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Editorial

Expanding the evidence for population mental health in Canada: a call to action for evidence-informed policy and practice

Katholiki Georgiades, PhD

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Now, well into our second year of the global COVID-19 pandemic, concerns for population mental health are mounting. These concerns are well justified given the increases in established risk factors known to contribute to mental ill-health, including economic hardship, social deprivation and cumulative losses of fundamental health and social services. The distribution and impact of these risk factors will likely be unequal, disproportionately affecting individuals living in adverse socioeconomic circumstances and marginalized communities, as well as those with pre-existing physical, mental health and neurodevelopmental conditions.

While evidence on the mental health impacts of the pandemic is accumulating rapidly, most studies to date rely on non-probability-based sampling methods, cross-sectional study designs, limited assessment of mental health and underrepresentation of marginalized populations and communities—the very populations disproportionately impacted by the pandemic.[1-3] These methodological weaknesses limit generalizability, statistical inferences and attributions of pandemic-related impacts on population mental health, compromising opportunities for informing mental health policy and practice.

This special issue of *Health Promotion and Chronic Disease Prevention in Canada: Research, policy and practice* presents results from the 2020 Survey on COVID-19 and Mental Health (SCMH),[4] a population-based, cross-sectional survey explicitly designed to address several of the methodological weaknesses of existing evidence. The 2020 SCMH applied robust, probability-based sampling methods to ascertain a representative sample of adults aged 18 years or older living in Canada's 10 provinces and three territorial capital cities. The sample includes 14 689 respondents (53.3% response rate) who completed an online or telephone survey during the second wave of the COVID-19 pandemic, between September and December 2020. Select survey content and measurement was similar to the annual component of the Canadian Community Health Survey (CCHS),[5] a biennial, cross-sectional health survey of the Canadian population, permitting comparisons of mental health before and during the COVID-19 pandemic.

The articles[6-10] in this special issue present urgently needed and reliable population-level estimates of mental health during the pandemic as well as comparative analyses quantifying the magnitude and distribution of change in mental health across the population and for select sociodemographic subgroups. Results are extended further by identifying correlates of mental health that are unique to the pandemic, thereby providing greater insights to inform strategies for response, recovery and future preparedness.

The findings generally converge on several important themes consistent with population-based surveys in the United Kingdom[11,12] and the United States,[13-15] and systematic reviews of emerging evidence.[16-18] First, levels of distress, measured using well-validated symptom-based screening instruments of depression and anxiety, have increased during the pandemic relative to before.[9,11-17] These increases are generally more pronounced during lockdowns compared to when pandemic restrictions ease.[9,12,16]

Second, increases in levels of distress vary across population subgroups and are more pronounced among younger adults, females and immigrant populations.[9,11,13-15] Changes in mental health as a function of socioeconomic circumstances are nuanced: some indicators suggest a positive association between educational attainment and greater increases in levels of distress and alcohol use during the pandemic, relative to before;[9,7,10] while other findings indicate no difference.[8]

Third, the prevalence of self-reported suicidal ideation appears not to have increased during the pandemic.[8] These findings are consistent with recent analyses of data from 21 countries documenting no significant increase in risk of suicide in the early months of the pandemic (April–July 2020) compared to expected levels based on data from the pre-pandemic period.[19]

Fourth, a sizable portion of the Canadian population have reported increases in cannabis (5%) and alcohol use (16%) since the start of the pandemic and use of either cannabis or alcohol is strongly associated with co-occurring levels of distress.[10]

Finally, frontline workers and individuals reporting pandemic-related economic, health and interpersonal stressors are more likely

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to report high levels of distress and suicidal ideation during the pandemic.[8,9]

Taken together, these findings suggest a likely increase in demand for mental health care in the population and a need for responses targeting select subgroups that have been disproportionately impacted. To bridge the gap between level of need in the population and mental health service availability, innovative models of service delivery designed to increase access and efficiency, such as stepped care and collaborative care models, may show promise.[20-23] An integral component of these efforts must include outcome monitoring to determine the effectiveness of mental health care and establish iterative cycles of continuous improvement and innovation.[24]

While these findings provide initial insights into potential pandemic-related impacts on population mental health, important gaps remain. First, and foremost, is the complete absence of comparable, nationally representative data on the mental health of Canadian children and young people—a longstanding gap that predates the pandemic. This is a particular concern now, given the extraordinary challenges and disruptions to fundamental aspects of their daily lives that children and young people have endured throughout the pandemic.

The mental health–related impacts of these disruptions remain largely unknown, leaving decision makers and service providers with little evidence to draw upon when deciding about allocating vital resources and establishing intervention and mitigation strategies. Without these data, policy and practice decisions cannot be adequately informed and widening mental health disparities will likely ensue.

Second, the sole reliance on cross-sectional studies, with varying sampling and measurement methodologies, compromises the validity of temporal comparisons and places strict limits on causal attributions linked specifically to pandemic-related impacts. Longitudinal studies, with comparable pre-pandemic baseline data and carefully timed follow-up assessments, are required to identify subgroups most at risk and determine temporal ordering of associations that can inform causal attributions and optimize the effectiveness of prevention and intervention strategies.[1-3,25]

Moreover, our current evidence of pandemic-related impacts on population mental health is restricted to the first and second waves of the pandemic. Repeated follow-up assessments are needed to monitor longer-term impacts given well-documented health consequences of previous economic recessions and disasters—particularly increasing rates of mental ill-health, including suicide and substance use as well as family violence and psychiatric hospitalizations.[26-28]

Third, systematic underrepresentation of marginalized, racialized and Indigenous populations creates stark data gaps that must be addressed if we are truly committed to reducing health disparities in Canada.

Fourth, mental health measurement must go beyond the use of symptom-based screening scales to include indicators of severity, comorbidity and functional impairments.[24] Taking a more comprehensive approach to measurement will aid in determining who is most in need of mental health interventions.

The pandemic has shone a light on our ill-preparedness for monitoring population mental health, particularly among the most vulnerable. Sustained investments in methodologically rigorous, longitudinal, population-based surveys can serve as a common platform for achieving a number of complementary goals of public health surveillance, mental health science, policy and practice. In times of crises, these surveys serve an essential role in generating timely evidence about population mental health needs, strategies for mitigating risks and opportunities for evaluating intervention efforts.[29]

Although costly to implement, the value proposition of longitudinal, population-based surveys is immense, by way of generating accurate and reliable evidence—necessary prerequisites for informing mental health policy and practice.[1,2] The potential of such investments is epitomized by the COVID-19 Longitudinal Health and Well-being National Core Study in the United Kingdom, which was designed to link over 20 longitudinal, population-based cohort studies with national electronic health, education, occupation and geographical records to determine the impacts of the COVID-19 pandemic in the immediate, medium and longer term.[30]

With mental disorders now among the leading causes of disability burden globally, there is no doubt we must increase investments in mental health science to reduce the burden of suffering.[31] Policy makers and practitioners need timely evidence to inform the range of effective mental health programming required across the population and to implement layered approaches to "proportionate universalism" addressing longstanding equity goals while making effective use of public resources.[32] A critical gap that must be addressed immediately is the lack of nationally representative data on the mental health needs of Canadian children and young people. Recent investments in a longitudinal follow-up of the Canadian Health Survey of Children and Youth (CHSCY)[33] represent a promising starting point. The CHSCY is a nationally representative sample of children and youth aged 1 to 17 years that uses data collected by Statistics Canada immediately prior to the pandemic.

The COVID-19 pandemic represents a call to action for sustained investments in population-based, longitudinal surveys of mental health. Without such investments, we have no metric for monitoring our progress and collective impact in reducing the burden of mental ill-health in our population.

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Conflicts of interest

The author declares that she has no conflicts of interest.

Statement

The content and views expressed in this editorial are those of the author and do not necessarily reflect those of the Government of Canada.

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At-a-glance

Measuring self-reported change in alcohol and cannabis consumption during the second wave of the COVID-19 pandemic in Canada

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Abstract

This study presents nationally representative estimates of self-reported changes in alcohol and cannabis consumption since the onset of COVID-19 in Canada. We used data from the Survey on COVID-19 and Mental Health (collected from September to December 2020) to calculate the prevalence of self-reported change in alcohol and cannabis consumption. We found that 15.7% of respondents self-reported an increase in alcohol consumption and 5.4% in cannabis consumption since the start of the pandemic. Sociodemographic disparities were also observed, indicating that increased alcohol and cannabis consumption may be more prevalent among certain populations.

Highlights

- From 11 September to 4 December 2020, 15.7% and 5.4% of individuals self-reported an increase in alcohol and cannabis consumption, respectively, compared to before the pandemic.
- Individuals who reported that their mental health was worse now, compared to before the pandemic, had the highest prevalence of self-reported increase in alcohol and cannabis consumption.
- Understanding the social determinants of health is critical to the development of harm reduction and mitigation strategies.

Introduction

On 25 January 2020, Canada confirmed its first case of the novel coronavirus (COVID-19) and by early March 2020, community transmission was apparent. Since then, rigorous public health guidelines and measures, such as hand hygiene, mandating masks, school closures and physical distancing protocols, have been implemented in Canada. These public health measures have had a critical role in mitigating the spread of COVID-19 to protect the health of Canadians. However, there is increasing evidence that the pandemic and these ensuing strict public health measures have had a negative impact on the mental health and well-being of Canadians.[1-3]

Data from the first wave of the COVID-19 pandemic in Canada have shown increased prevalence of stress, anxiety and depression,[1-5] which are known risk factors for the onset and sustained misuse of substances, such as alcohol[6-8] and cannabis.[9] A study initiated by Mental Health Research Canada found that one-third of participants aged 18 years and above who reported having a previous diagnosis of anxiety (n = 307) or depression (n = 325) also reported an increase in alcohol and cannabis use during the pandemic.[4]

Furthermore, data collected between 29 March and 3 April 2020 from a national survey of 4383 participants aged 25 years and older indicate that 14% of respondents reported increased alcohol consumption and 5.5% reported increased cannabis consumption during the first wave of the pandemic.[10] Findings from early in the second wave (from 14 to 21 September 2020) among Canadian adults are consistent, with 40% of 3027 participants from one study indicating their mental health had deteriorated since the onset of the pandemic.[11] Moreover, during the same period, increased alcohol and cannabis use was reported for 30% and 20%, respectively, of individuals with a pre-existing mental health condition.[11] These findings highlight the intricate relationship between mental health and substance use.

These results are a significant and pressing public health concern, suggesting a widespread impact of the pandemic on behavioural health.[12] As the country works towards a national recovery plan in response to the repercussions and long-term consequences of the COVID-19 pandemic, more national data on population health behaviours, such as substance use, are needed to help inform public health guidance. Such guidance includes creating public health messages focussed on mitigating harms associated with alcohol and cannabis use. To date, there has been limited national information on alcohol and cannabis consumption during the second wave of the pandemic in Canada. The objective of this At-a-glance article is to (1) estimate the self-reported change in alcohol and cannabis use during the second wave of the COVID-19 pandemic, and (2) disaggregate self-reported increase in

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alcohol and cannabis use by sociodemographic characteristics and self-reported change in mental health.

Methods

Data collection and sampling

We used data from the Survey on COVID-19 and Mental Health (SCMH), which is a cross-sectional survey developed and funded by Statistics Canada and the Public Health Agency of Canada (PHAC). This survey was administered to 30 000 dwellings from 11 September to 4 December 2020 with the purpose of capturing information related to mental health and well-being. A simple random sample was selected for each province and the territorial capitals. Of the 14 689 people who responded to the survey, 84% agreed to share their data with PHAC, resulting in a sample size of 12 344 for this analysis. Individuals living on reserves or other Indigenous settlements, full-time members of the Canadian Armed Forces and individuals in institutions were excluded from the survey coverage. Further detail about the SCMH design and sampling framework can be found on Statistics Canada's website.[13]

Self-reported change in alcohol and cannabis consumption

Respondents were asked, "How has your *alcohol* consumption changed since *before* the COVID-19 pandemic?" and "How has your *cannabis* consumption changed since *before* the COVID-19 pandemic?" Response options were: "Increased", "Decreased" and "No change". If respondents overlooked or refused to answer the questions, the data were considered as missing and the respondents were excluded from the analysis (n = 43).

Data analysis

We estimated the weighted prevalence (with 95% confidence interval [CI]) of self-reported (1) increased change, (2) decreased change or (3) no change in alcohol and cannabis consumption among individuals aged 18 years and older. Estimates of self-reported increase were disaggregated by gender; age group; income change since COVID-19 (increased, decreased, no change); self-reported household income quintile; number of people in household; being a parent or legal guardian of a child or children under the age of 18 years; education level (less than high school, high school

TABLE 1
Characteristics of respondents in study on changes in alcohol and cannabis consumption since the beginning of the COVID-19 pandemic, Canada, September to December 2020

Variable	Proportion, % (95% CI)
Gender	
Male	49.1 (48.9–49.3)
Female	50.7 (50.6–50.7)
Age group	
18–24 years	9.5 (8.6–10.4)
25–34 years	18.7 (17.8–19.6)
35–44 years	16.8 (16.8–16.8)
45–54 years	15.6 (15.6–15.6)
55–64 years	17.2 (17.2–17.2)
65+ years	22.2 (22.2–22.2)
Income change since COVID-19	
Increased	6.0 (5.3–6.7)
Decreased	37.5 (36.3–38.8)
No change	56.5 (55.2–57.7)
Self-reported total household income quintile	
Q1	21.1 (20.0–22.2)
Q2	20.2 (19.1–21.3)
Q3	22.4 (21.2–23.6)
Q4	18.3 (17.2–19.4)
Q5	18.0 (16.9–19.1)
Province/territorial capital	
British Columbia	13.4 (13.4–13.4)
Alberta	11.4 (11.4–11.4)
Saskatchewan	2.8 (2.8–2.8)
Manitoba	3.3 (3.3–3.3)
Ontario	39.5 (39.5–39.5)
Quebec	22.9 (22.9–22.9)
New Brunswick	2.0 (2.0–2.0)
Nova Scotia	2.6 (2.6–2.6)
Prince Edward Island	0.4 (0.4–0.4)
Newfoundland and Labrador	1.4 (1.4–1.4)
Whitehorse, Yukon	0.1 (0.1–0.1)
Yellowknife, Northwest Territories	0.1 (0.1–0.1)
Iqaluit, Nunavut	0.02 (0.02–0.02)
Place of residence	
Urban	82.3 (81.5–83.1)
Rural	17.7 (16.9–18.5)
Number of people in household	
1	14.5 (14.1–14.9)
2	35.5 (34.8–36.2)
3	17.5 (16.5–18.5)
4	18.6 (17.4–19.7)
5 and more	13.9 (12.7–15.1)

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graduate, postsecondary graduate); self-identification as part of a racialized group (yes/no); immigrant status; province/territorial capital; place of residence (urban/rural); and self-reported changes in mental health compared to before the pandemic.

