental health as "very good" or "excellent" (Findlay and Arim, 2020).

These findings on the mental health consequences of the pandemic are mirrored in other country contexts. For example, in a large-scale nationwide survey conducted by Qiu and colleagues (2020) in late January and early February 2020, the research team measured the prevalence and severity of psychological distress among a convenience sample of people living in China. While the findings were focused on describing mental health impacts among the general population, there were indications that certain sub-populations were disproportionately impacted, including women, migrant workers, people aged 18–30 as well as those who were over 60 years of age (Qiu et al., 2020). In another cross-sectional survey, Mazza and colleagues (2020) used a convenience sample to provide a rapid epidemiological estimate of the mental health impacts of the pandemic during mid-March in Italy. Findings suggest that quarantine measures had a profound impact on mental health and that adverse mental health impacts were more likely among certain groups or demographics including women, people experiencing unemployment and those with existing medical conditions (Mazza et al., 2020). Fitzpatrick and colleagues (2020) also conducted a nationally representative survey, but with a focus on fear and mental health consequences (i.e., depression and anxiety) due to the pandemic in the United States (US). Similar to findings from China and Italy, certain populations were more likely to experience mental health consequences, including women and those experiencing unemployment as well as families with children and people who identified as belonging to a visible minority group. However, the primary focus of this study was on fear responses to the pandemic across geographic regions of the country, with more limited focus on mental health outcomes (Fitzpatrick et al., 2020). In the United Kingdom (UK), Pierce and colleagues conducted a secondary analysis of data collected through the UK Household Longitudinal Study to examine changes in mental health among the general population prior to and during lockdown in April 2020. Aligned with other national surveys, the findings indicate that UK residents

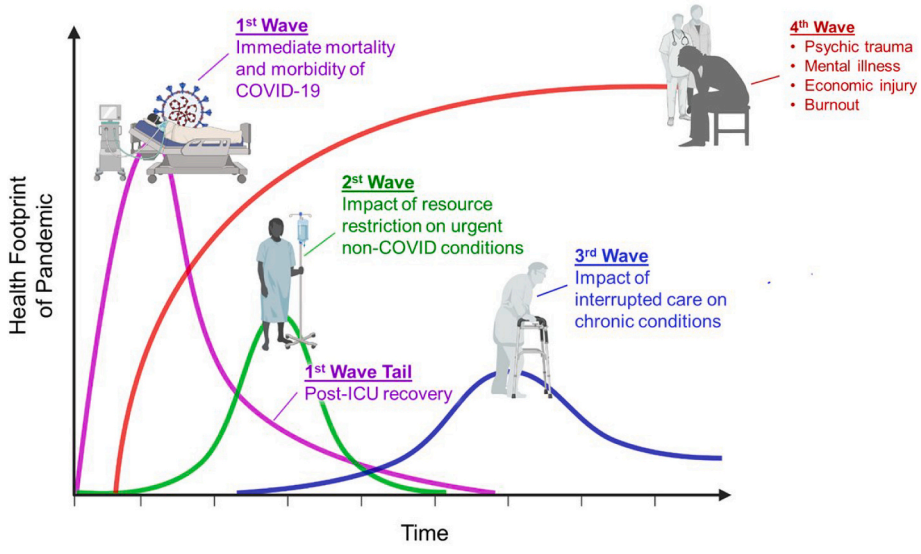

Fig. 1. The four waves of COVID-19. (Source: @VectorSting (Tseng, 2020))

experienced a deterioration in mental health since the onset of the pandemic and that adverse mental health impacts are concentrated among women, young people and families with young children (Pierce et al., 2020a). In addition to these national surveys, Xiong and colleagues (2020) conducted a systematic review examining the mental health impacts of the pandemic among people living in China, Spain, Italy, Iran, the US, Turkey, Nepal and Denmark (Xiong et al., 2020). The researchers conclude that the pandemic has resulted in high rates of adverse mental health symptoms among the general populations living in these countries, with women, people under 40 years of age, those with comorbid physical or mental health conditions and who experience unemployment more likely to be impacted. Additionally, those who were students and who had frequent exposure to social or news media about the pandemic were also more likely to experience adverse mental health outcomes.

However, as described, Canadian and other nationwide polls conducted to date have primarily utilized non-probability samples, which have been critiqued as problematic and prone to bias (Pierce et al., 2020b). Further, the analyses conducted have focused predominantly on the mental health impacts experienced among the general population. This has left significant gaps in our understandings of *whose* mental health is most impacted, how the pandemic is contributing to widening mental health inequities, and coping strategies sustaining mental health.

The present monitoring study seeks to contribute to addressing current omissions in the scientific literature by expanding and further highlighting differential impacts of the pandemic for different subgroups, to provide data critical to informing equity-oriented public health and policy responses in real-time to protect and promote the mental health of those most at risk. While the focus is largely descriptive in nature, this is crucial for ensuring a baseline dataset to monitor the population mental health impacts of the pandemic over time.

2. Methods

2.1. Survey development and approach

The development of this repeated cross-sectional monitoring survey, *"Assessing the Impacts of COVID-19 on Mental Health"*, represents a unique collaboration between academic researchers from the University of British Columbia (UBC) and the Canadian Mental Health Association (CMHA), a national mental health advocacy organization. It benefits from an international research partnership with the Mental Health Foundation, a national UK mental health organization. Our interdisciplinary and intersectoral team represents a critical element of our research process, providing direct linkages to policy decision makers to influence rapid, data-driven policy and programming responses. Further, our global partnership facilitates the potential for cross-nation comparisons, identified as a key mental health priority within the COVID-19 pandemic (Holmes et al., 2020).

2.2. Outcomes

Survey items were initially informed by a UK longitudinal survey commissioned by the Mental Health Foundation in March 2020. Original item development was guided by research evidence on mental health impacts of past pandemics. The survey was refined in consultation with people with lived experience of mental health conditions involving a citizen's jury participatory methodology process (Kousoulis et al., 2020a). Items were modified, and questions added to reflect the Canadian context, with the aim to examine indicators of mental health, stress, and coping in the previous two weeks among the Canadian population 18 years and older during the COVID-19 pandemic. Emphasis was placed on facilitating identification of the disproportionate impacts of the pandemic on populations or groups identified as experiencing increased risks due to structural vulnerability and pre-existing health and social inequities. This was achieved by including items on race/ethnicity, socioeconomic status, gender, sexual orientation, and mental health and disability status (see Additional File 1).

2.3. Data collection and analyses

This investigation focuses on our first wave of data collection, with at least two additional strategic waves planned in the coming months. Online surveys were distributed by national polling vendor, Maru/Matchbox, which manages an online 'restricted access' panel (Maru Voice Canada panel) of approximately 125,000 members. This panel is available to trusted research partners as an approach to promoting sample integrity and data quality. Panel participants were recruited through a variety of mechanisms to ensure inclusion of difficult to reach populations (e.g., older adults, racialized populations).

From May 14–292,020, Maru/Matchbox deployed the online survey to a random selection of panel members from across all Canadian provinces and territories stratified by Canadian Census-informed socioeconomic characteristics (age, gender household income, region). Adjustments were made for response propensity to generate a nationally representative sample by these characteristics. Surveys were available in Canada's two official languages, English and French. This data collection period corresponds with the time when many Canadian provinces/territories initiated their first phases of "re-opening", following approximately two-months of physical distancing orders and closures. Analyses focused on examining six constructs related to mental health during the COVID-19 pandemic: self-reported mental health, emotional responses, sources of stress, coping, substance use, and experiences of suicidality and self-harm. The maximum margin of error for proportions derived from a sample consisting of $n = 3000$ participants is $+/- 1{\cdot}79\%$ at a 95% level of confidence. Differences in proportions within groups were tested with Chi-squared tests. To ensure representativeness of our sample, results were also statistically weighted according to current Census data for age, gender, region, and income in the adult population of Canada.

2.4. Ethics

Ethical approval for this study was provided by the Behavioural Research Ethics Board at UBC (H20–01273). All participants provided online consent prior to beginning the survey and received a small honorarium through Maru/Matchbox to compensate for their time.

3. Results

Qualifying members of the Maru Voice Canada panel were invited to participate in the survey ($n = 3558$) to reach a total of 3000 respondents, yielding an invitation-to-response rate of 84%. Results were statistically weighted using current Canadian Census data to ensure a sample reflective of the adult Canadian population by age, gender, region, and income. The average age of respondents was 49·1 years (SD = 16·2) and 51·1% were female, with more detailed socio-demographic characteristics presented in Table 1. In presenting the following results, we first provide the proportion of respondents who endorsed a particular experience, followed by the 95% confidence interval, which appears in brackets.

3.1. Self-reported mental health amid COVID-19

Overall, 38·2% (95% CI 36·5–40·0) of respondents indicated a deterioration in mental health since the onset of the COVID-19 pandemic. Statistically significant differences were identified within subgroups of the population. Specifically, people with pre-existing mental health conditions were the group most likely to report a deterioration in mental health (59·1%, 95% CI 55·0–63·2). People with a disability and those with an annual household income <$25,000 were also more likely to report worse mental health [47·5% (95% CI

Table 1
Socio-demographic characteristics of the sample.

		Total respondents $N = 3000$	%
Gender[a]	Man	1467	48·9
	Woman	1533	51·1
Age	18–34	534	17·8
	35–54	1157	38·6
	55+	1309	43·6
Household income	<$25 K	234	7·8
	$25 K- < $50 K	504	16·8
	$50 K- < $100 K	992	33·1
	$100 K+	1270	42·3
Education	Elementary/grade school	6	0·2
	Some high school	67	2·2
	High school graduate	358	11·9
	Some college / technical school	252	8·4
	Completed college / technical school	620	20·7
	Some university	267	8·9
	University undergraduate degree	813	27·1
	Some post-graduate school	141	4·7
	Post-graduate degree	476	15·9
Ethnicity	Indigenous origins (for example, First Nations, Inuit, Métis)	87	2·9
	South Asian origins (for example, Indian, Punjabi, Pakistani)	70	2·3
	East Asian origins (for example, Chinese, Japanese, Korean)	177	5·9
	Southeast Asian origins (for example, Filipino, Thai, Vietnamese)	47	1·6
	Latin American origins (for example, Brazilian, Cuban, Bolivian)	25	0·8
	European origins (for example, British, German, Russian)	2117	70·6
	Middle Eastern origins (for example, Iranian, Iraqi, Afghan)	27	0·9
	African origins (for example, Nigerian, Ghanaian, Zimbabwean)	38	1·3
Province	BC/Territories	440	14·7
	Alberta	333	11·1
	Ontario	1140	38
	Quebec	658	21·9
	Manitoba/Saskatchewan	194	6·5
	Atlantic provinces	235	7·8
Area of residence	Urban	2516	83.9
	Rural	484	16.1
Employment	Working full time (30 or more hours per week)	1225	40·8
	Working part time (fewer than 30 hours per week)	286	9·5
	Retired	882	29·4
	Full time student (e.g. school, college, university, job training)	50	1·7
	Part time student (e.g. school, college, university, job training)	16	0·5
	Unemployed (due to COVID-19)	284	9·5
	Unemployed (prior to COVID-19)	103	3·4
Prior mental health condition	Yes	546	18·2
Disability	Yes	316	10·5
Parent	Parent / guardian (to a child under 18)	618	20·6
Essential service worker	Yes	817	27·2

[a] The polling vendor that distributed this survey, Maru/matchbox, provides demographic data for each panel member, which is collected in advance of survey participation. Though this binary representation of gender was used in this analysis, we recognize that binary gender identities do not accurately capture everyone's self-identified gender; however, our sample sizes for other gender identities were not large enough to conduct meaningful analyses.

41·7–53·3) and 43·5% (95% CI 37·3–49.8), respectively]. Additionally, the impacts of the pandemic on mental health were gendered, with women more likely to report a deterioration of their mental health than men [44·4% (95% CI 41·9–47·0) vs 32·5% (95% CI 30·1–35·0)] (Table 2).

3.2. Emotional responses to COVID-19

Linked to this deterioration in mental health, respondents identified several challenging emotional experiences as common. Overall, respondents were most likely to report experiencing anxiety/worry (46·0%, 95% CI 44·2–47·8), boredom (39·4%, 95% CI 37·7–41·2), stress (37·5%, 95% CI 35·7–39·3), loneliness/isolation (30·5%, 95% CI 28·9–32·2), and sadness (26·8%, 95% CI 25·3–28·5). Experiences of depression were also common (23·1%, 95% CI 21·6–24·7). However, indicators of resilience were likewise observed, with some respondents feeling calm (24·8%, 95% CI 23·3–26·4), hopeful (24·4%, 95% CI 22·8–25·9), empathetic (23·0%, 95% CI 21·5–24·6), and content (12·3%, 95% CI 11·1–13·6).