Survey sampling weights were provided by Statistics Canada to generate nationally representative estimates. Variance was estimated using the bootstrap method, and SAS Enterprise Guide version 7.1 (SAS Institute Inc., Cary, NC, USA) was used for statistical analyses. Chi-square tests were conducted to examine significant associations between sociodemographic variables, self-reported mental health and alcohol and cannabis consumption behaviours.

Results

Based on nationally representative data, 15.7% of individuals self-reported an increase in alcohol consumption, 9.9% self-reported a decrease and 74.3% self-reported no change. For cannabis, 5.4% self-reported an increase in consumption, 1.8% self-reported a decrease, 19.5% self-reported no change and 73.3% self-reported never using cannabis. The prevalence estimates for increased alcohol or cannabis consumption varied after disaggregation. Statistically significant differences are highlighted in the Results section of this article, and all estimates can be found in Tables 1 and 2.

Alcohol consumption

The prevalence of self-reported increased alcohol consumption was higher among individuals aged 35 to 44 years (21.9%) and 45 to 54 years (21.0%), those with a postsecondary education (18.4%), and individuals who reported a change in their household income since COVID-19 (18.5% increased income, 19.1% decreased income). The prevalence of self-reported increased alcohol consumption augmented by income quintile (ranging from 7.5% to 27.2%). Yellowknife, Northwest Territories, (22.5%) had the highest prevalence of self-reported increase in alcohol consumption, while Prince Edward Island (11.0%) had the lowest prevalence. The percentage of self-reported increase in alcohol consumption was higher for individuals living in an urban area (16.2%), living in a household with four people (20.8%), parents or legal guardians of children under the age of 18 years (22.6%), born in Canada ("non-immigrants") (18.2%) and people who did not identify as being part of a racialized group (17.8%). Lastly, the rate of increased alcohol consumption was highest among people who reported that their mental health was much worse or somewhat worse now compared to before the COVID-19 pandemic (27.0%).

TABLE 1 (continued)
Characteristics of respondents in study on changes in alcohol and cannabis consumption since the beginning of the COVID-19 pandemic, Canada, September to December 2020

Variable	Proportion, % (95% CI)
Parent/legal guardian of a child or children under 18 years	
Yes	27.6 (26.6–28.5)
No	72.4 (71.5–73.4)
Education level	
Less than high school	7.6 (6.9–8.3)
High school graduate	23.6 (22.4–24.8)
Postsecondary graduate	68.8 (67.5–70.0)
People who self-identify as part of a racialized group	
Yes	24.3 (23.1–25.4)
No	75.7 (74.6–76.9)
Immigrant	
Yes	25.6 (24.4–26.8)
No	73.0 (71.8–74.1)
Non-permanent resident	1.4[E] (1.1–1.8)
Self-rated mental health compared to before the COVID-19 pandemic	
Much better now/somewhat better now	7.6 (6.8–8.3)
About the same	59.0 (57.6–60.3)
Much worse now/somewhat worse now	33.5 (32.2–34.8)
Self-reported change in alcohol consumption	
Increased	15.7 (14.7–16.7)
Decreased	9.9 (9.1–10.8)
No change	74.3 (73.2–75.5)
Self-reported change in cannabis consumption	
Increased	5.4 (4.8–6.1)
Decreased	1.8 (1.4–2.1)
No change	19.5 (18.4–20.5)
Never used cannabis	73.3 (72.1–74.5)

Data source: 2020 Survey on COVID-19 and Mental Health.

Abbreviations: CI, confidence interval; Q, quintile.

[E] As per the Survey on COVID-19 and Mental Health release guidelines, prevalence estimates should be interpreted with caution, as the unweighted total sample size is between 75 and 150. Please look at the confidence intervals when interpreting these estimates.

Cannabis consumption

The prevalence of self-reported increased cannabis consumption was higher for males (5.8%), non-immigrants (6.3%), people who reported that their income had decreased (7.9%) since the beginning of COVID-19 pandemic and individuals who self-reported that their mental health was much worse now/somewhat worse now (10.0%). Self-reported increased cannabis consumption decreased by age (ranging from 12.1% to 1.0%), was highest in Nova Scotia (7.8%) and lowest in Saskatchewan (3.0%).

Discussion

Overall, we found that 15.7% of individuals living in Canada self-reported an increase in their alcohol consumption and 5.4% self-reported an increase in their cannabis consumption during the second wave of the COVID-19 pandemic. Self-reported increase in alcohol and cannabis use were disaggregated by sociodemographic

TABLE 2
Percentage of self-reported increase in alcohol and cannabis consumption since COVID-19, disaggregated by sociodemographic characteristics, adults aged 18 years and older, Canada, September to December 2020

Variable	% of self-reported increase in alcohol consumption (95% CI)	*p*-value	% of self-reported increase in cannabis consumption (95% CI)	*p*-value
Gender				
Male	15.2 (13.8–16.6)	0.5902	5.8 (4.8–6.8)	< 0.001
Female	16.2 (14.9–17.5)		4.9 (4.1–5.8)	
Age group				
18–24 years	14.1 (10.0–18.3)	< 0.001	12.1 (8.0–16.1)	< 0.001
25–34 years	18.2 (15.5–20.8)		9.8 (7.7–12.0)	
35–44 years	21.9 (19.6–24.3)		6.0 (4.6–7.4)	
45–54 years	21.0 (18.4–23.7)		4.4 (3.2–5.7)	
55–64 years	13.8 (11.9–15.7)		3.1 (2.2–3.9)	
65+ years	7.3 (6.0–8.6)		1.0 (0.5–1.4)	
Income change since COVID-19				
Increased	18.5 (14.3–22.6)	< 0.001	5.4 (2.8–8.0)	< 0.001
Decreased	19.1 (17.2–20.9)		7.9 (6.5–9.3)	
No change	13.3 (12.2–14.3)		3.8 (3.1–4.5)	
Self-reported total household income quintile				
Q1	7.5 (6.0–9.0)	< 0.001	4.2 (3.0–5.4)	0.1351
Q2	12.7 (10.7–14.7)		5.0 (3.7–6.4)	
Q3	15.9 (13.8–18.1)		6.5 (4.7–8.2)	
Q4	21.1 (18.5–23.8)		6.7 (5.1–8.2)	
Q5	27.2 (24.2–30.2)		5.6 (3.7–7.4)	
Province/territorial capital				
British Columbia	19.2 (16.6–21.8)	0.0013	5.0 (3.4–6.6)	< 0.001
Alberta	17.0 (14.4–19.7)		6.0 (4.4–7.6)	
Saskatchewan	15.3 (14.5–18.1)		3.0 (1.6–4.3)	
Manitoba	16.2 (13.5–18.8)		5.2 (3.6–6.8)	
Ontario	14.9 (13.1–16.6)		6.5 (5.1–7.8)	
Quebec	14.7 (12.9–16.5)		3.8 (2.7–4.9)	
New Brunswick	14.1 (11.5–16.7)		5.1 (3.2–7.0)	
Nova Scotia	16.5 (13.4–19.5)		7.8 (5.6–9.9)	
Prince Edward Island	11.0 (8.4–13.5)		5.5 (3.5–7.4)	
Newfoundland and Labrador	14.0 (11.1–16.9)		4.1 (2.5–5.8)	
Whitehorse, Yukon	17.7 (13.8–21.6)		5.3 (2.9–7.6)	
Yellowknife, Northwest Territories	22.5 (17.1–27.9)		5.9 (3.1–8.6)	
Iqaluit, Nunavut	18.0 (12.1–23.9)		6.4 (2.5–10.3)	
Place of residence				
Urban	16.2 (15.1–17.3)	0.0105	5.6 (4.8–6.3)	0.3146
Rural	13.1 (11.2–15.1)		4.7 (3.3–6.1)	
Number of people in household				
1	11.9 (10.4–13.4)	< 0.001	5.3 (4.2–6.3)	0.3663
2	13.5 (12.2–14.8)		4.9 (4.1–5.8)	
3	17.1 (14.6–19.6)		5.1 (3.6–6.6)	
4	20.8 (18.0–23.5)		6.9 (4.8–9.0)	
5 and more	17.0 (13.6–20.4)		5.5 (3.2–7.8)	

Continued on the following page

TABLE 2 (continued)
Percentage of self-reported increase in alcohol and cannabis consumption since COVID-19, disaggregated by sociodemographic characteristics, adults aged 18 years and older, Canada, September to December 2020

Variable	% of self-reported increase in alcohol consumption (95% CI)	*p*-value	% of self-reported increase in cannabis consumption (95% CI)	*p*-value
Parent/legal guardian of a child or children under 18 years				
Yes	22.6 (20.6–24.5)	< 0.001	4.8 (3.8–5.7)	0.1749
No	13.1 (12.0–14.2)		5.7 (4.8–6.5)	
Education level				
Less than high school	4.9 (3.2–6.6)	< 0.001	3.6 (0.9–6.3)	0.3849
High school graduate	11.5 (9.5–13.5)		5.3 (3.9–6.7)	
Postsecondary graduate	18.4 (17.2–19.6)		5.7 (4.9–6.5)	
People who self-identify as part of a racialized group				
Yes	9.4 (7.4–11.4)	< 0.001	5.1 (3.5–6.8)	0.6659
No	17.8 (16.7–18.9)		5.5 (4.8–6.2)	
Immigrant				
Yes	8.8 (7.3–10.4)	< 0.001	3.1 (1.8–4.4)	0.0024
No	18.2 (17.1–19.4)		6.3 (5.5–7.1)	
Non-permanent resident	14.5[E] (2.4–26.6)		6.6[E] (0.2–12.9)	
Self-rated mental health compared to before the COVID-19 pandemic				
Much better now/somewhat better now	13.6 (10.3–16.9)	< 0.001	8.8 (5.0–12.6)	< 0.001
About the same	9.5 (8.6–10.5)		2.4 (1.8–3.0)	
Much worse now/somewhat worse now	27.0 (24.9–29.1)		10.0 (8.5–11.5)	

Data source: 2020 Survey on COVID-19 and Mental Health.

Abbreviations: CI, confidence interval; Q, quintile.

[E] As per the Survey on COVID-19 and Mental Health release guidelines, prevalence estimates should be interpreted with caution, as the unweighted total sample size is between 75 and 150. Please look at the confidence intervals when interpreting these estimates.

characteristics and self-reported change in mental health, providing additional evidence of the wider impacts of the pandemic. Our result for cannabis was consistent with the increase reported early in the pandemic from 29 March to 3 April 2020 (first wave) in the Canadian Perspective Survey Series (CPSS) (5.5%).[10] Our estimate of increased alcohol consumption was slightly higher than what was found in series 1 of the CPSS (14%).[10]

Once disaggregated, results differed by various sociodemographic variables, which indicates potential disparities for certain groups. The increase in consumption of alcohol and cannabis differed significantly by age group, province and change in household income since the beginning of the COVID-19 pandemic. Interestingly, the number of individuals who self-reported an increase in alcohol consumption increased with age, whereas increases in cannabis consumption appeared to decrease with age. Moreover, individuals who rated their mental health as much worse/somewhat worse compared to before the COVID-19 pandemic also had a higher proportion of increased alcohol (27%) and cannabis consumption (10%) compared to those who rated their mental health as about the same, or much better/somewhat better now. This result is consistent with existing literature[4,11] and highlights the complex relationship between mental health and alcohol and cannabis use.

We also observed substance-specific differences. Among those who self-reported an increase in alcohol consumption, significant differences were observed by household income quintile, place of residence (urban/rural), size and composition of household, and racialized groups. Interestingly, gender differences were not observed for alcohol use. Among those who self-reported an increase in cannabis consumption, proportionally more men reported an increase in cannabis consumption compared to women.

It is important to note that these estimates are representative of the entire survey population, including people who have never used alcohol or cannabis. These results would likely vary significantly if we restricted our sample to respondents who had used these substances before. As Canada is currently in the recovery stage, subsequent studies should continue monitoring alcohol and cannabis consumption for the entire population, which includes non-consumers, but also specifically for individuals who do consume these substances to inform public health prevention and harm reduction strategies. Future research evaluating certain policies that may have contributed to increased alcohol and cannabis use (for example, access to alcohol through home deliveries) is also warranted.

Conclusion

During the second wave of the COVID-19 pandemic in Canada, an estimated 15.7% of Canadians self-reported an increase in their consumption of alcohol and 5.4% an increase in their consumption of cannabis. These nationally representative estimates varied by sociodemographic characteristics, which indicates the importance of understanding the social determinants of

health. Future studies should focus on the association between the determinants and substance use during COVID-19 to help identify the at-risk populations that may benefit from increased awareness, mitigation efforts and resources pertaining to alcohol- and cannabis-related harms.

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Conflicts of interest

The authors have no conflicts of interest to disclose.

Authors' contributions and statement

MV, KHM, NH and MB drafted this At-a-glance article. MV did the statistical analyses. All co-authors interpreted the data, and revised the article.

The content and views expressed in this article are those of the authors and do not necessarily reflect those of the Government of Canada.

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Original quantitative research

Applying a gendered lens to understanding self-reported changes in alcohol and cannabis consumption during the second wave of the COVID-19 pandemic in Canada, September to December 2020

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Abstract

Introduction: Increased alcohol and cannabis consumption and related harms have been reported since the beginning of the COVID-19 pandemic. Existing evidence shows that substance use and related harms differ by gender. Yet, no Canadian study has applied a gendered lens to alcohol and cannabis consumption use during this time. Our objectives were to (1) provide gender-specific prevalence estimates of self-reported increased alcohol and cannabis use; and (2) examine gender-specific associations between sociodemographic and mental health variables and alcohol and cannabis use.

Methods: Using data from the Survey on COVID-19 and Mental Health, we calculated nationally representative, gender-specific prevalence estimates and disaggregated them by sociodemographic and mental health variables. Four logistic regression models were used to assess the likelihood of self-reported increased alcohol and cannabis use.

Results: The prevalence of self-reported increase in alcohol use (16.2% women; 15.2% men) and cannabis use (4.9% women; 5.8% men) did not differ by gender. For both genders, income, racialized group membership, working in the past week, being a parent/legal guardian of a child aged under 18 and screening positive for depression and anxiety were associated with increased alcohol use. Men and women who were between the ages of 18 to 44, screened positive for depression, or both, were more likely to report increased cannabis use. For women, education was significantly associated with increased alcohol use. For men, being a parent/legal guardian was significantly associated with lower odds of increased cannabis use.

Conclusion: Sociodemographic factors, as well as depression and anxiety, were similarly associated with increased alcohol and cannabis use for both men and women in the second wave of the pandemic.

Keywords: *substance use, alcohol, cannabis, gender, mental health, anxiety, depression*

Highlights

- Between September and December 2020, 16.2% of women and 15.2% of men self-reported an increase in their alcohol consumption. During the same period, 4.9% of women and 5.8% of men self-reported an increase in their cannabis consumption.
- Overall, the factors associated with alcohol and cannabis use in gender-specific regression models were similar.
- For women, higher education was significantly associated with self-reported increased alcohol use.
- Men who were parents/legal guardians were significantly less likely to report increased cannabis use.
- For men and women, screening positive for symptoms of depression was significantly associated with higher odds of increased alcohol and cannabis use.

Introduction

The COVID-19 pandemic has brought unprecedented changes to daily life across the globe. From the first detected case of COVID-19 in January of 2020 to May 2021, Canada has reported over 1.3 million cases and over 25 000 deaths.[1] Evidence suggests that the ongoing pandemic is affecting members of the population, with some in Canada reporting worsening mental health,[2] economic challenges and increases in substance use behaviour.[3] Use of regulated substances, such as cannabis and alcohol, has increased across the first and second waves of the pandemic.[3] Such increases could lead to risky patterns of use or substance-related harms.[4-6] To develop effective policy, programming and targeting of harm reduction strategies, there is a need to understand the sociodemographic factors that may contribute to changes in alcohol and cannabis

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consumption. This includes applying a gendered lens to self-reported changes in alcohol and cannabis consumption during the second wave of the pandemic in Canada (September to December 2020).

The mental health consequences of COVID-19 in Canada are becoming apparent. Recent findings from a series of nationally weighted polls showed the prevalence of anxiety and depression to be at the highest levels in February 2021 compared to the first wave of data collection, which coincided with the beginning of the pandemic in Canada.[7] According to Mental Health Research Canada, the proportion of Canadians reporting high anxiety was four times higher in February 2021 than before the pandemic.[7] In addition, the proportion of participants who reported high levels of depression in February 2021 was 13% higher than before the pandemic (17% compared to 4%).[7] Data from this nationally representative poll showed that the proportion reporting high anxiety was similar across the provinces but was greater among women (31% compared to 19% of men).[7]

There is evidence to suggest that individuals are turning to substance use as a means to cope with the pandemic.[8,9] For example, the Canadian Mental Health Association reported that 17% of participants in a nationally representative survey had increased their substance use as a way to cope during the pandemic in Canada.[3] Consistent with these findings, a few studies in Canada have shown an increase in alcohol and cannabis consumption during the first and second waves of COVID-19.[3,10,11] Overall, existing Canadian evidence from April 2020 to March 2021 suggests that the prevalence of increased alcohol consumption ranged from 18% to 32%, while the range for increased cannabis consumption was between 6% and 34%.[3,10-12] The variability of estimates is likely due to sample characteristics, with lower estimates based on an entire survey sample and higher estimates based on a subset of participants who identified as using alcohol and cannabis. Taken together, the evidence points to an increase in alcohol and cannabis use for some Canadian adults.

Very few studies have reported on gender differences in alcohol and cannabis consumption during the pandemic, and no Canadian studies have provided nationally representative consumption estimates by gender. Based on Canadian data collected before COVID-19, more men than women reported consuming cannabis[13] and alcohol.[14,15] Furthermore, in Canada, rates of alcohol-related and cannabis-related hospitalizations and deaths were higher among males than females, suggesting a greater burden on men.[16]

However, studies have shown that consumption of alcohol[14] and cannabis[17] has been on the rise for women in Canada. Relatedly, a trend analysis of Ontario emergency department visits from 2003 to 2016 found that alcohol-attributable hospitalizations increased for women at an age-adjusted rate that was 1.63 times greater than the rate for men.[18] Furthermore, according to a report by the Canadian Institute for Health Information, from 2001 to 2017, alcohol-attributable deaths increased by 26% for women compared to a 5% increase for men.[16] Given these trends, as well as the increases in alcohol and cannabis consumption during the pandemic, understanding consumption behaviour by gender is important for informing harm reduction strategies.

The purpose of this study was to report gender-specific prevalence estimates of self-reported changes in alcohol and cannabis consumption by sociodemographic factors and to evaluate gender-specific associations between sociodemographic factors and self-reported changes in alcohol and cannabis consumption.

Methods

Study design and sample size

Data were obtained from the Survey on COVID-19 and Mental Health (SCMH). This was a cross-sectional, nationally representative, rapid response survey led by Statistics Canada with the purpose of assessing the impacts of COVID-19 on the mental health and well-being of the Canadian population. The survey was administered from 11 September 2020 to 4 December 2020 to 30 000 dwellings in the 10 provinces and capital cities of the three territories in Canada, which resulted in a sample of 14 689 participants aged 18 years and older. Of the initial sample, 84% agreed to share their data with the Public Health Agency of Canada, which resulted in a sample size of 12 344 for our analyses. Those excluded from survey coverage included individuals living on reserves or other Indigenous settlements, full-time members of the Canadian Armed Forces and individuals in institutions. Additional information about the SCMH can be found on the Statistics Canada website.[19]

Measures

Sociodemographic variables

The following sociodemographic characteristics were explored: gender, age, level of education, total household income quintile, working in the previous week, being a parent/legal guardian of a child or children under the age of 18 years, and visible minority (yes/no). The SCMH used the term "visible minority" to identify respondents other than Indigenous who are non-Caucasian in ethnicity or non-White in culture. For the purposes of this paper, we will refer to this variable as "member of a racialized group" (yes/no). Note that the survey collected gender and not sex assigned at birth. Gender is a social construct and refers to the characteristics, behaviours and roles that a society has attributed to women and men.[20] Participants were asked the question, "What is your gender?" and asked to select "male", "female" or "gender diverse". The gender diverse category represented 0.2% of the sample, limiting the ability to obtain reliable estimates for this group. As such, this category was not included in the analyses.

Mental health variables

For the purpose of these analyses, derived dichotomous cut-point variables were used for symptoms of moderate to severe generalized anxiety disorder (GAD) and major depressive disorder (MDD). For GAD, participants were classified as screening positive if they scored 10 or higher on the Generalized Anxiety Disorder scale (GAD-7).[21] For MDD, participants were classified as screening positive if they scored 10 or higher on the Patient Health Questionnaire (PHQ-9).[22]

Self-reported changes in substance use

To obtain a measure of change in substance use, participants were asked, "How has your alcohol consumption changed since before the COVID-19 pandemic?" and "How has your cannabis consumption changed since before the COVID-19 pandemic?" Participant response options were: Increased, Decreased and No change. Self-reported decreased consumption and no change were grouped together to create a dichotomous variable for changes in

substance use with increase and decrease/no change as the two groups. Responses coded as "not stated" were treated as missing and these participants were excluded from the analyses (n = 43).

Analyses

Respondents who reported that they had never used cannabis were grouped into the "no change" category. Sensitivity analyses for self-reported change in cannabis consumption were performed to see whether the patterns in disaggregated variables and associations in logistic regression models were different between the entire sample, which included individuals who had never used cannabis (n = 8843) and a sub-sample, which consisted solely of individuals who had used cannabis in their lifetime (n = 3487). Sensitivity analyses revealed that the patterns in disaggregated variables and associations in logistic models were similar between the entire sample and the sub-sample. Therefore, our estimates herein capture self-reported change in alcohol and cannabis consumption during COVID-19 among the entire Canadian population, which included individuals who have never used cannabis and who do not consume alcohol.

The dataset was stratified by gender for all analyses (n_{women} = 7063; n_{men} = 5255). To obtain gender-specific prevalence estimates, the data were disaggregated by sociodemographic and mental health variables. All prevalence estimates were weighted using survey sampling weights provided by Statistics Canada to generate nationally representative results. Gender-specific logistic regression analyses were conducted to estimate associations between sociodemographic variables and self-reported increase in alcohol and cannabis consumption. For the regression models, total household income was treated as a continuous variable for ease of interpretation. In total, we ran four logistic regression models. Variance was estimated using the bootstrap method and SAS Enterprise Guide version 7.1 (SAS Institute Inc., Cary, NC, USA).

Results

Sample characteristics are presented in Table 1. For both men and women, total household income quintile was evenly distributed. The majority of men and women were between the ages of 25 and 64 years (68.8% women; 67.9% men), were postsecondary graduates (69.3% women; 68.3% men) and reported working in the past week (54.8% women; 61.7% men). In addition, the majority of respondents did not identify as members of a racialized group (77.7% women; 73.6% men) and were not parents/legal guardians of a child aged under 18 (71.9% women; 72.9% men). Finally, most individuals in our study sample did not screen positive for moderate to severe symptoms of GAD (83.8% women; 90.1% men) or MDD (82.5% women; 87.4% men).

Overall, 16.2% of women and 15.2% of men in Canada reported that their alcohol consumption had increased since the beginning of COVID-19. Furthermore, 4.9% of women and 5.8% of men self-reported an increase in cannabis consumption. Among the sub-sample of individuals who have ever used cannabis in their life, 20.1% of men and 20.3% of

TABLE 1
Sociodemographic characteristics for survey participants who self-reported on changes in alcohol and cannabis use during the COVID-19 pandemic, by gender[a]

Variable	Sample characteristics			
	Women		Men	
	Percent	95% CI	Percent	95% CI
Member of racialized group				
Yes	22.27	20.67–23.87	26.36	24.61–28.11
No	77.73	76.13–79.33	73.64	71.89–75.39
Age group (years)				
18–24	7.85	6.68–9.03	11.10	9.68–12.52
25–44	36.19	35.01–37.37	34.71	33.31–36.12
45–64	32.56	32.50–32.61	33.17	33.06–33.28
65+	23.40	23.35–23.46	21.01	20.93–21.10
Education level				
Less than high school	7.74	6.82–8.66	7.45	6.41–8.49
High school graduate	23.01	21.39–24.62	24.21	22.33–26.09
Postsecondary graduate	69.25	67.53–70.98	68.34	66.42–70.26
Total household income quintile				
Q1	22.08	20.65–23.51	20.05	18.41–21.69
Q2	20.33	18.85–21.81	20.03	18.50–21.56
Q3	22.74	21.09–24.38	22.10	20.35–23.85
Q4	17.62	16.08–19.16	18.97	17.29–20.65
Q5	17.23	15.69–18.76	18.85	17.19–20.52
Worked in past week				
Yes	54.75	53.13–56.37	61.71	59.90–63.51
No	45.25	43.63–46.87	38.29	36.49–40.10
Parent/legal guardian of child under 18 years				
Yes	28.14	26.82–29.46	27.12	25.64–28.59
No	71.86	70.54–73.18	72.88	71.41–74.36
Symptoms of GAD				
Yes	16.20	14.80–17.59	9.92	8.65–11.20
No	83.80	82.41–85.20	90.08	88.80–91.35
Symptoms of MDD				
Yes	17.51	16.02–19.00	12.61	11.23–14.00
No	82.49	81.00–83.98	87.39	86.00–88.78

Data source: 2020 Survey on COVID-19 and Mental Health.

Abbreviations: CI, confidence interval; GAD, generalized anxiety disorder; MDD, major depressive disorder; Q, quintile.

[a] Analyses were conducted within gender and not between genders.

women self-reported that their cannabis consumption had increased since COVID-19 began.

Gender-stratified prevalence estimates

Gender-stratified estimates for increased alcohol consumption are presented in Table 2. For both genders, prevalence of self-reported increased alcohol consumption was significantly higher among non-racialized group members (18.5% women, 17.1% men) compared to racialized group members (8.4% women, 10.2% men) and higher in the 25 to 44 age group (20.8% women, 19.0% men) compared to the other age groups (7.3% to 17.2% for women and men, respectively). Prevalence of self-reported increased alcohol consumption increased significantly across each level of education for women (4.1%–19.6%) and from less than high school to high school graduate for men (5.8%–12.5%). Prevalence of self-reported increased alcohol consumption increased with total household income quintile (7.2%–27.8% for women; 7.9%–26.6% for men).

Furthermore, individuals who worked in the past week (20.4% women; 19.2% men) and parents/legal guardians of a child (or children) under the age of 18 years (23.3% women; 21.7% men) had significantly higher prevalence of self-reported increased alcohol consumption compared to those who did not work in the past week (10.8% women; 8.6% men) and who were not parents/legal guardians of a child aged under 18 (13.4% women; 12.7% men). Lastly, the percentage of self-reported increased alcohol use was approximately two times higher for men and women with symptoms of GAD (26.4% women; 29.8% men) and MDD (26.3% women; 29.5% men) compared to those without symptoms of GAD (14.2% women; 13.6% men) and MDD (13.8% women; 13.1% men).

Prevalence estimates for self-reported increase in cannabis consumption stratified by gender and disaggregated by socio-demographic characteristics and mental health variables are presented in Table 3. For men and women, prevalence of self-reported increased cannabis consumption significantly decreased with age (12.5% to 1.1% for women; 11.1% to 0.8% for men). Among women, estimates were not significantly different but were slightly higher for non-racialized group members (5.2%) and parents/legal guardians of a child or children under the age of 18 (5.1%) compared to racialized group members (4.1%) and women who were not parents/legal guardians (4.9%). For men, prevalence was similar among members of racialized groups (6.0% racialized group members, 5.8% non-racialized group members), and men who were not parents/legal guardians (6.3%) compared to those who were (4.4%).

Prevalence estimates for education, income quintile groups and working in the past week versus not were not significantly different for men and women. However, the percentage of self-reported increased cannabis use was nearly four times higher for men and women with symptoms of GAD (12.6% women; 18.2% men) and MDD (14.2% women; 16.1% men) compared to those without symptoms of GAD (3.5% women; 4.5% men) and MDD (3.0% women; 4.3% men).