Like self-reported mental health, there were notable differences in emotional responses among populations experiencing health and social inequities. For example, people with a pre-existing mental health condition were again more likely to endorse challenging emotions including anxiety (62·5%, 95% CI 58·4–66·5), stress (57·8%, 95% CI 53·6–61·9), depression (46·1%, 95% CI 42·0–50·3), loneliness (45·3%, 95% CI 41·1–49·4), and sadness (40·5%, 95% CI 36·4–44·7) compared to those without a pre-existing mental health condition. Challenging emotions were also highly prevalent among those with a low household income and those with a disability (Table 3).

3.3. Sources of stress

Sources of stress centered largely on concerns related to the virus itself (e.g., getting ill, loved ones dying). However, financial concerns (37·4%, 95% CI 35·7–39·2) and job loss (22·6%, 95% CI 21·1–24·1) were also among the most endorsed stressors. Those in the lowest

Table 2
Changes in self-reported mental health since the onset of the COVID-19 pandemic.

	Total sample	Gender			LGBT2Q+			Income					Ethnicity				Disability			Pre-existing mental health condition		
		Male	Female	*p* value	Yes	No	p value	<$25 K	$25- < $50 K	$50 K- < $100 K	$100 K+	p value	VM	NVM	IND	p value	Yes	No	p value	Yes	No	p value
	(n = 3000)	(n = 1492)	(n = 1486)		(n = 232)	(n = 2750)		(n = 253)	(n = 497)	(n = 990)	(n = 1261)		(n = 451)	(n = 2050)	(n = 90)		(n = 299)	(n = 2672)		(n = 568)	(n = 2404)	
Better mental health	261 9%	119 8%	141 9%	<0·001	33 14%	224 8%	<0·001	27 10%	49 10%	85 9%	100 8%	0·012	67 15%	146 7%	13 14%	<0·001	25 8%	235 9%	0·002	56 10%	202 8%	<0·001
Worse mental health	1146 38%	485 32%	660 44%		104 45%	1035 38%		110 43%	157 32%	374 38%	504 40%		164 36%	800 39%	37 41%		142 47%	988 37%		336 59%	795 33%	
About the same	1587 53%	891 59%	697 46%		95 41%	1486 54%		116 46%	288 58%	528 53%	656 52%		219 49%	1104 54%	41 46%		132 44%	1445 54%		176 31%	1402 58%	

VM = Visible minority, NVM = Non-visible minority, IND = Indigenous, LGBT2Q+ = Lesbian, Gay, Bisexual, Transgender, Two-Spirit and Queer or Questioning.
Note. Differences in proportions within vulnerability groups were tested with Chi-squared tests.

income category were more likely to report concerns regarding finances (52·6%, 95% CI 46·2–58·9) compared to those with higher income. Food insecurity was also concerning, with 17·5% (95% CI 16·2–18·9) of respondents identifying worry about having enough food to meet their household's basic needs. Stress related to experiencing physical or emotional domestic violence was more frequently reported by visible minority groups (17·1%, 95% CI 13·7–20·9) and Indigenous (13·3%, 95% CI 7·1–22·1) compared to non-visible minority groups (6·6%, 95% CI 5·6–7·8). Overall, groups defined by people with a pre-existing mental health condition and/or a disability reported particularly prevalent experiences with negative stressors due to COVID-19 (Table 4).

3.4. Coping

Approximately 14·3% (95% CI 13·1–15·6) of respondents indicated they were "not coping very well" or "not well at all". Important differences were identified within population subgroups. Again, those with a pre-existing mental health condition (28·2%, 95% CI 24·5–32·1), household income <$25,000 (24·9%, 95% CI 19·7–30·7), and those with a disability (24·4%, 95% CI 19·7–29·7) were more likely than other groups to identify coping challenges. There were also differences by ethnicity in how people felt they were coping, with Indigenous peoples (23·3%, 95% CI 15·1–33·4) and those who identify as a visible minority (19·7%, 95% CI 16·2–23·7) more likely to report coping challenges than their non-visible minority counterparts (12·5%, 95% CI 11·1–14·1).

The most commonly employed coping strategy was exercise, with 58·6% (95% CI 56·8–60·4) of the overall sample endorsing this strategy. This was followed by connecting with family/friends (56·1%, 95% CI 54·3–57·9) and maintaining a healthy lifestyle (43·3%, 95% CI 41·5–45·1). Aligned with the social determinant underpinnings of mental health, accessing Federal Government benefits and supports was an important coping strategy for some respondents in the overall sample (10·7%, 95% CI 9·6–11·9), as was having a supportive employer (16·7%, 95% CI 15·4–18·1). Much less common, even for those with a pre-existing mental health condition, was the use of in-person or virtual mental health care/resources (Table 5).

3.5. Substance use

Within the overall sample, 19·5% (95% CI 18·1–20·1) indicated that their use of alcohol had increased because of the pandemic. The group most likely to report increased alcohol use was Indigenous peoples (24·4%, 95% CI 16·0–34·6). In terms of cannabis and prescription medication use, those with a pre-existing mental health condition endorsed the greatest levels of increased use at 13·2% (95% CI 10·5–16·3) and 8·1% (95% CI 6·0–10·7) respectively, versus 5·8% (95% CI 4·9–6·8) and 2·5% (95% CI 1·9–3·2) among those without a mental health condition. Reports of increased use of tobacco and other psychoactive substances were less common (Table 6).

3.6. Experiences of suicidality and self-harm

Within the overall sample, 6·4% (95% CI 5·5–7·3) of participants reported experiencing suicidal thoughts/feelings as a result of the pandemic and 1·9% (95% CI 1·5–2·5) reported intentionally harming themselves. Those with a pre-existing mental health condition were more likely to report these experiences compared to those without a mental health condition [18·1% (95% CI 15·1–21·6) and 4·1% (95% CI 2·6–6·0), respectively]. Indigenous peoples (15·6%, 95% CI 8·8–24·7), people with a disability (14·7%, 95% CI 10·9–19·3), and those with a household income <$25,000 (13·8%, 95% CI 9·8–18·7) were also more likely to report experiencing suicidal thoughts/feelings. People who identified as LGBTQ+ were more likely than those who did not identify as LGBTQ+ to report both suicidal thoughts (14·2%, 95% CI 10·0–19·4) and self-harm (6·9%, 95% CI 4·0–11·0) versus 5·8% (95% CI 4·9–6·7) and 1·5% (95% CI 1·1–2·1), respectively (Table 7).