TABLE 2
Prevalence estimates for survey participants who self-reported increased alcohol consumption during the COVID-19 pandemic, by gender[a]

Variable	Increase among women		Increase among men	
	Percent	95% CI	Percent	95% CI
Overall	16.18	14.90–17.46	15.19	13.79–16.58
Member of racialized group				
Yes	8.40	5.70–11.11	10.16	7.35–12.96
No	18.51	17.10–19.91	17.05	15.39–18.70
Age group (years)				
18–24	16.76	10.29–23.24	11.92	6.61–17.24
25–44	20.81	18.40–23.21	19.03	16.26–21.79
45–64	17.24	15.09–19.39	17.21	14.81–19.61
65+	7.28	5.64–8.92	7.34	5.38–9.30
Education level				
Less than high school	4.09	1.88–6.29	5.77	3.17–8.38
High school graduate	10.22	7.72–12.71	12.54	9.47–15.62
Postsecondary graduate	19.59	17.95–21.22	17.19	15.48–18.89
Total household income quintile				
Q1	7.22	5.32–9.12	7.93	5.69–10.17
Q2	14.38	11.67–17.09	11.07	8.09–14.05
Q3	15.38	12.71–18.05	16.41	13.11–19.70
Q4	24.71	20.62–28.79	17.97	14.71–21.23
Q5	27.80	23.60–32.00	26.64	22.14–31.14
Worked in past week				
Yes	20.40	18.47–22.32	19.21	17.18–21.24
No	10.85	9.23–12.47	8.64	6.93–10.35
Parent/legal guardian of child under 18 years				
Yes	23.25	20.50–26.00	21.73	18.89–24.58
No	13.41	11.99–14.83	12.73	11.11–14.35
Symptoms of GAD				
Yes	26.42	22.16–30.67	29.81	23.78–35.84
No	14.17	12.90–15.44	13.58	12.17–14.99
Symptoms of MDD				
Yes	26.32	22.43–30.21	29.46	24.07–34.84
No	13.75	12.47–15.02	13.12	11.70–14.54

Data source: 2020 Survey on COVID-19 and Mental Health.

Abbreviations: CI, confidence interval; GAD, generalized anxiety disorder; MDD, major depressive disorder; Q, quintile.

[a] Analyses were conducted within gender and not between genders.

TABLE 3
Prevalence estimates for survey participants who self-reported increased cannabis use during the COVID-19 pandemic, by gender[a]

Variable	Increase among women		Increase among men	
	Percent	95% CI	Percent	95% CI
Overall	4.94	4.11–5.77	5.81	4.78–6.84
Member of racialized group				
Yes	4.13	1.98–6.28	5.97	3.51–8.44
No	5.16	4.29–6.03	5.80	4.69–6.90
Age group (years)				
18–24	12.48	7.03–17.94	11.14	5.44–16.85
25–44	6.92	5.30–8.53	9.10	6.98–11.23
45–64	3.68	2.61–4.75	3.74	2.68–4.80
65+	1.10	0.45–1.75	0.84	0.21–1.47
Education level				
Less than high school	3.30	0.60–6.01	3.95	0.00–8.82
High school graduate	4.33	2.88–5.78	5.81	3.56–8.06
Postsecondary graduate	5.35	4.32–6.37	6.03	4.85–7.22
Total household income quintile				
Q1	3.84	2.39–5.28	4.57	2.68–6.46
Q2	4.34	2.83–5.86	5.62	3.38–7.87
Q3	6.91	4.41–9.40	5.76	3.53–7.99
Q4	6.70	4.31–9.09	6.23	4.19–8.27
Q5	3.53	2.04–5.01	7.37	4.05–10.68
Worked in past week				
Yes	5.76	4.64–6.88	6.68	5.30–8.05
No	3.89	2.68–5.09	4.44	2.86–6.01
Parent/legal guardian of child under 18 years				
Yes	5.13	3.70–6.57	4.36	3.09–5.62
No	4.87	3.87–5.87	6.31	4.97–7.65
Symptoms of GAD				
Yes	12.61	9.52–15.69	18.18	12.50–23.87
No	3.49	2.70–4.28	4.55	3.56–5.54
Symptoms of MDD				
Yes	14.20	10.74–17.65	16.13	11.64–20.61
No	3.04	2.40–3.69	4.28	3.28–5.29

Data source: 2020 Survey on COVID-19 and Mental Health.

Abbreviations: CI, confidence interval; GAD, generalized anxiety disorder; MDD, major depressive disorder; Q, quintile.

[a] Analyses were conducted within gender and not between genders.

Gender-stratified logistic regressions

Gender-specific adjusted odds ratios are presented in Table 4. For men and women, the odds of self-reported increased alcohol consumption increased with income (aOR_{women} = 1.11, 95% CI: 1.07–1.15; aOR_{men} = 1.12, 1.06–1.17). For both genders, non-racialized group members (aOR_{women} = 2.95, 1.95–4.48; aOR_{men} = 2.35, 1.62–3.40), working in the past week (aOR_{women} = 1.32, 1.01–1.72; aOR_{men} = 1.54, 1.08–2.21), being a parent/legal guardian of a child or children under the age of 18 (aOR_{women} = 1.46, 1.13–1.90; aOR_{men} = 1.38, 1.05–1.82), having symptoms of MDD (aOR_{women} = 1.86, 1.36–2.54; aOR_{men} = 2.35, 1.58–3.50) and GAD (aOR_{women} = 1.65, 1.18–2.32; aOR_{men} = 1.72, 1.14–2.61) were significantly associated with higher odds of self-reported increased alcohol consumption. The odds of self-reported increased alcohol consumption were over three times higher for women who had a postsecondary education (aOR = 3.05, 1.47–6.32) compared to women with less than a high school education.

For both men and women, being between the ages of 18 to 24 (aOR_{women} = 6.22, 2.09–18.49; aOR_{men} = 7.82, 1.67–36.69) and 25 to 44 (aOR_{women} = 4.73, 1.87–11.93; aOR_{men} = 11.32, 2.69–47.61), and having symptoms of MDD (aOR_{women} = 3.30; 1.76–6.18; aOR_{men} = 2.18, 1.20–3.95) were significantly associated with increased odds of self-reported increased cannabis consumption. Women aged 18 to 24 were 6.22 times (2.09–18.49) more likely to report increased cannabis consumption and women aged 45 to 64 were 2.52 times (1.11–5.70) more likely to report increased cannabis consumption. Men who were parents/legal guardians of a child or children under the age of 18 were less likely to report increased cannabis consumption (aOR = 0.42, 0.26–0.67). Men with symptoms of GAD were over 2 times more likely to report increased cannabis consumption (aOR = 2.44, 1.32–4.54).

Discussion

As the impacts of the COVID-19 pandemic in Canada have stretched beyond the disease itself, a key priority is to assess the short- and long-term effects of COVID-19-related public health measures on population well-being, one aspect of which is substance use. An important part of that strategy is to understand the impacts for specific segments of the population and identify where disproportionate burdens of harm may be experienced. Canadian evidence has shown that men and women are experiencing harms associated with substance use since the beginning of the pandemic.[6] Specifically, there was an increase in alcohol- and cannabis-related hospitalizations and substance-related deaths (involving alcohol, cannabis and other substances) for both men and women from March to September 2020, compared to the same period in 2019.[6] Given these increases in harms, and the potential for differential burdens of disease,[23] a gender-specific understanding of patterns of use is essential to informing mitigation strategies.

For both men and women, income, racialized group membership, working in the past week, being a parent/legal guardian of a child aged under 18 and screening positive for MDD or GAD increased the odds of self-reporting increased alcohol

TABLE 4
Adjusted odds ratios for survey participants who self-reported increased alcohol and cannabis use during the COVID-19 pandemic, by gender[a]

Variable	Alcohol increase		Cannabis increase	
	Women aOR (95% CI)	Men aOR (95% CI)	Women aOR (95% CI)	Men aOR (95% CI)
Member of racialized group				
Yes	Ref	Ref	Ref	Ref
No	2.95 (1.95–4.48)	2.35 (1.62–3.40)	1.57 (0.84–2.94)	1.48 (0.86–2.54)
Age group (years)				
18–24	1.76 (0.92–3.37)	1.34 (0.65–2.79)	6.22 (2.09–18.49)	7.82 (1.67–36.69)
25–44	1.28 (0.86–1.90)	1.67 (1.05–2.66)	4.73 (1.87–11.93)	11.32 (2.69–47.61)
45–64	1.23 (0.86–1.76)	1.46 (0.94–2.26)	2.52 (1.11–5.70)	3.90 (0.97–15.71)
65+	Ref	Ref	Ref	Ref
Education level				
Less than high school	Ref	Ref	Ref	Ref
High school graduate	1.60 (0.75–3.43)	1.42 (0.73–2.79)	1.28 (0.34–4.80)	2.59 (0.30–22.23)
Postsecondary	3.05 (1.47–6.32)	1.71 (0.90–3.25)	1.99 (0.57–6.97)	2.76 (0.32–23.55)
Total household income (continuous)	1.11 (1.07–1.15)	1.12 (1.06–1.17)	1.00 (0.94–1.06)	1.04 (0.97–1.11)
Worked in past week				
Yes	1.32 (1.01–1.72)	1.54 (1.08–2.21)	0.97 (0.58–1.61)	1.23 (0.71–2.11)
No	Ref	Ref	Ref	Ref
Parent/legal guardian of child under 18 years				
Yes	1.46 (1.13–1.90)	1.38 (1.05–1.82)	0.76 (0.46–1.26)	0.42 (0.26–0.67)
No	Ref	Ref	Ref	Ref
Symptoms of GAD				
Yes	1.65 (1.18–2.32)	1.72 (1.14–2.61)	1.38 (0.71–2.68)	2.44 (1.32–4.54)
No	Ref	Ref	Ref	Ref
Symptoms of MDD				
Yes	1.86 (1.36–2.54)	2.35 (1.58–3.50)	3.30 (1.76–6.18)	2.18 (1.20–3.95)
No	Ref	Ref	Ref	Ref

Data source: 2020 Survey on COVID-19 and Mental Health.

Abbreviations: aOR, adjusted odds ratio; CI, confidence interval; GAD, generalized anxiety disorder; MDD, major depressive disorder; Ref, reference.

[a] Analyses were conducted within gender and not between genders for each substance.

consumption. Concerning self-reported increased cannabis consumption, being aged 18 to 44 and screening positive for MDD were associated with increased odds for men and women. Similarly, we found that parents/legal guardians of a child or children aged under 18 had a higher prevalence of self-reported increased alcohol consumption compared to others for men and women.

Our findings are consistent with a nationally representative study of 3000 people from the first wave of the pandemic in Canada. Gadermann et al.[24] found that 27.7% of parents of children aged under 18 self-reported increased alcohol consumption in May 2020 compared to 16.1% of others. After adjusting for various factors, we found that being a parent/legal guardian was significantly associated with higher odds of reporting increased alcohol consumption. Future investigations should assess the wider impacts of COVID-19 (including substance use and harms) on parents to enable targeted harm reduction strategies that are tailored to diverse familial needs.

Other important findings that are consistent with the literature are the associations of symptoms of anxiety and depression with increased substance use. Two studies in Canada have shown that experiencing poor mental health during the pandemic is related to increased substance use.[3,11] Similarly, we found that Canadian adults who screened positive for GAD, MDD, or both, were significantly more likely to self-report increased alcohol and cannabis use. These findings are concerning and highlight the need to provide Canadians with appropriate supports to cope with various stressors related to or made worse by the pandemic.

Broadly speaking, sociodemographic factors were similarly associated with increased alcohol consumption for both men and women. However, there were some noteworthy differences. For women, we found that having a postsecondary education was significantly associated with self-reported increased alcohol use. Education and other indices of socioeconomic status (e.g. income) are generally associated with alcohol use,[25,26] yet this

association was only significant for women, which was unexpected. It may be indicative of an increased burden on women during the pandemic to juggle competing demands related to the family or caregiving and the workplace.[27]

For men, being a parent/legal guardian of a child aged under 18 was associated with lower odds of increased cannabis consumption. Future research should investigate whether this is indicative of broader gender-specific consumption patterns. For example, in 2020, smoking was the most common mode of cannabis consumption, and prevalence remained stable from 2019 for men. However, this reported mode of consumption decreased from 64.2% to 52.5% for women who used cannabis.[28] Given the potential risk of second-hand exposure among children from parental cannabis smoking,[29,30] men with children in the home may be less likely to smoke cannabis. Evidence on adverse health outcomes among children exposed to second-hand cannabis smoking and potential risk-modifying behaviours among parents who use cannabis is limited, and additional research is needed. Our findings also indicate that men who screened positive for GAD were significantly more likely to self-report increased cannabis consumption. This association may be bidirectional, given that the frequent use of high-potency cannabis products (which is more common among men) may increase the likelihood of developing GAD.[31]

Strengths and limitations

To our knowledge, this is the first Canadian study to apply a gendered lens in the analysis of self-reported increased alcohol and cannabis use during the COVID-19 pandemic with a large, nationally representative survey. In addition, our gender-specific findings corroborate previous research showing an association between mental health and alcohol and cannabis use in the Canadian population.

There are, however, some limitations to acknowledge. Change in substance use was self-reported and the rate of change was not quantified, meaning any degree of change was treated the same, regardless of how those changes may have affected absolute levels of consumption that may or may not have aligned with low-risk substance use guidelines. Future research would benefit from a more nuanced assessment of changes in substance use patterns, including continued follow-up of respondents to assess change in use over time. Furthermore, findings related to increased cannabis use may not be solely attributable to experiences associated with COVID-19, given the recent legalization of cannabis for recreational use, and subsequent shifts in consumption patterns and societal attitudes towards consumption. Lastly, causality of observed relationships cannot be inferred, given the cross-sectional nature of the survey.

Conclusion

During the second wave of the COVID-19 pandemic, 16.2% of women and 15.2% of men self-reported an increase in their alcohol consumption, while 4.9% of women and 5.8% of men self-reported an increase in their cannabis consumption. Evidence suggests that parents/legal guardians of children under 18 and individuals experiencing symptoms of GAD and MDD may be experiencing challenges during this time, and may opt for initiating or increasing use of alcohol and cannabis as a potential coping mechanism. While overall trends in self-reported increases in alcohol and cannabis consumption were similar for men and women, there is a need for future investigations to qualify the degree of change in use patterns and increase sampling among gender-diverse populations. These findings highlight the potential need for targeted resources and appropriate supports for parents and caregivers, as well as for a focus on low-risk drinking and lower-risk cannabis use guidelines in the context of an ongoing public health emergency.