Table 3
Emotional responses to the COVID-19 pandemic.

	Total sample	Gender			LGBT2Q+			Income					Ethnicity				Disability			Pre-existing mental health condition		
		Male	Female	p value	Yes	No	p value	<$25 K	$25 K- < $50 K	$50 K- < $100 K	$100 K+	p value	VM	NVM	IND	*p*-value	Yes	No	p value	Yes	No	p value
	(n = 3000)	(n = 1492)	(n = 1486)		(n = 232)	(n = 2750)		(n = 253)	(n = 497)	(n = 990)	(n = 1261)		(n = 451)	(n = 2050)	(n = 90)		(n = 299)	(n = 2672)		(n = 568)	(n = 2404)	
Challenging emotions																						
Anxious or worried	1379 46%	568 38%	811 54%	<0·001	118 51%	1252 46%	0·131	120 47%	225 45%	447 45%	587 47%	0·868	224 50%	952 46%	40 44%	0·389	155 52%	1208 45%	0·029	355 63%	1005 42%	<0·001
Bored	1183 39%	556 37%	628 42%	0·006	113 49%	1063 39%	0·004	94 37%	215 43%	379 38%	495 39%	0·237	156 35%	860 42%	42 47%	0·008	128 43%	1044 39%	0·210	272 48%	901 37%	<0·001
Stressed	1124 37%	447 30%	677 45%	<0·001	108 46%	1013 37%	0·005	106 42%	188 38%	384 39%	445 35%	0·146	157 35%	791 39%	41 46%	0·112	140 47%	970 36%	<0·001	328 58%	781 33%	<0·001
Lonely or isolated	916 31%	386 26%	530 35%	<0·001	87 37%	824 30%	0·021	98 39%	153 31%	318 32%	346 27%	0·002	121 27%	647 32%	42 47%	0·001	113 38%	795 30%	0·004	257 45%	649 27%	<0·001
Sad	805 27%	307 20%	498 33%	<0·001	71 30%	730 27%	0·192	76 30%	139 28%	267 27%	323 26%	0·461	104 23%	587 29%	18 20%	0·016	97 32%	700 26%	0·021	230 41%	566 24%	<0·001
Depressed	694 23%	292 19%	403 27%	<0·001	83 36%	609 22%	<0·001	87 34%	120 24%	239 24%	249 20%	<0·001	111 25%	479 23%	28 31%	0·221	109 36%	579 22%	<0·001	262 46%	419 17%	<0·001
Angry	571 19%	249 17%	322 21%	0·001	53 23%	514 19%	0·139	46 18%	94 19%	190 19%	241 19%	0·983	46 10%	433 21%	19 21%	<0·001	79 26%	482 18%	<0·001	179 32%	386 16%	<0·001
Afraid	506 17%	198 13%	309 21%	<0·001	47 20%	455 17%	0·145	52 20%	85 17%	181 18%	188 15%	0·066	72 16%	325 16%	13 14%	0·934	76 25%	421 16%	<0·001	151 27%	349 15%	<0·001
Hopeless	379 13%	151 10%	228 15%	<0·001	36 15%	342 12%	0·183	48 19%	68 14%	123 12%	141 11%	0·008	65 14%	242 12%	15 17%	0·142	55 18%	321 12%	0·002	133 24%	239 10%	<0·001
Panicked	247 8%	81 5%	166 11%	<0·001	39 17%	206 7%	<0·001	32 12%	60 12%	75 8%	80 6%	<0·001	38 8%	166 8%	11 12%	0·379	48 16%	192 7%	<0·001	93 16%	150 6%	<0·001
Positive emotions																						
Calm	745 25%	396 26%	348 23%	0·053	49 21%	691 25%	0·179	59 23%	120 24%	248 25%	318 25%	0·903	95 21%	537 26%	22 24%	0·075	60 20%	681 25%	0·040	109 19%	628 26%	0·001
Hopeful	731 24%	356 24%	375 25%	0·290	50 21%	677 25%	0·302	58 23%	126 25%	227 23%	320 25%	0·497	98 22%	536 26%	18 20%	0·076	76 25%	649 24%	0·666	134 24%	591 25%	0·635
Empathetic	690 23%	283 19%	406 27%	<0·001	54 23%	634 23%	0·935	47 18%	98 20%	222 22%	323 26%	0·012	89 20%	521 25%	21 23%	0·038	78 26%	605 23%	0·179	170 30%	517 22%	<0·001
Comfortable	504 17%	233 16%	271 18%	0·064	28 12%	471 17%	0·044	26 10%	84 17%	151 15%	242 19%	0·002	53 12%	377 18%	16 18%	0·003	47 16%	455 17%	0·567	82 14%	419 17%	0·090
Secure	386 13%	190 13%	195 13%	0·786	34 15%	350 13%	0·414	22 9%	61 12%	119 12%	183 15%	0·050	37 8%	280 14%	12 13%	0·007	39 13%	345 13%	0·949	71 12%	313 13%	0·740
Content	370 12%	168 11%	203 14%	0·067	28 12%	339 12%	1·000	27 11%	54 11%	130 13%	160 13%	0·493	46 10%	272 13%	14 15%	0·160	30 10%	338 13%	0·193	69 12%	299 12%	0·862

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Note. Differences in proportions within vulnerability groups were tested with Chi-squared tests.

Table 4
Sources of stress amid COVID-19 pandemic.