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Conflicts of interest

The authors have no conflicts of interest to disclose.

Authors' contributions and statement

KHM contributed to the conceptualization of the work, analysis, interpretation of the data and drafting and revising the paper. JV contributed to the conceptualization of the work, analysis, interpretation of the data and drafting and revising the paper. MV contributed to the conceptualization, analysis, interpretation of the data and drafting and revising the paper. MW contributed to the interpretation of data and revising the paper. NH contributed to the drafting and revising of the paper. MMB contributed to the conceptualization of work, interpretation of data and revising of the paper.

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Original quantitative research

Symptoms of major depressive disorder during the COVID-19 pandemic: results from a representative sample of the Canadian population

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Abstract

Introduction: Since the outbreak of COVID-19, numerous studies from around the world have reported declines in mental health. However, most of these studies were of low-to-moderate quality and many were based on convenience samples or used mental health measures with low validity, or both. Consequently, it has been difficult to draw conclusions.

Methods: Both the 2020 Survey on COVID-19 and Mental Health (SCMH) and the Canadian Community Health Survey (CCHS) (2015–2019) used the Patient Health Questionnaire-9 to screen for major depressive disorder (MDD) in adults aged 18 or older. The prevalence of MDD was compared between the SCMH and the CCHS. Risk and protective factors for MDD in the SCMH were examined using bivariate and logistic regression analyses.

Results: Based on SCMH data, 15.2% (95% CI: 14.2–16.2) of Canadians screened positive for MDD. The prevalence of MDD was more than two times higher in the SCMH (during COVID-19) than in the CCHS (predating COVID-19). In bivariate analysis, Canadians reporting five or more COVID-19-related risk factors were close to 30 times more likely to have MDD than those reporting no risk factors. Mastery and a sense of community belonging were protective factors for MDD.

Conclusion: After remaining stable for two decades, the prevalence of depression among Canadians increased substantially with the onset of COVID-19. Ongoing monitoring of this common condition associated with major morbidity is vital to determine if elevated levels of MDD persist as we progress through and beyond future waves of COVID-19.

Keywords: *COVID-19, coping, coronavirus, depression, family violence, mastery, mental health, sense of community belonging*

Highlights

- During the second wave of COVID-19 in the fall of 2020, the prevalence of major depressive disorder (MDD) among Canadians aged 18 or older (defined as the proportion screening positive for MDD using the Patient Health Questionnaire-9) was 15% (13% for males and 18% for females).
- Based on data from eight Canadian provinces, the prevalence of MDD during the fall of 2020 was more than double what it had been in pre-COVID times (16% vs. 7%).
- A dose-response relationship was observed between MDD and COVID-19-related risk factors for poor mental health. Each increase in the number of COVID-19-related risk factors was associated with an increase in the prevalence of MDD, ranging from 2% among those reporting no risk factors to 62% among those reporting five or more risk factors.
- Mastery, the extent to which individuals perceive they have control over their life circumstances, was strongly associated with MDD. Those with low levels of mastery were 17 times more likely to screen positive for MDD than those with high mastery.
- Individuals reporting a very weak sense of community belonging were 10 times more likely to screen positive for MDD than those with a very strong sense of belonging.

Introduction

On March 11, 2020, the World Health Organization officially declared the COVID-19 outbreak to be a pandemic.[1] Since then, unprecedented public health measures have been implemented to contain the virus. In Canada, these have included closures of schools and childcare centres, physical distancing requirements, curfews, travel bans and the closure of many businesses.[2]

COVID-19 and the measures imposed to reduce its spread have resulted in stressors and other negative effects for

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Canadians, including worries about personal health and the health of loved ones, job loss, income insecurity, family tension stemming from confinement and feelings of fear, loneliness and isolation.[3,4] As well, unhealthy lifestyle behaviour changes have been reported, such as greater consumption of alcohol and cannabis,[4] and some reports have suggested an increase in family violence.[4,5] These negative changes are concerning since research has found that experiencing stressful life events is the most important risk factor for depression.[6-13] Furthermore, problematic use of alcohol[14] and cannabis[15] has been shown to be related to depression.

Canadian data collected starting in the mid-1990s indicate that the prevalence of depression had been stable for two decades.[16] However, since the outbreak of the pandemic, studies from Canada and other countries reveal increases in negative psychological outcomes, including depression.[17-24] However, based on assessment of the target populations, sample sizes, methods of sample selection and instruments used for measuring mental health, most of these studies were of low-to-moderate quality—many were based on convenience samples or used mental health measures of low validity, or both, which makes it difficult to draw conclusions.[17,19-22,24]

Psychosocial factors and resources such as mastery (the extent to which people perceive that they have control over their life circumstances),[25] coping mechanisms and a sense of community belonging have been shown to reduce the likelihood of depressive symptoms.[8,26-30] However, studies examining protective factors for depression during the pandemic are lacking. Identifying protective factors is essential for the development of intervention programs aimed at reducing depressive symptoms as Canadians live through multiple waves of COVID-19.

In this study, we examined depression in relation to COVID-19 using data from the nationally representative Canadian Survey on COVID-19 and Mental Health (SCMH) conducted during the second wave of the COVID-19 pandemic in the fall of 2020, and the Canadian Community Health Survey (CCHS)—Annual Component from 2015 to 2019 (conducted before the onset of COVID-19). In both surveys, symptoms of depression during the previous two weeks were measured using the Patient Health Questionnaire-9 (PHQ-9), a nine-item instrument used as a screening tool for identifying probable cases of major depressive disorder, henceforth referred to as MDD for convenience.[31-33]

The research questions addressed were:

1. Did the prevalence of MDD change between the pre-COVID period and the administration of the SCMH (during the second wave)? Did changes differ by sociodemographic characteristics?
2. What was the prevalence of COVID-19-related risk and protective factors during the second wave of COVID-19? The COVID-19-related risk factors include changes related to COVID-19 that have the potential to negatively impact mental health.
3. During the second wave of COVID-19, what were the risk factors (COVID-19-related and sociodemographic) and protective factors associated with MDD?

The unparalleled nature of the COVID-19 pandemic offers a unique opportunity to examine the mental health of Canadians during a public health emergency to understand the health consequences.

Methods

Data sources

Data are from the SCMH-2020[34] and the 2015 to 2019 CCHS—Annual Component.[35]

The SCMH collected cross-sectional data from 11 September 2020 to 4 December 2020. The target population was individuals aged 18 years or older living in the 10 provinces or in the three territorial capital cities. Individuals living on reserves, in institutions and outside capital cities in the territories were excluded. These exclusions represented less than 2% of the Canadian population. In each province and in each territorial capital, a simple random sample of dwellings was selected from the Dwelling Universe File (a list of dwelling addresses based on various administrative data files created by Statistics Canada). One person aged 18 or older was randomly chosen from each occupied sampled dwelling to participate in the SCMH. Respondents completed the survey online or by telephone. The response rate was 53.3%—14 689 respondents in total. SCMH respondents were asked for permission to share the information they provided with the Public Health Agency of Canada (PHAC); 12 344 agreed to share. This study was based on records from the share file.

The target population of the CCHS was individuals aged 12 years or older living in the 10 provinces or three territories.[35] Residents of reserves and other Indigenous settlements in the provinces, full-time members of the Canadian Forces, the institutionalized population and individuals living in some remote regions were excluded. These exclusions represented less than 3% of the Canadian population. In the CCHS, the Labour Force Survey area frame was used for the sampling of the adult population. The CCHS was completed by telephone or in person using a computer-assisted questionnaire.

In the annual CCHS, the PHQ-9 module is optional content; each year, the province or territory decides if this module will be administered. The years in which the CCHS depression module was most recently administered were: 2019 in Ontario and Manitoba; 2018 in Prince Edward Island; 2016 in Newfoundland and Labrador, Nova Scotia, New Brunswick and Saskatchewan; and 2015 in British Columbia. The PHQ-9 module has not been administered in Quebec and Alberta. The territories are excluded from the CCHS annual files because territorial data become representative of the population only after two years of data have been collected.

From 2015 to 2019, response rates to the CCHS ranged from a low of 54.4% in 2019 to a high of 62.8% in 2017. Similar to the SCMH, the CCHS asked respondents for permission to share their information with PHAC; each year, more than 90% agreed to share. For the eight provinces for which comparisons with the SCMH were made, the combined CCHS sample size of those aged 18 years or older on the share files was 31 920.

Measures

MDD

Both surveys measured symptoms of MDD using the PHQ-9.[31-33] The PHQ-9 is not a diagnostic instrument, but a PHQ-9 score of 10 or higher suggests depressive symptoms of sufficient severity and persistence that additional assessment or treatment is required clinically.[31-33] Table 1 provides details on the items and scoring.

Covariates

MDD was examined in relation to sociodemographic variables, COVID-19-related risk factors and protective factors.

The sociodemographic variables included were gender (female, male); age group (18–24, 25–34, 35–49, 50–64 and 65 years or older); racialized group member (non-White, White); immigrant status (yes, no ["non-immigrants" include those born in Canada and those who are Canadian citizens by birth]); place of residence (urban centre, rural); educational attainment (less than high school, high school, post-secondary certificate/degree/diploma, and university certificate, diploma or degree above the bachelor's level); household income (divided into quintiles); and frontline worker (yes, no). In the SCMH questionnaire, a frontline worker was defined as "an individual who has the potential to come in direct contact with COVID-19 by assisting those who have been diagnosed

TABLE 1
Measures for depression, COVID-19-related risk factors and protective factors

Variable	Measure
Depression	To measure depression, respondents to the SCMH and the CCHS were asked the following questions from the Patient Health Questionnaire-9 (PHQ-9) to identify probable cases of major depressive disorder (MDD):[31-33] **Over the last 2 weeks, how often have you been bothered by any of the following problems?** 1. Had little interest or pleasure in doing things 2. Felt down, depressed, or hopeless 3. Had trouble falling or staying asleep, or sleeping too much 4. Felt tired or having little energy 5. Had poor appetite or overate 6. Felt bad about yourself—or that you are a failure or have let yourself or your family down 7. Had trouble concentrating on things, such as reading the newspaper or watching television 8. Been moving or speaking so slowly that other people could have noticed? Or the opposite, being so fidgety or restless that you have been moving around a lot more than usual 9. Had thoughts that you would be better off dead or of hurting yourself in some way The answer categories were: Not at all; Several days; More than half the days; Nearly every day. A score was assigned to each item, from 0 (Not at all) to 3 (Nearly every day). An overall score was derived by summing the scores for the 9 items. A cut-off score of 10 identifies probable cases of MDD.[31-33] The PHQ-9 has also been found to be a reliable and valid measure of depression severity.[31]
COVID-19-related risk factors	Nine COVID-19-related risk factors were examined in the study. Six risk factors came from the following "mark all that apply" checklist: **Have you experienced any of the following impacts due to the COVID-19 pandemic?** • Loss of job or income • Difficulty meeting financial obligations or essential needs • Death of a family member, friend or colleague • Feelings of loneliness or isolation • Physical health problems • Challenges in personal relationships with members of your household The other three risk factors (increased consumption of alcohol and cannabis since the onset of COVID-19, and concerns about family violence) were derived from the following items: **On average, over the course of the COVID-19 pandemic, how has your alcohol consumption changed when comparing to before the pandemic?** • Increased • Decreased • No change **On average, over the course of the COVID-19 pandemic, how has your use of cannabis changed when comparing to before the pandemic?** • Increased • Decreased • No change

Continued on the following page

TABLE 1 (continued)
Measures for depression, COVID-19-related risk factors and protective factors

Variable	Measure
COVID-19-related risk factors	**The next questions concern the serious problem of violence in the home. Your responses are important whether or not you have had any of these experiences. Remember that all information provided is strictly confidential. How concerned are you about violence in your home?** • Not at all • Somewhat • Very • Extremely All three risk factors were dichotomized: increased use (Yes/No) for alcohol and cannabis, and concern for violence in your home as "Yes" (response = "Somewhat", "Very" or "Extremely") or "No" (response = "Not at all").
Protective factors	**Sense of community belonging** The following item was used to measure sense of community belonging: **How would you describe your sense of belonging to your local community?** • Very strong • Somewhat strong • Somewhat weak • Very weak
	Mastery Mastery is a psychological resource referring to the extent to which people perceive that they have control over their life circumstances. Mastery is not considered to be a fixed personal resource, but rather, it can evolve with the experiences (good and bad) that individuals face across the lifespan.[29] SCMH respondents were administered the 7-item scale developed by Pearlin & Schooler 1978:[25] 1. You have little control over the things that happen to you. 2. There is really no way you can solve some of the problems you have. 3. There is little you can do to change many of the important things in your life. 4. You often feel helpless in dealing with the problems of life. 5. Sometimes you feel that you are being pushed around in life. 6. What happens to you in the future mostly depends on you. 7. You can do just about anything you really set your mind to. The answer categories were: Strongly agree; Agree; Neither agree nor disagree; Disagree; Strongly disagree. A score was assigned to each item, from 0 (Strongly agree) to 4 (Strongly disagree). An overall score was derived by summing the scores for the 7 items. Scoring was reversed for items 6 and 7.
	Coping mechanisms The SCMH assessed coping mechanisms by asking respondents: **Are you doing any of the following activities for your health?** • Communicating with friends and family • Meditating • Praying or seeking spiritual guidance • Exercising outdoors • Exercising indoors • Changing food choices • Participating in hobbies • Changing sleep patterns The answer categories were: Yes, for my mental health; Yes, for my physical health; Yes, both for my mental and physical health; and No. The responses were dichotomized to: Yes, for my mental and/or physical health; No. Responses to exercise outdoors and exercise indoors were combined into a single variable.

Note: The questions in the table are as they appear in Statistics Canada's Survey on COVID-19 and Mental Health,[34] Cycle 1, available from https://www23.statcan.gc.ca/imdb/p3Instr.pl?Function=assembleInstr&Item_Id=1286126&TET=1.

with the virus." Examples provided were "police officers, firefighters, paramedics, nurses or doctors."

Nine COVID-19-related risk factors were examined: six COVID-19-related events or concerns, increases in the consumption of alcohol and cannabis since the onset of COVID-19, and concerns about family violence (Table 1). An overall risk factor score (from 0–9) was created by summing the number of risk factors for each respondent.

The protective factors examined were sense of community belonging, mastery and coping mechanisms (Table 1).

Analysis

All analyses were run for the total sample and stratified by gender; separate analyses were not possible for gender-diverse individuals due to insufficient sample sizes, but gender-diverse individuals (n = 20) are included in the total estimates.

Frequency estimates were produced to show the prevalence of MDD in the SCMH and the CCHS. Comparison of estimates between the two surveys was based on the eight provinces for which CCHS depression data were available. Overall comparisons (absolute and relative) were made, as well as comparisons by sociodemographic factors. The comparison by household income quintiles was based on three provinces because total household income was unavailable on the CCHS files for certain years. MDD prevalence estimates, and 95% confidence intervals (CIs), were produced for the SCMH and the CCHS, as well as absolute and relative differences in prevalence between the two surveys and the 95% CIs of the differences.

When making comparisons between the SCMH and the CCHS, we used CCHS data from the years 2015 to 2019 and implicitly assumed that the prevalence of MDD was stable across these years. Although Canadian data collected starting in the mid-1990s indicate that the prevalence of depression was stable for two decades,[16] the final year in this time trend was prior to 2015. A sensitivity analysis was conducted to see if there is validity to the conjecture that the prevalence of MDD was stable over the years 2015 to 2019. For Ontario and Manitoba, three data points were available for these years, and we compared the prevalence estimates of MDD to see if they were stable.

All other analyses were based solely on SCMH data. Bivariate analysis was used to compare risk and protective factors for males and females.

Associations between COVID-19-related risk factors, protective factors and sociodemographic factors in relation to MDD were examined using cross-tabulations and logistic regression models while simultaneously controlling for the three groups of factors.

All analyses were based on weighted data. Weights created by Statistics Canada ensured that the data on the share files were representative of the population. Among other factors, the weights incorporate an adjustment for nonresponse. To account for the survey design effects of the SCMH and CCHS, standard errors, coefficients of variation and 95% CIs were estimated using the bootstrap technique.[36] Differences between estimates were tested for statistical significance ($p < 0.05$) using chi-square tests. A Bonferroni adjustment for multiple comparisons was made when examining provincial/territorial differences. Analyses were conducted in SAS Enterprise Guide version 7.1 (SAS Institute Inc., Cary, NC, USA).

Results

Changes in prevalence over time (research question 1)

Table 2 shows the prevalence of a positive screen for MDD for all Canadians based on data from the SCMH and compares estimates between the SCMH and the CCHS using data from eight provinces. In the fall of 2020, based on data from the SCMH, 15.2% of Canadians screened positive for MDD (Table 2). The prevalence was higher among females than males (17.5% vs. 12.6%).

Based on data from the eight provinces where comparable data are available from the CCHS (2015 through 2019), the prevalence of MDD in the SCMH was 9.6 percentage points higher than it was in the CCHS (16.3% vs. 6.7%). A significant increase in the prevalence of MDD between CCHS and SCMH was observed for all sociodemographic variables except for males aged 65 years or older and males with less than high school education, among whom changes were not statistically significant.

Increases in the prevalence of MDD were similar among sociodemographic subgroups, with the following exceptions. Changes in the prevalence of MDD differed by age group: the largest increase was among young adults aged 18 to 24, for whom a 17.4 percentage point increase in MDD was observed (from 11.2% to 28.5%), and the smallest was among seniors aged 65 or older, for whom the increase was 4.1 percentage points (from 3.2% to 7.3%). A larger increase was observed among females in urban centres than among females living in rural areas. A smaller increase was observed among residents of Newfoundland and Labrador.

We also examined relative changes in the prevalence of MDD between the SCMH and the CCHS. Overall, the prevalence of MDD was 2.4 times higher in the SCMH compared with the CCHS. Although absolute changes differed among young adults aged 18 to 24 and seniors, the relative increases in the prevalence of MDD were similar (2.6 times higher vs. 2.3 times higher). The relative increase was larger for immigrants (3.3 times higher) than non-immigrants (2.2 times higher).

In our sensitivity analysis of the CCHS to assess the conjecture that the prevalence of MDD was stable from 2015 to 2019, we found that in the provinces of Ontario and Manitoba, the prevalence was 6.2% in 2015, 7.2% in 2016, and 6.8% in 2019, indicating stable rates over these years. This was followed by an increase to 16.5% in the 2020 SCMH.

Prevalence of COVID-19-related risk factors and protective factors (research question 2)

Based on SCMH data, among the nine COVID-19-related risk factors considered in the analysis (Table 3), four factors were more prevalent among females than males: death of a family member, friend, or colleague (7.7% vs. 5.0%); feelings of loneliness or isolation (44.4% vs. 33.2%); physical concerns (28.7% vs. 19.8%); and challenges in personal relationships with household members (20.0% vs. 16.1%). Males were more likely to report loss of job or income due to COVID-19 (26.6% vs. 24.0%). Among people who increased their alcohol consumption, on the days they consumed alcohol, males reported an

TABLE 2
Prevalence of a positive screen for MDD, by gender and sociodemographic characteristics, household population aged 18 years or older, Canada, 2020 and 2015 to 2019

Variable	Total								Males								Females							
	SCMH		CCHS		Absolute change in risk SCMH minus CCHS[a]		Relative risk SCMH/CCHS		SCMH		CCHS		Absolute change in risk SCMH minus CCHS[a]		Relative risk SCMH/CCHS		SCMH		CCHS		Absolute change in risk SCMH minus CCHS[a]		Relative risk SCMH/CCHS	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Total population aged 18+ years	15.2	(14.2, 16.2)	N/A		N/A				12.6	(11.2, 14.0)	N/A		N/A				17.5	(16.0, 19.0)	N/A		N/A			
Estimates based on 8 provinces[b]																								
Total 18+	16.3	(14.9, 17.6)	6.7*	(6.2, 7.2)	9.6	(8.2, 11.0)	2.4	(2.2, 2.7)	13.9	(12.0, 15.8)	5.8*	(5.1, 6.5)	8.1	(6.1, 10.1)	2.4	(2.0, 2.9)	18.5	(16.5, 20.4)	7.5*	(6.8, 8.2)	11.0	(8.9, 13.0)	2.5	(2.2, 2.8)
Estimates by sociodemographic variables (based on 8 provinces[b])																								
Age group (years; reference is other age groups combined)																								
18–24	28.5	(21.9, 35.2)	11.2*	(9.1, 13.2)	17.4[c]	(10.3, 24.5)	2.6	(1.9, 3.5)	23.9	(15.6, 32.3)	9.5*	(6.7, 12.3)	14.4	(5.5, 23.3)	2.5	(1.5, 4.1)	35.2	(24.4, 45.9)	12.6*	(9.7, 15.6)	22.5	(11.4, 33.7)	2.8	(1.9, 4.1)
25–34	22.4	(18.5, 26.3)	8.1*	(6.7, 9.5)	14.3	(10.1, 18.5)	2.8	(2.1, 3.6)	18.7	(13.1, 24.2)	7.7*	(5.3, 10.1)	11.0	(5.0, 17.0)	2.4	(1.5, 3.9)	25.1	(19.6, 30.6)	8.4*	(6.8, 10.1)	16.6	(11.0, 22.3)	3.0	(2.2, 3.9)
35–49	15.7	(13.2, 18.1)	6.6*	(5.7, 7.4)	9.1	(6.6, 11.7)	2.4	(2.0, 2.9)	12.4	(9.4, 15.4)	5.5*	(4.4, 6.7)	6.9	(3.7, 10.1)	2.2	(1.6, 3.1)	18.9	(15.1, 22.7)	7.6*	(6.3, 8.8)	11.3	(7.3, 15.3)	2.5	(1.9, 3.3)
50–64	15.2	(13.0, 17.4)	6.4*	(5.5, 7.3)	8.8	(6.5, 11.1)	2.4	(1.9, 2.9)	14.7	(11.5, 18.0)	5.1*	(3.9, 6.3)	9.7	(6.3, 13.1)	2.9	(2.1, 4.0)	15.7	(12.7, 18.8)	7.7*	(6.4, 9.1)	8.0	(4.7, 11.3)	2.0	(1.6, 2.6)
65 or older	7.3	(5.8, 8.8)	3.2*	(2.7, 3.7)	4.1[c]	(2.5, 5.7)	2.3	(1.8, 3.0)	4.8	(2.9, 6.7)	2.8	(2.1, 3.5)	2.0[c]	(0.0, 4.1)	1.7	(1.1, 2.8)	9.5	(7.1, 11.8)	3.5*	(2.9, 4.2)	5.9[c]	(3.5, 8.4)	2.7	(2.0, 3.7)
Racialized group member																								
Yes (non-White)	16.7	(13.9, 19.5)	6.7*	(5.5, 7.8)	10.0	(7.0, 13.1)	2.5	(2.0, 3.2)	14.7	(11.1, 18.3)	5.5*	(3.8, 7.1)	9.2	(5.3, 13.2)	2.7	(1.8, 4.1)	18.5	(14.3, 22.8)	7.8*	(6.2, 9.4)	10.7	(6.2, 15.3)	2.4	(1.7, 3.2)
No (White; reference)	16.2	(14.7, 17.8)	6.7*	(6.2, 7.2)	9.6	(7.9, 11.2)	2.4	(2.2, 2.7)	13.7	(11.5, 15.9)	5.9*	(5.2, 6.7)	7.7	(5.4, 10.0)	2.3	(1.9, 2.8)	18.6	(16.5, 20.7)	7.3*	(6.6, 8.0)	11.2	(9.1, 13.4)	2.5	(2.2, 2.9)
Immigrant status																								
Yes	12.6	(10.2, 15.0)	3.8*	(3.1, 4.6)	8.8	(6.3, 11.3)	3.3[c]	(2.5, 4.3)	11.6	(8.5, 14.6)	3.3*	(2.4, 4.2)	8.3	(5.1, 11.5)	3.5	(2.4, 5.2)	13.7	(9.8, 17.5)	4.4*	(3.1, 5.6)	9.3	(5.3, 13.4)	3.1	(2.1, 4.7)
No (reference)	17.9	(16.4, 19.5)	8.0*	(7.4, 8.6)	9.9	(8.2, 11.6)	2.2	(2.0, 2.5)	15.2	(12.9, 17.5)	7.0*	(6.0, 7.9)	8.2	(5.7, 10.7)	2.2	(1.8, 2.7)	20.3	(18.1, 22.5)	8.9*	(8.1, 9.7)	11.4	(9.1, 13.7)	2.3	(2.0, 2.6)
Place of residence																								
Urban centre	17.1	(15.5, 18.6)	6.9*	(6.3, 7.4)	10.2	(8.6, 11.9)	2.5	(2.2, 2.8)	14.3	(12.2, 16.4)	6.1*	(5.2, 6.9)	8.2	(6.0, 10.5)	2.4	(1.9, 2.9)	19.7	(17.4, 22.0)	7.6*	(6.8, 8.3)	12.1[c]	(9.8, 14.5)	2.6	(2.2, 3.0)
Rural (reference)	13.1	(10.8, 15.4)	5.9*	(5.1, 6.6)	7.2	(4.8, 9.6)	2.2	(1.8, 2.8)	12.4	(8.7, 16.0)	4.5*	(3.5, 5.5)	7.9	(4.1, 11.6)	2.7	(1.9, 4.0)	13.7	(10.7, 16.8)	7.2*	(6.1, 8.3)	6.5	(3.3, 9.7)	1.9	(1.5, 2.5)
Parent of child younger than 18																								
Yes	15.9	(13.6, 18.3)	5.5*	(4.7, 6.4)	10.4	(7.9, 12.9)	2.9	(2.3, 3.6)	12.9	(9.6, 16.1)	3.9*	(2.7, 5.2)	8.9	(5.5, 12.4)	3.3	(2.1, 5.1)	18.8	(15.2, 22.5)	6.9*	(5.7, 8.1)	11.9	(8.1, 15.7)	2.7	(2.1, 3.5)
No (reference)	16.4	(14.8, 18.0)	7.0*	(6.5, 7.6)	9.4	(7.6, 11.1)	2.3	(2.0, 2.6)	14.3	(12.0, 16.6)	6.3*	(5.5, 7.2)	8.0	(5.5, 10.4)	2.3	(1.8, 2.8)	18.3	(16.1, 20.5)	7.7*	(6.9, 8.5)	10.6	(8.3, 13.0)	2.4	(2.0, 2.8)
Highest level of education attained (reference is other education groups combined)																								
Less than high school	15.2	(9.8, 20.7)	9.8	(8.1, 11.6)	5.4	(–0.2, 11.0)	1.5	(1.1, 2.3)	7.7	(3.3, 12.2)	8.3	(6.0, 10.5)	–0.5[c]	(–5.4, 4.4)	0.9[c]	(0.5, 1.8)	22.9	(13.7, 32.0)	11.3*	(8.7, 14.0)	11.5	(2.1, 21.0)	2.0	(1.3, 3.2)
High school	18.8	(15.6, 22.0)	8.5*	(7.4, 9.7)	10.3	(6.9, 13.7)	2.2	(1.8, 2.7)	17.6	(13.1, 22.1)	7.1*	(5.7, 8.6)	10.4	(5.6, 15.2)	2.5	(1.7, 3.5)	20.0	(15.5, 24.4)	9.9*	(8.2, 11.6)	10.1	(5.3, 14.8)	2.0	(1.5, 2.7)
Postsecondary certificate, diploma or degree	16.7	(15.0, 18.4)	6.0*	(5.4, 6.7)	10.7	(8.8, 12.5)	2.8	(2.4, 3.2)	14.3	(11.8, 16.7)	5.4*	(4.3, 6.4)	8.9	(6.3, 11.5)	2.7	(2.0, 3.5)	18.9	(16.5, 21.4)	6.6*	(5.7, 7.4)	12.4	(9.8, 15.0)	2.9	(2.4, 3.4)
University certificate, diploma or degree above bachelor's level	11.1	(8.4, 13.8)	3.0*	(2.1, 3.8)	8.1	(5.4, 10.9)	3.7	(2.5, 5.6)	8.9	(5.1, 12.7)	2.7*	(1.4, 4.1)	6.1	(2.1, 10.2)	3.2	(1.5, 7.0)	12.7	(9.1, 16.3)	3.2*	(2.1, 4.3)	9.5	(5.7, 13.2)	4.0	(2.5, 6.3)