	Total sample	Gender			LGBT2Q+			Income					Ethnicity				Disability			Pre-existing mental health condition		
		Male	Female	p value	Yes	No	p value	<$25 K	$25 K- < $50 K	$50 K- < $100 K	$100 K+	p value	VM	NVM	IND	p-value	Yes	No	p value	Yes	No	p value
	(n = 3000)	(n = 1492)	(n = 1486)		(n = 232)	(n = 2750)		(n = 253)	(n = 497)	(n = 990)	(n = 1261)		(n = 451)	(n = 2050)	(n = 90)		(n = 299)	(n = 2672)		(n = 568)	(n = 2404)	
Finance and employment related stressors																						
Financial concerns (debt and inability to pay bills)	1122 37%	531 35%	591 39%	0·009	107 46%	1009 37%	0·004	133 53%	213 43%	386 39%	390 31%	<0·001	210 47%	724 35%	37 41%	<0·001	133 44%	977 37%	0·001	287 51%	820 34%	<0·001
Unable to access benefit /not being eligible	543 18%	274 18%	268 18%	0·634	57 24%	484 18%	0·007	79 31%	115 23%	182 18%	167 13%	<0·001	117 26%	321 16%	21 23%	<0·001	88 29%	448 17%	<0·001	154 27%	381 16%	<0·001
Loss of job	678 23%	315 21%	363 24%	0·015	63 27%	614 22%	0·082	67 26%	113 23%	235 24%	263 21%	<0·001	154 34%	418 20%	16 18%	<0·001	62 21%	608 23%	0·295	155 27%	512 21%	<0·001
Health related stressors																						
Becoming ill with the virus	1400 47%	641 43%	758 51%	<0·001	119 51%	1274 46%	0·210	126 50%	225 45%	461 47%	588 47%	0·099	195 43%	969 47%	44 49%	<0·001	170 57%	1219 46%	<0·001	318 56%	1068 44%	<0·001
Having no-one to care for me, as a result of becoming ill with the virus	500 17%	226 15%	273 18%	0·014	54 23%	443 16%	0·010	81 32%	103 21%	170 17%	146 12%	<0·001	97 22%	296 14%	16 18%	<0·001	96 32%	401 15%	<0·001	136 24%	360 15%	<0·001
Passing COVID-19 on to someone else	1502 50%	643 43%	859 57%	<0·001	136 58%	1359 49%	0·023	134 53%	250 50%	494 50%	623 49%	0·027	207 46%	1051 51%	46 51%	<0·001	155 52%	1334 50%	0·277	347 61%	1137 47%	<0·001
Being vulnerable because of an existing medical condition, age	1037 35%	488 33%	549 37%	0·015	94 41%	938 34%	0·023	108 43%	179 36%	319 32%	431 34%	<0·001	113 25%	746 36%	40 44%	<0·001	196 65%	833 31%	<0·001	282 50%	745 31%	<0·001
Fear of getting severely sick or dying	1025 34%	445 30%	580 39%	<0·001	87 37%	933 34%	0·419	102 40%	188 38%	331 33%	404 32%	0·001	169 38%	677 33%	33 37%	<0·001	139 47%	878 33%	<0·001	251 44%	763 32%	<0·001
Not being able to care for friends and family as a result of becoming ill	714 24%	325 22%	388 26%	0·003	62 27%	650 24%	0·183	70 27%	124 25%	223 23%	297 24%	0·004	123 27%	455 22%	18 20%	0·024	86 29%	625 23%	0·002	164 29%	544 23%	<0·001
Family/ friends related stressors																						
Not being able to care for friends and family due to physical distancing	1094 36%	469 31%	625 42%	<0·001	100 43%	990 36%	0·027	103 41%	175 35%	334 34%	482 38%	0·005	165 37%	732 36%	27 30%	0·010	116 39%	967 36%	0·058	256 45%	827 34%	<0·001
Being separated from friends and family	1771 59%	777 52%	993 66%	<0·001	151 65%	1613 59%	0·098	151 60%	293 59%	551 56%	775 62%	0·026	208 46%	1270 62%	55 60%	<0·001	192 64%	1564 59%	0·011	382 67%	1373 57%	<0·001
Worrying about the mental health of my child(ren) affected by the pandemic	748 25%	342 23%	406 27%	<0·001	36 15%	710 26%	0·807	50 20%	112 23%	224 23%	362 29%	0·129	105 23%	510 25%	25 28%	0·259	82 27%	660 25%	0·008	149 26%	586 24%	<0·001
Fear of a family member/loved one getting severely sick or dying	1699 57%	765 51%	934 62%	<0·001	150 65%	1540 56%	0·015	138 54%	273 55%	556 56%	732 58%	0·531	242 54%	1185 58%	50 56%	0·003	185 62%	1501 56%	0·011	374 66%	1310 55%	<0·001
Stressors related to partner																						
Experiencing relationship challenges with my partner	571 19%	273 18%	298 20%	0·140	64 28%	507 18%	<0·001	46 18%	89 18%	190 19%	246 20%	0·004	93 21%	376 18%	26 29%	<0.001	54 18%	515 19%	0.118	147 26%	418 17%	<0.001
Being safe from physical or emotional domestic violence	276 9%	151 10%	126 8%	0·155	27 11%	246 9%	0·082	38 15%	56 11%	90 9%	94 7%	<0·001	77 17%	135 7%	12 13%	<0·001	33 11%	236 9%	0·024	60 11%	216 9%	0·066
Other stressors																						
Being able to cope with uncertainty	1517 51%	645 43%	872 58%	<0·001	136 59%	1373 50%	0·016	149 59%	252 51%	490 50%	627 50%	0·002	231 51%	1032 50%	43 48%	0·003	175 59%	1327 50%	<0·001	371 65%	1126 47%	<0·001
Having enough food to meet my household's basic needs	525 18%	242 16%	283 19%	0·035	48 21%	473 17%	0·183	93 37%	121 24%	153 15%	158 13%	<0·001	116 26%	294 14%	23 26%	<0·001	83 28%	437 16%	<0·001	137 24%	383 16%	<0·001

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Note. Differences in proportions within vulnerability groups were tested with Chi-squared tests.

Table 5
Coping strategies amid COVID-19 pandemic.