Continued on the following page

TABLE 2 (continued)
Prevalence of a positive screen for MDD, by gender and sociodemographic characteristics, household population aged 18 years or older, Canada, 2020 and 2015 to 2019

Variable	Total								Males								Females							
	SCMH		CCHS		Absolute change in risk SCMH minus CCHS[a]		Relative risk SCMH/CCHS		SCMH		CCHS		Absolute change in risk SCMH minus CCHS[a]		Relative risk SCMH/CCHS		SCMH		CCHS		Absolute change in risk SCMH minus CCHS[a]		Relative risk SCMH/CCHS	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Household income quintile (based on 3 provinces;[d] reference is other income groups combined)																								
1 (lowest)	19.3	(15.4, 23.2)	11.1*	(9.4, 12.8)	8.2	(4.0, 12.3)	1.7	(1.4, 2.2)	16.0	(10.6, 21.4)	9.5*	(7.3, 11.8)	6.4	(0.5, 12.3)	1.7	(1.1, 2.5)	22.8	(16.9, 28.6)	12.2*	(9.8, 14.6)	10.6	(4.4, 16.7)	1.9	(1.4, 2.5)
2	18.6	(14.1, 23.1)	6.5*	(5.2, 7.7)	12.2	(7.5, 16.8)	2.9	(2.1, 3.9)	15.4	(8.7, 22.0)	6.9*	(4.8, 8.9)	8.5	(1.4, 15.5)	2.2	(1.3, 3.9)	20.7	(14.7, 26.6)	6.0*	(4.5, 7.5)	14.7	(8.5, 20.8)	3.4	(2.3, 5.1)
3	17.7	(13.4, 22.1)	6.3*	(5.0, 7.6)	11.4	(6.8, 16.1)	2.8	(2.0, 3.9)	15.8	(9.9, 21.8)	5.2*	(3.6, 6.9)	10.6	(4.5, 16.7)	3.0	(1.8, 5.0)	19.6	(13.1, 26.1)	7.2*	(5.2, 9.2)	12.4	(5.5, 19.2)	2.7	(1.7, 4.3)
4	16.2	(11.5, 21.0)	6.6*	(4.9, 8.3)	9.7	(4.6, 14.7)	2.5	(1.6, 3.8)	11.9	(5.6, 18.2)	6.3*	(3.4, 9.2)	5.6	(−1.2, 12.4)	1.9	(0.8, 4.5)	21.3	(14.6, 28.1)	6.9*	(5.0, 8.8)	14.4	(7.4, 21.5)	3.1	(2.0, 4.8)
5 (highest)	11.1	(7.6, 14.7)	4.3*	(3.2, 5.5)	6.8	(3.1, 10.5)	2.6	(1.7, 4.0)	11.2	(6.4, 16.0)	4.3*	(2.6, 6.1)	6.9	(1.8, 12.0)	2.6	(1.3, 5.3)	11.1	(5.8, 16.4)	4.3*	(2.9, 5.7)	6.8	(1.3, 12.3)	2.6	(1.4, 4.7)
Province (reference is other provinces combined)																								
Newfoundland and Labrador	11.5	(9.0, 14.0)	6.1*	(4.5, 7.7)	5.4[c]	(2.4, 8.4)	1.9	(1.3, 2.7)	8.6	(5.2, 12.0)	4.4*	(2.2, 6.6)	4.1	(0.0, 8.2)	1.9	(1.0, 3.7)	14.1	(10.4, 17.8)	7.7*	(5.0, 10.5)	6.4	(1.8, 11.0)	1.8	(1.1, 3.0)
Prince Edward Island	14.1	(11.1, 17.1)	5.8*	(3.8, 7.8)	8.3	(4.8, 11.9)	2.4	(1.7, 3.6)	12.6	(7.9, 17.3)	3.7*	(1.1, 6.3)	8.9	(3.6, 14.2)	3.4	(1.1, 10.9)	15.5	(11.6, 19.4)	7.7*	(4.8, 10.6)	7.8	(2.9, 12.7)	2.0	(1.3, 3.1)
Nova Scotia	16.5	(13.2, 19.9)	9.1*	(7.2, 11.0)	7.4	(3.6, 11.2)	1.8	(1.3, 2.5)	12.9	(7.5, 18.3)	5.9*	(3.9, 7.9)	7.0	(1.2, 12.7)	2.2	(1.2, 3.9)	20.0	(16.1, 23.8)	12.1*	(9.1, 15.0)	7.9	(3.1, 12.7)	1.7	(1.2, 2.3)
New Brunswick	17.4	(14.1, 20.6)	6.4*	(4.8, 8.0)	11.0	(7.4, 14.6)	2.7	(2.0, 3.8)	17.8	(12.6, 23.0)	5.0*	(3.0, 7.0)	12.8	(7.3, 18.4)	3.6	(2.0, 6.3)	17.0	(13.1, 20.8)	7.6*	(5.2, 10.1)	9.3	(4.8, 13.9)	2.2	(1.5, 3.4)
Ontario	15.9	(13.9, 17.8)	6.8*	(6.0, 7.5)	9.1	(7.1, 11.2)	2.4	(2.0, 2.8)	12.7	(10.1, 15.4)	6.3*	(5.3, 7.4)	6.4	(3.6, 9.2)	2.0	(1.5, 2.6)	18.9	(16.0, 21.8)	7.1*	(6.2, 8.1)	11.8	(8.8, 14.7)	2.6	(2.2, 3.2)
Manitoba	20.1	(17.0, 23.3)	7.9*	(6.0, 9.7)	12.2	(8.6, 15.9)	2.6	(1.9, 3.4)	17.1	(12.6, 21.7)	5.7*	(3.5, 7.8)	11.5	(6.4, 16.5)	3.0	(1.8, 5.0)	21.9	(17.3, 26.4)	9.7*	(6.8, 12.6)	12.1	(6.8, 17.5)	2.2	(1.5, 3.3)
Saskatchewan	14.4	(11.5, 17.3)	5.8*	(4.4, 7.3)	8.6	(5.4, 11.8)	2.5	(1.8, 3.4)	13.1	(8.3, 17.9)	4.2*	(2.4, 6.0)	8.9	(3.8, 14.1)	3.1	(1.8, 5.6)	15.5	(12.1, 18.9)	7.5*	(5.0, 9.9)	8.0	(3.9, 12.2)	2.1	(1.4, 3.0)
British Columbia	17.2	(14.4, 20.0)	6.0*	(5.1, 6.9)	11.2	(8.3, 14.2)	2.9	(2.3, 3.6)	16.9	(12.7, 21.1)	4.9*	(3.7, 6.2)	12.0	(7.7, 16.3)	3.4	(2.4, 5.0)	17.4	(13.8, 21.0)	7.0*	(5.6, 8.4)	10.4	(6.5, 14.2)	2.5	(1.9, 3.3)

Data source: 2020 Survey on COVID and Mental Health; and 2015–2019 Canadian Community Health Survey.

Abbreviations: CCHS, Canadian Community Health Survey; CI, confidence interval; MDD, major depressive disorder; N/A, not applicable; SCMH, Survey on COVID and Mental Health.

Note: A Bonferroni adjustment for multiple comparisons was made when comparing estimates for provinces.

[a] The estimate for SCMH (during the second wave of COVID-19) minus the estimate for CCHS (pre-pandemic).

[b] The comparison between SCMH and CCHS is based on 8 provinces. CCHS data were collected in 2019 for Ontario and Manitoba; 2018 for Prince Edward Island; 2016 for Newfoundland and Labrador, Nova Scotia, New Brunswick and Saskatchewan; and 2015 for British Columbia.

[c] Significantly different from reference ($p < 0.05$).

[d] The comparison between SCMH and CCHS for household income quintiles is based on Ontario, Manitoba and Prince Edward Island.

* Significantly different from SCMH ($p < 0.05$).

average of six drinks per day, and females, an average of four drinks per day. Among people who increased their cannabis use, 43% of males and 44% of females reported using it five or more days per week.

Females were more likely than males to report the use of several coping mechanisms. The average mastery score was higher for males than females (18.5 vs. 17.8). Estimates for a sense of community belonging were similar for males and females.

Associations between risk and protective factors and MDD (research question 3)

All nine COVID-19-related risk factors were individually associated with MDD among both males and females in the SCMH (Table 4). A dose-response relationship was evident; each increase in the number of risk factors was associated with a significant increase in the prevalence of MDD. The prevalence of MDD was more than 60% among those reporting five or more risk factors, compared with 2.2% among those with no risk factors.

Individuals who reported using exercise and hobbies to promote health were less likely to have MDD. Meditating, changing food choices and changing sleep patterns to cope were associated with an increased risk of MDD. Mastery and a sense of community belonging were robust protective factors. People in the lowest mastery quartile were 17 times more likely to have MDD than were those in the highest quartile. Those with a very weak sense of community belonging were 10 times more likely to have MDD than were those with a very strong sense of belonging.

The prevalence of MDD was inversely associated with age, ranging from a high of 27.8% among those aged 18 to 24 to a low of 6.8% among seniors aged 65 or older. Non-immigrant females were at higher risk for MDD than were female immigrants (18.6% vs. 14.2%), as were females living in urban centres compared with those in rural areas (18.7% vs. 12.2%). For males, having less than high school education was associated with a lower risk of MDD. The same was true for having a university certificate, diploma or degree above bachelor's level for both genders. Females with high school but no postsecondary education were at increased risk. MDD was inversely associated with household income quintile—the highest prevalence was for the bottom quintile (17.6%), and the lowest, for the top quintile (12.4%). Among females who had worked during the week before the survey, frontline workers were more likely than other workers to have MDD (24.0% vs. 17.3%). MDD was less common among residents of Quebec (10.5%) than other provinces/territories.

Table 5 presents the adjusted odds ratios for MDD, controlling for all factors simultaneously. Unadjusted odds are also included for ease of comparison between the bivariate and multivariate analyses.

Since a dose-response relationship was observed between COVID-19-related risk factors and MDD, in the logistic regression models, the number of COVID-19 risk factors was entered as a continuous variable. Based on the unadjusted odds, on average, each incremental increase in the number of risk factors was associated with a 2.1-fold increase in the odds of MDD. In the multivariate analysis, this finding persisted but was slightly attenuated to 1.7.

The regression models were rerun to examine effects of the nine risk factors individually. As expected, based on the unadjusted odds, all nine risk factors increased the odds of MDD. However, when we simultaneously controlled for all nine risk factors, there was some attenuation in odds, and the association with MDD for two risk factors no longer attained statistical significance: loss of job or income due to COVID-19 was no longer significant, and death of family member, friend or colleague due to COVID-19 only approached statistical significance ($p = 0.08$). In the multivariate model for males, although the odds ratios remained elevated, the only risk factors that attained statistical significance were feelings of loneliness or isolation due to COVID-19 and physical health problems due to COVID-19.

For the protective factors, the associations observed in the bivariate analyses persisted in the multivariate analyses with two exceptions. The association with meditation was no longer statistically significant nor was changes in sleep patterns for females.

It was more common for associations between sociodemographic factors and MDD observed in the bivariate analysis to lose statistical significance in the multivariate analysis. For example, for the total population, the associations with education, income, living in an urban centre and living in Quebec did not persist in the multivariate analyses. For age group, in the gender stratified analysis, all associations failed to attain statistical significance in the multivariate analysis.

Discussion

Based on SCMH data collected during the second wave of the COVID-19 pandemic, 15.2% of Canadians screened positive for MDD. Comparable estimates of the prevalence of MDD in various pre-COVID years (2015 through 2019) are available for eight Canadian provinces. SCMH results showed that in the fall of 2020, the prevalence of MDD in these eight provinces had more than doubled from what it had been in pre-COVID times.

For the most part, relative changes in the prevalence of MDD were similar among all sociodemographic subgroups. However, absolute changes in prevalence differed by age group; the largest increases in the prevalence of MDD were observed among young adults aged 18 to 24, and the smallest among seniors aged 65 or older. The 17.4 percentage point increase in the prevalence of MDD observed for young adults is concerning, and specific targeting of public health interventions may be warranted to deal with the excess burden of MDD for this age group.