	Total sample	Gender			LGBT2Q+			Income					Ethnicity				Disability			Pre-existing mental health condition		
		Male	Female	p value	Yes	No	p value	<$25 K	$25 K- < $50 K	$50 K- < $100 K	$100 K+	p value	VM	NVM	IND	p-value	Yes	No	p value	Yes	No	p value
	(n = 3000)	(n = 1492)	(n = 1486)		(n = 232)	(n = 2750)		(n = 253)	(n = 497)	(n = 990)	(n = 1261)		(n = 451)	(n = 2050)	(n = 90)		(n = 299)	(n = 2672)		(n = 568)	(n = 2404)	
Overall coping																						
Very/fairly well	2402	1210	1192	0·016	174	2215	0·008	165	389	788	1059	<0·001	323	1704	63	<0·001	212	2174	<0·001	385	1997	<0·001
	80%	81%	79%		75%	81%		65%	78%	80%	84%		72%	83%	70%		71%	81%		68%	83%	
Not very well/not well at all	430	189	241		48	379		63	71	145	150		89	257	21		73	349		160	263	
	14%	13%	16%		21%	14%		25%	14%	15%	12%		20%	13%	23%		24%	13%		28%	11%	
Self-care activities																						
Going for a walk/exercise outside	1758	812	946	<0·001	129	1621	0·332	121	244	555	838	<0·001	184	1310	48	<0·001	136	1607	<0·001	321	1418	0·282
	59%	54%	63%		55%	59%		48%	49%	56%	67%		41%	64%	53%		46%	60%		56%	59%	
Maintaining a healthy lifestyle	1298	594	704	<0·001	88	1204	0·085	69	188	408	633	<0·001	157	953	34	<0·001	94	1196	<0·001	216	1069	0·006
	43%	40%	47%		38%	44%		27%	38%	41%	50%		35%	47%	30%		31%	45%		38%	44%	
Doing a hobby	1127	497	631	<0·001	101	1022	0·057	94	187	373	473	0·999	130	827	36	<0·001	120	1002	0·373	246	872	0·002
	38%	33%	42%		44%	37%		37%	38%	38%	38%		29%	40%	40%		40%	37%		43%	36%	
Spending time with my pet(s)	825	305	520	<0·001	96	728	<0·001	66	129	252	378	0·075	61	633	30	<0·001	93	723	0·137	220	597	<0·001
	27%	20%	35%		41%	26%		26%	26%	25%	30%		14%	31%	33%		31%	27%		39%	25%	
Connecting virtually with family or friends	1684	713	971	<0·001	128	1549	0·731	119	261	548	757	<0·001	200	1228	43	<0·001	161	1512	0·365	318	1354	0·910
	56%	48%	65%		55%	56%		47%	52%	55%	60%		44%	60%	48%		54%	57%		56%	56%	
Using external support																						
Having a supportive employer	500	226	273	0·008	51	447	0·035	20	60	171	249	<0·001	56	373	12	0·008	33	465	0·005	112	386	0·036
	17%	15%	18%		22%	16%		8%	12%	17%	20%		12%	18%	13%		11%	17%		20%	16%	
Accessing federal government benefits and supports	321	150	171	0·238	32	287	0·121	43	68	105	105	<0·001	77	201	12	<0·001	36	283	0·442	85	231	<0·001
	11%	10%	11%		14%	10%		17%	14%	11%	8%		17%	10%	13%		12%	11%		15%	10%	
Connecting with a mental health worker or counsellor virtually	123	38	85	<0·001	21	102	<0·001	26	20	39	38	<0·001	19	90	4	0·986	33	85	<0·001	79	43	<0·001
	4%	3%	6%		9%	4%		10%	4%	4%	3%		4%	4%	4%		11%	3%		14%	2%	
Accessing provincial government supports	95	48	47	1·000	15	79	0·006	12	23	31	28	0·026	20	60	4	0·211	10	84	0·851	30	63	0·001
	3%	3%	3%		7%	3%		5%	5%	3%	2%		4%	3%	4%		3%	3%		5%	3%	
Accessing virtual mental health resources	67	26	41	0·051	9	57	0·097	7	13	22	24	0·729	24	34	2	<0·001	11	55	0·071	30	37	<0·001
	2%	2%	3%		4%	2%		3%	3%	2%	2%		5%	2%	2%		4%	2%		5%	2%	
Contacting a support group	51	23	28	0·406	6	45	0·285	9	6	17	20	0·155	16	28	1	0·005	7	42	0·333	14	36	0·106
	2%	2%	2%		3%	2%		3%	1%	2%	2%		4%	1%	1%		2%	2%		3%	2%	

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Note. Differences in proportions within vulnerability groups were tested with Chi-squared tests.

Table 6
Substance use amid COVID-19 pandemic.

	Total sample	Gender			LGBT2Q+			Income					Ethnicity				Disability			Pre-existing mental health condition		
		Male	Female	p value	Yes	No	p value	<$25 K	$25- < $50 K	$50 K- < $100 K	$100 K+	p value	VM	NVM	IND	p value	Yes	No	p value	Yes	No	p value
	(n = 3000)	(n = 1492)	(n = 1486)		(n = 232)	(n = 2750)		(n = 253)	(n = 497)	(n = 990)	(n = 1261)		(n = 451)	(n = 2050)	(n = 90)		(n = 299)	(n = 2672)		(n = 568)	(n = 2404)	
Drinking alcohol	584	291	293	0·963	53	531	0·197	16	65	206	297	<0·001	73	414	22	<0·001	37	545	0·001	123	455	0·140
	19%	19%	20%		23%	19%		6%	13%	21%	24%		16%	20%	24%		12%	20%		22%	19%	
Use of tobacco products	146	83	63	0·107	19	127	0·025	13	27	60	46	0·059	28	93	6	<0·001	21	125	0·078	34	113	0·204
	5%	6%	4%		8%	5%		5%	5%	6%	4%		6%	5%	7%		7%	5%		6%	5%	
Use of cannabis products	217	114	104	0·527	42	175	<0·001	24	34	83	77	0·100	43	151	4	0·002	25	187	0·385	75	139	<0·001
	7%	8%	7%		18%	6%		9%	7%	8%	6%		10%	7%	4%		8%	7%		13%	6%	
Use of prescribed medication	107	48	59	0·325	15	92	0·025	12	19	36	40	0·639	19	59	9	<0·001	19	88	0·007	46	59	<0·001
	4%	3%	4%		7%	3%		5%	4%	4%	3%		4%	3%	10%		6%	3%		8%	2%	
Use of other psychoactive (cocaine, heroin)	42	31	12	0·005	11	31	<0·001	5	7	19	10	0·079	13	20	5	<0·001	9	33	0·032	13	29	0·049
	1%	2%	1%		5%	1%		2%	1%	2%	1%		3%	1%	6%		3%	1%		2%	1%	

VM = Visible minority, NVM = Non-visible minority, IND = Indigenous, LGBT2Q+ = Lesbian, Gay, Bisexual, Transgender, Two-Spirit and Queer or Questioning.
Note. Differences in proportions within vulnerability groups were tested with Chi-squared tests.

Table 7
Experiences of suicidality and self-harm amid COVID-19 pandemic.

	Total sample	Gender			LGBT2Q+			Income					Ethnicity				Disability			Pre-existing mental health condition		
		Male	Female	p value	Yes	No	p value	<$25 K	$25- < $50 K	$50 K- < $100 K	$100 K+	p value	VM	NVM	IND	p value	Yes	No	p value	Yes	No	p value
	(n = 3000)	(n = 1492)	(n = 1486)		(n = 232)	(n = 2750)		(n = 253)	(n = 497)	(n = 990)	(n = 1261)		(n = 451)	(n = 2050)	(n = 90)		(n = 299)	(n = 2672)		(n = 568)	(n = 2404)	
Experienced suicidal thoughts/ feelings	192	97	95	0·176	33	159	<0·001	35	35	67	54	<0·001	26	117	14	<0·001	44	145	0·000	103	86	<0·001
	6%	6%	6%		14%	6%		14%	7%	7%	4%		6%	6%	16%		15%	5%		18%	4%	
Deliberately hurt myself	58	30	28	0·483	16	42	<0·001	4	10	22	22	0·850	17	30	4	0·001	10	48	0·060	23	34	<0·001
	2%	2%	2%		7%	2%		1%	2%	2%	2%		4%	2%	4%		3%	2%		4%	1%	

VM = Visible minority, NVM = Non-visible minority, IND = Indigenous, LGBT2Q+ = Lesbian, Gay, Bisexual, Transgender, Two-Spirit and Queer or Questioning.
Note. Differences in proportions within vulnerability groups were tested with Chi-squared tests.

4. Discussion

The mental health impacts of COVID-19 are widespread globally. People are struggling with greater levels of stress, worry, anxiety, and depression (Angus Reid Institute, 2020; Morneau Shepell, 2020). Yet, there is a paucity of empirical data exploring *who* is most impacted and elucidating ways that the pandemic is interfacing with existing health, social, and structural inequities that produce even poorer outcomes for some populations. This evidence is critical to informing equity-oriented public health responses to protect and promote population mental health through the pandemic and beyond.

In this paper, we describe findings from the first wave of our nationally representative monitoring study examining the mental health impacts of COVID-19 among those living in Canada. We identified impacts on mental health, emotional responses, stress, coping, substance use, suicidality, and self-harm. Further, responsive to global appeals for a focus on inequities associated with the pandemic (Laurencin and McClinton, 2020; United Nations, 2020), our analyses uncovered differential mental health impacts by gender, sexual orientation, household income, ethnicity, mental health status, and disability status. To our knowledge, this study is among the first to provide comprehensive empirical evidence on the differential mental health impacts of COVID-19; thus, documenting the potential for widening mental health inequities among structurally vulnerable populations.

Consistent with other national-level mental health survey data (Angus Reid Institute, 2020; Morneau Shepell, 2020; Findlay and Arim, 2020; Cowan, 2020), our study shows that populations in Canada are experiencing a deterioration in mental health and coping ability in the context of the pandemic. Overall, people are experiencing heightened challenging emotions compared to positive emotions. The greatest sources of stress relate to the physical impacts of the virus and financial concerns, including employment insecurity. This is particularly concerning amidst our findings that suicidal thoughts and self-harm are alarmingly high. Indeed, unemployment is a significant moderator of suicide, with McIntyre and colleagues projecting suicide mortality to rise dramatically due to unemployment resulting from the pandemic (McIntyre and Lee, 2020). Those who experience vulnerabilities due to mental health or disability, income, ethnicity, sexuality, or gender are more likely than their counterparts to endorse mental health deterioration, challenging emotions, difficulties coping, suicidal thoughts, and self-harm.

In addition to findings directly examining mental health impacts, our study identified several concerning outcomes that place populations at increased risk for poor mental health. Specifically, nearly one in five participants identified worry about having enough food to meet their household's basic needs. This was further magnified among vulnerable groups, including those in the lowest income category, people with a disability, and racialized and Indigenous peoples. The relationship between food insecurity and mental health is well-established and has shown to be independently associated with experiences of mental distress and mental health conditions (Friel et al., 2014). Furthermore, racialized and Indigenous groups were over two times more likely than their non-visible minority counterparts to report fear of physical or emotional domestic violence, which is strongly linked to persistent adverse mental health outcomes, particularly for women (Howard et al., 2010).

In alignment with UK-based findings from Cowan and colleagues, which sampled the general population and those with lived experience of mental health conditions, common coping strategies among our sample included exercise, connecting virtually with family/friends, and maintaining a healthy lifestyle (Cowan, 2020). While these are important individual-level strategies for supporting mental health, particularly among those with the health and social capital to engage in them, the pandemic further highlights that mental health is not simply an individual responsibility. Without collective or policy-level interventions operating to safeguard the mental health of entire populations, many solutions centred on the individual will remain inaccessible or ineffective. Indeed, as noted by other researchers focused on COVID-19 and structural vulnerability, the pandemic response would benefit by approaching COVID-19 using syndemics theory (Poteat et al., 2020; Horton, 2020).

Syndemics theory, first proposed by Merrill Singer, helps to uncover how health and social disparities emerge from the interactions between disease states and the social, environmental, and economic forces that worsen disease outcomes (Singer et al., 2017). In the context of this study, syndemics theory helps to explain why the mental health consequences of COVID-19 are more concentrated among structurally vulnerable groups, due to interactions between the virus and co-morbid health conditions, racism, poverty, social exclusion, and discrimination. Further, this theory lends support to the need for collectively oriented, policy level solutions to address the health of individuals and populations. As Richard Horton (2020) recently noted, "no matter how effective a treatment or protective a vaccine, the pursuit of a purely biomedical solution to COVID-19 will fail. Unless governments devise policies and programmes to reverse profound disparities, our societies will never be truly COVID-19 secure" (p. 874) (Horton, 2020).

As identified by Holmes and colleagues, efforts to address population mental health will be bolstered by global partnerships to facilitate data and solutions sharing (Holmes et al., 2020). Our partnership with the UK Mental Health Foundation contributes to this priority area. For example, we have already identified similar trends in our data, to the work in-progress by Kousoulis and colleagues (Kousoulis et al., 2020b), highlighting that certain groups are particularly vulnerable in both the UK and Canadian contexts (e.g., people with a disability or mental health condition, racialized groups). Future research will examine geographic similarities and differences in mental health more fulsomely and leverage these data to enhance outcomes globally.

To respond to the mental health crises resulting from the COVID-19 pandemic, a public health approach inclusive of mental health promotion, prevention, and treatment is needed. While prevention and treatment have historically received more attention and investment, mental health promotion represents a critical and underutilized element of a comprehensive mental health strategy. Mental health promotion is a strengths-based orientation aimed at enhancing positive mental health at the individual, community and population level, including for those experiencing the greatest vulnerability or risk. Positive mental health includes qualities such as self-esteem, coping ability, and sense of wellbeing (Herrman and Jané-Llopis, 2012).

Mental health promotion utilizes healthy public policy, which is distinguished by "explicit concern for health and equity in all areas of policy and by an accountability for health impact" (World Health Organization, 1995), as a key lever to strengthen individuals' and communities' ability to reduce structural barriers (e.g., poverty, discrimination) so that populations have the capacity and resources to optimize their mental health (Sunderland and Findlay, 2013). This approach is aligned with and responsive to calls to address the mental health impacts of the pandemic through action grounded in a public health and social determinants perspective, offering an evidence-informed framework to guide the "recovery" process (Haynes et al., 2020; Power et al., 2020; Douglas et al., 2020; Campion et al., 2020; Canadian Human Rights Commission, 2020; Holmes et al., 2020).

A mental health promotion approach is aligned with the growing grassroots movement in support of a "Just Recovery" to the pandemic. The Just Recovery movement is underpinned by six principles: 1) put people's health and wellbeing first, no exceptions; 2) strengthen the social safety net and provide relief directly to people; 3) prioritize the needs of workers and communities; 4) build resilience to prevent future crises; 5) build solidarity and equity across communities, generations, and borders; and 6) uphold Indigenous rights and work in partnership with Indigenous peoples (*Just Recovery*, 2020). Further research and theorizing are needed to explore how these approaches can be integrated to drive political will for upstream solutions that address the root

causes of mental health inequities.

While our study has many strengths, including the large and nationally representative sample, there are important limitations that warrant discussion. Specifically, the cross-sectional design of this study limits our ability to draw causal conclusions. This limitation will be partially addressed in forthcoming analyses when we have multiple waves of data to provide a picture of the impacts of the pandemic on mental health over time. Notably, however, other national polls conducted in Canada to examine the mental health impacts of the pandemic support our findings. Indeed, data from Statistics Canada provides an indication of the population mental health trends prior to and during the pandemic with a 14% decline in the proportion of the population describing their mental health as "very good" or "excellent" between 2018 and April 2020 (Findlay and Arim, 2020).

In addition to the limitations of a cross-sectional survey design, the aim of this research was not to diagnose mental health conditions and many of the adverse outcomes observed are expected within a pandemic and are likely transient. However, for some more vulnerable groups, challenges may persist and contribute to further deteriorations and widening mental health inequities. Respondents were asked to self-assess change in their mental health status from pre-COVID to current experience using a single-item measure, which may be considered a limitation to some. However, the mental health literature indicates that single item self-rated mental health measures are commonly used in population surveys and have demonstrated associations with multi-item measures (Ahmad et al., 2020). Further, the extant health literature suggests that single-item measures of self-perceived health status can be valid and reliable, while also sensitive to detecting change over time (Macias et al., 2015).

This survey was based on a previously implemented survey on the mental health consequences of COVID-19 in the UK. Given the aim to rapidly measure and monitor the mental health impacts of the pandemic in Canada, we did not pilot the adapted items modified for a Canadian context. However, the diversity of our study team, including interdisciplinary researchers, UK and Canadian mental health advocacy organizations, and people with lived experience of mental health challenges, provided confidence in the items developed. Further refinements will be made based on Wave 1 data in preparation for Wave 2 data collection. Additionally, while our sample was representative of the population of Canada by age, gender, region and income, other characteristics may not have been representative. For example, our sample was not representative of the overall population of Canada for ethnicity, with some "ethnic groups" underrepresented in our sample. However, given our large sample sizes, we retained the statistical power needed to conduct our analyses of interest for this paper. There is also the potential for selection bias within our sample. While oversampling and community partnerships were used to mitigate selection bias and minimize possible technology barriers, it is possible that those who participated in the survey differed from the overall Canadian population on key measures. Additional strategic waves of data collection will enhance examinations of data trends over time and strengthen confidence in observed outcomes. This will be important as we move to provide evidence to directly guide policy decision making to enhance population mental health. Further, while we have identified a number of "categories" of vulnerability, these are not mutually exclusive and the intersections, or experiences of multiple vulnerabilities, are likely to highlight even greater disparities (Cairney et al., 2014). While such analyses were not possible given the breadth of this paper, future research utilizing an intersectional approach to examine the mental health impacts for those who experience multiple vulnerabilities is needed and will be addressed in forthcoming papers.

5. Conclusions

The Canadian mental health system has long been identified as overburdened and not equipped to respond to the underlying social and structural conditions that create vulnerability for adverse mental health outcomes. Further, mental health challenges due to the COVID-19 pandemic are disproportionally impacting those who have been systematically and structurally oppressed. An equity-oriented public health approach informed by syndemics theory and that moves beyond prevention and treatment to include initiatives grounded in mental health promotion science is needed. A comprehensive approach holds promise for guiding institutional and government-level policy solutions towards the mental health crisis, characterized as the "4th wave" of the COVID-19 pandemic. Such an approach will leverage the full range of solutions needed to mitigate the growing mental health inequities that are poised to impact populations globally, throughout the course and aftermath of the pandemic.

Ethics approval and consent to participate

Ethical approval for this study was provided by the Behavioural Research Ethics Board at UBC (H20–01273). All participants provided online consent prior to beginning the survey and received a small honorarium through Maru/Matchbox to compensate for their time.

Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

CR reports receiving personal fees from the University of British Columbia during the conduct of this study. JM reports that the CMHA has received funding, unrelated to this study, from various government and community-based funders. All other authors report no competing interests.

Author's contributions

EJ, CM, JM and AG co-led the conceptualization of the study. EJ directed the project administration, formal analysis, and writing – original draft. CM further contributed to the formal analysis and writing of this manuscript – original draft and JM contributed to writing – review and editing of this manuscript. SH, CR, KT, LM, AK, and AG contributed to the formal analysis and writing of this manuscript – review and editing. AK was also involved in early conceptualizations of the study.

Role of funding source

The CMHA funded Maru/Matchbox data collection and JM (employed by CMHA) contributed to the development of survey content and writing of the manuscript. CMHA had no further role in study design, data collection, data analysis, or interpretation.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ypmed.2020.106333.

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