All nine COVID-19-related risk factors examined in this study were individually associated with MDD, although in the multivariate analysis, loss of job or income due to COVID-19 and death of family member, friend or colleague due to COVID-19 did not attain statistical significance. Furthermore, a dose-response relationship was observed: each increase in the number of risk factors was associated with a significant increase in the prevalence of MDD. Research has found that stressful life events are the most important causal factor for first-time episodes of depression.[7] Although perception of what constitutes a stressful life event for an individual is subjective, many of the COVID-19-related risk factors considered

TABLE 3
Prevalence of COVID-19-related risk factors for MDD and protective factors and resources, by gender, household population aged 18 years or older, Canada, 2020

Variable	Total		Males		Females	
	%	95% CI	%	95% CI	%	95% CI
COVID-19-related risk factors						
Loss of job or income due to COVID-19	25.3	(24.1–26.5)	26.6	(24.8–28.4)	24.0*	(22.3–25.6)
Difficulty meeting financial obligations or essential needs due to COVID-19	15.6	(14.6–16.6)	16.1	(14.6–17.6)	15.0	(13.7–16.4)
Death of family member, friend or colleague due to COVID-19	6.4	(5.7–7.0)	5.0	(4.1–5.9)	7.7*	(6.7–8.6)
Feelings of loneliness or isolation due to COVID-19	39.0	(37.7–40.3)	33.2	(31.3–35.1)	44.4*	(42.6–46.2)
Physical health problems due to COVID-19	24.5	(23.3–25.6)	19.8	(18.1–21.4)	28.7*	(27.1–30.4)
Challenges in personal relationships with members of your household due to COVID-19	18.2	(17.2–19.2)	16.1	(14.6–17.6)	20.0*	(18.5–21.4)
Increased consumption of alcohol since onset of COVID-19	15.7	(14.7–16.7)	15.2	(13.8–16.6)	16.2	(14.9–17.5)
Increased consumption of cannabis since onset of COVID-19	5.4	(4.8–6.1)	5.8	(4.8–6.8)	4.9	(4.1–5.8)
Concern for family violence in your household	4.2	(3.6–4.8)	4.5	(3.6–5.5)	3.9	(3.2–4.7)
Number of risk factors						
0	32.3	(31.1–33.6)	35.8	(34.0–37.7)	29.0*	(27.4–30.7)
1	25.5	(24.3–26.6)	25.2	(23.5–27.0)	25.8	(24.2–27.3)
2	18.1	(17.0–19.1)	17.7	(16.1–19.3)	18.5	(17.0–20.0)
3	11.8	(10.9–12.7)	10.4	(9.1–11.7)	13.0*	(11.7–14.3)
4	7.0	(6.3–7.7)	5.9	(4.8–6.9)	8.0*	(7.0–9.1)
5 or more	5.4	(4.7–6.0)	5.0	(4.0–5.9)	5.6	(4.7–6.5)
Protective factors						
Coping mechanisms						
Communicating with friends and family	87.0	(86.0–87.9)	82.8	(81.2–84.4)	91.0*	(90.0–92.1)
Meditating	22.2	(21.1–23.3)	18.6	(17.0–20.2)	25.5*	(23.9–27.1)
Praying or seeking spiritual guidance	30.6	(29.4–31.9)	25.6	(23.8–27.5)	35.5*	(33.9–37.2)
Exercising	80.3	(79.2–81.5)	80.1	(78.4–81.8)	80.6	(79.0–82.2)
Changing food choices	37.6	(36.3–38.9)	34.9	(32.9–36.9)	40.1*	(38.3–41.9)
Participating in hobbies	61.6	(60.3–63.0)	59.7	(57.6–61.7)	63.4*	(61.6–65.2)
Changing sleep patterns	20.0	(18.8–21.1)	18.8	(17.1–20.4)	21.1*	(19.5–22.7)
Mastery (average score)	18.1	(18.0–18.3)	18.5	(18.3–18.7)	17.8*	(17.6–18.0)
Sense of community belonging						
Very strong	15.1	(14.2–16.0)	15.6	(14.2–17.1)	14.6	(13.4–15.9)
Somewhat strong	48.6	(47.2–49.9)	48.1	(46.1–50.1)	49.0	(47.2–50.8)
Somewhat weak	28.5	(27.2–29.7)	28.6	(26.7–30.4)	28.3	(26.7–30.0)
Very weak	7.9	(7.1–8.6)	7.7	(6.6–8.7)	8.0	(7.0–9.1)

Data source: 2020 Survey on COVID and Mental Health.

Abbreviations: CI, confidence interval; MDD, major depressive disorder.

* Significantly different from males ($p < 0.05$).

TABLE 4
Prevalence of a positive screen for MDD, by gender and selected characteristics, household population aged 18 years or older, Canada, 2020

Variable	Total		Males		Females	
	%	95% CI	%	95% CI	%	95% CI
Total	15.2	(14.2–16.2)	12.6	(11.2–14.0)	17.5[a]	(16.0–19.0)
COVID-19-related risk factors						
Loss of job or income due to COVID-19						
Yes	23.2*	(20.6–25.8)	18.3*	(15.0–21.7)	28.1*	(24.2–32.0)
No (reference)	12.7	(11.6–13.7)	10.7	(9.2–12.3)	14.4	(12.9–15.8)
Difficulty meeting financial obligations or essential needs due to COVID-19						
Yes	34.2*	(30.9–37.6)	27.6*	(23.0–32.2)	40.5*	(35.5–45.4)
No (reference)	11.9	(10.9–12.9)	9.9	(8.5–11.4)	13.6	(12.2–15.1)
Death of family member, friend or colleague due to COVID-19						
Yes	27.4*	(22.3–32.6)	27.2*	(18.7–35.7)	27.3*	(20.9–33.7)
No (reference)	14.5	(13.5–15.5)	12.0	(10.6–13.4)	16.9	(15.4–18.4)
Feelings of loneliness or isolation due to COVID-19						
Yes	29.5*	(27.5–31.4)	27.1*	(23.9–30.4)	30.9*	(28.4–33.5)
No (reference)	6.3	(5.4–7.2)	5.6	(4.4–6.8)	7.0	(5.7–8.3)
Physical health problems due to COVID-19						
Yes	38.5*	(35.8–41.2)	37.0*	(32.4–41.5)	39.4*	(35.9–42.8)
No (reference)	7.9	(7.0–8.7)	6.8	(5.6–8.0)	9.0	(7.6–10.3)
Challenges in personal relationships with members of your household due to COVID-19						
Yes	35.7*	(32.6–38.8)	30.9*	(26.2–35.7)	38.8*	(34.8–42.9)
No (reference)	10.8	(9.8–11.8)	9.2	(7.9–10.5)	12.4	(11.0–13.9)
Increased consumption of alcohol since onset of COVID-19						
Yes	26.9*	(23.9–30.0)	24.4*	(19.9–29.0)	28.9*	(24.9–32.9)
No (reference)	13.0	(12.0–14.1)	10.5	(9.1–11.9)	15.4	(13.8–16.9)
Increased consumption of cannabis since onset of COVID-19						
Yes	42.2*	(35.9–48.5)	35.2*	(26.4–44.1)	49.8*	(41.2–58.3)
No (reference)	13.6	(12.7–14.6)	11.2	(9.9–12.6)	15.8	(14.4–17.2)
Concern for family violence in your household						
Yes	33.4*	(26.3–40.6)	29.2*	(18.6–39.8)	38.0*	(28.5–47.5)
No (reference)	14.4	(13.4–15.4)	11.8	(10.5–13.2)	16.7	(15.3–18.2)
Number of risk factors (reference is previous category)						
0	2.2	(1.5–2.8)	2.2	(1.3–3.1)	2.2	(1.2–3.1)
1	7.4*	(6.0–8.8)	7.4*	(5.2–9.5)	7.4*	(5.7–9.1)
2	19.1*	(16.3–21.8)	16.2*	(12.2–20.1)	21.8*	(17.9–25.6)
3	26.1*	(22.6–29.6)	21.1*	(16.2–26.1)	30.0*	(25.3–34.6)
4	42.5*	(37.0–48.0)	39.9*	(31.3–48.4)	43.8*	(36.9–50.7)
5 or more	61.6*	(55.5–67.7)	55.4*	(45.5–65.3)	66.6*	(59.2–74.0)
Protective factors						
Coping mechanisms						
Communicating with friends and family						
Yes	15.1	(14.0–16.2)	12.4	(10.8–13.9)	17.4	(15.8–18.9)
No (reference)	16.1	(13.4–18.9)	14.0	(10.6–17.4)	19.9	(15.0–24.9)
Meditating						
Yes	17.6*	(15.5–19.8)	14.4	(10.9–17.9)	19.6	(16.6–22.7)
No (reference)	14.5	(13.4–15.6)	12.1	(10.6–13.6)	16.9	(15.2–18.6)

Continued on the following page

TABLE 4 (continued)
Prevalence of a positive screen for MDD, by gender and selected characteristics, household population aged 18 years or older, Canada, 2020

Variable	Total		Males		Females	
	%	95% CI	%	95% CI	%	95% CI
Praying or seeking spiritual guidance						
Yes	15.0	(13.2–16.9)	13.4	(10.6–16.2)	16.2	(13.8–18.6)
No (reference)	15.4	(14.2–16.6)	12.5	(10.9–14.1)	18.4	(16.5–20.3)
Exercising						
Yes	13.1*	(12.0–14.1)	11.1*	(9.6–12.6)	14.7*	(13.2–16.3)
No (reference)	24.0	(21.2–26.8)	19.0	(15.2–22.9)	29.0	(24.7–33.2)
Changing food choices						
Yes	18.7*	(17.0–20.5)	15.5*	(12.9–18.1)	21.0*	(18.5–23.6)
No (reference)	13.1	(11.9–14.3)	11.2	(9.6–12.9)	15.2	(13.4–17.0)
Participating in hobbies						
Yes	13.3*	(12.1–14.5)	11.1*	(9.4–12.8)	15.0*	(13.2–16.8)
No (reference)	18.4	(16.6–20.1)	14.9	(12.5–17.4)	22.0	(19.6–24.5)
Changing sleep patterns						
Yes	26.4*	(23.6–29.2)	25.3*	(20.9–29.7)	27.2*	(23.4–31.0)
No (reference)	12.5	(11.5–13.5)	9.7	(8.4–11.1)	15.1	(13.5–16.6)
Mastery quartile (reference is previous category)						
1 (lowest)	36.5	(33.9–39.1)	32.5	(28.4–36.5)	39.4	(35.9–42.9)
2	10.6*	(9.0–12.2)	8.5*	(6.4–10.5)	12.7*	(10.2–15.2)
3	5.6*	(4.0–7.1)	6.1*	(3.5–8.6)	5.1*	(3.3–6.8)
4 (highest)	2.2*	(1.5–2.9)	1.5*	(0.6–2.3)	3.0*	(1.8–4.1)
Sense of community belonging (reference is previous category)						
Very strong	4.7	(3.3–6.1)	3.6	(1.8–5.3)	5.9	(3.6–8.2)
Somewhat strong	9.6*	(8.4–10.8)	7.7*	(6.0–9.5)	11.1*	(9.4–12.8)
Somewhat weak	21.1*	(18.9–23.2)	17.8*	(14.8–20.8)	24.2*	(21.0–27.5)
Very weak	48.3*	(43.3–53.4)	42.9*	(35.3–50.4)	53.0*	(46.2–59.8)
Sociodemographic characteristics						
Age group (years; reference is other age groups combined)						
18–24	27.8*	(22.4–33.2)	21.0*	(14.4–27.6)	37.2*	(28.4–45.9)
25–34	20.7*	(17.9–23.6)	16.5*	(12.4–20.6)	23.8*	(19.7–27.9)
35–49	15.2	(13.4–17.1)	13.3	(10.9–15.7)	17.1	(14.3–19.9)
50–64	13.5*	(11.9–15.1)	12.3	(9.9–14.6)	14.8*	(12.4–17.1)
65 or older	6.8*	(5.6–8.0)	4.4*	(2.9–5.8)	8.9*	(7.1–10.7)
Racialized group member						
Yes (non-White)	16.6	(14.3–19.0)	13.9	(10.9–16.9)	19.3	(15.7–22.9)
No (White; reference)	14.7	(13.6–15.8)	12.2	(10.6–13.8)	16.9	(15.3–18.4)
Immigrant status						
Yes	12.5*	(10.5–14.5)	10.9	(8.3–13.4)	14.2*	(11.0–17.4)
No (reference)	16.2	(15.1–17.4)	13.5	(11.8–15.1)	18.6	(16.9–20.2)
Place of residence						
Urban centre	16.0*	(14.9–17.2)	13.1	(11.5–14.7)	18.7*	(17.0–20.5)
Rural (reference)	11.4	(9.6–13.1)	10.5	(7.8–13.3)	12.2	(9.9–14.5)
Parent of child younger than 18 years						
Yes	14.8	(13.0–16.7)	12.4	(10.0–14.9)	17.0	(14.3–19.8)
No (reference)	15.3	(14.1–16.5)	12.7	(11.0–14.4)	17.7	(15.9–19.4)

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TABLE 4 (continued)
Prevalence of a positive screen for MDD, by gender and selected characteristics, household population aged 18 years or older, Canada, 2020

Variable	Total		Males		Females	
	%	95% CI	%	95% CI	%	95% CI
Highest level of education attained (reference is other education groups combined)						
Less than high school	13.3	(9.6–17.0)	7.4*	(3.4–11.4)	18.6	(12.8–24.4)
High school	18.1*	(15.7–20.6)	15.4	(11.9–18.8)	20.6*	(17.1–24.2)
Postsecondary certificate, diploma or degree	15.5	(14.2–16.8)	13.3	(11.4–15.1)	17.5	(15.7–19.4)
University certificate, diploma or degree above bachelor's level	10.2*	(8.1–12.3)	8.0*	(5.1–11.0)	11.8*	(9.0–14.7)
Household income quintile (reference is other income groups combined)						
1 (lowest)	17.6*	(15.4–19.7)	15.0	(11.9–18.1)	20.0	(16.9–23.2)
2	16.4	(14.0–18.8)	14.1	(10.6–17.6)	18.1	(14.9–21.4)
3	16.6	(14.2–19.0)	13.7	(10.4–17.0)	19.1	(15.5–22.8)
4	13.9	(11.3–16.5)	11.1	(7.6–14.5)	17.0	(13.2–20.7)
5 (highest)	12.4*	(10.1–14.7)	12.2	(8.8–15.6)	12.7*	(9.4–15.9)
Frontline worker (among those who worked in previous week)						
Yes	20.9*	(16.6–25.2)	16.3	(10.1–22.5)	24.0*	(18.2–29.8)
No (reference)	14.4	(13.0–15.9)	11.7	(9.9–13.6)	17.3	(15.0–19.5)
Province/territorial (reference is other provinces/territories combined)						
Newfoundland and Labrador	11.5	(9.0–14.0)	8.6	(5.2–12.0)	14.1	(10.4–17.8)
Prince Edward Island	14.1	(11.1–17.1)	12.6	(7.9–17.3)	15.5	(11.6–19.4)
Nova Scotia	16.5	(13.2–19.9)	12.9	(7.5–18.3)	20.0	(16.1–23.8)
New Brunswick	17.4	(14.1–20.6)	17.8	(12.6–23.0)	17.0	(13.1–20.8)
Quebec	10.5*	(8.9–12.1)	8.3*	(6.0–10.5)	12.5*	(10.0–15.0)
Ontario	15.9	(13.9–17.8)	12.7	(10.1–15.4)	18.9	(16.0–21.8)
Manitoba	20.1	(17.0–23.3)	17.1	(12.6–21.7)	21.9	(17.3–26.4)
Saskatchewan	14.4	(11.5–17.3)	13.1	(8.3–17.9)	15.5	(12.1–18.9)
Alberta	18.3	(15.5–21.1)	14.1	(10.3–17.9)	22.1	(17.9–26.3)
British Columbia	17.2	(14.4–20.0)	16.9	(12.7–21.1)	17.4	(13.8–21.0)
Yukon (Whitehorse)	15.0	(11.4–18.6)	6.5	(2.9–10.0)	23.3	(17.0–29.5)
Northwest Territories (Yellowknife)	16.8	(11.6–22.0)	13.3	(5.6–21.1)	20.4	(13.4–27.5)
Nunavut (Iqaluit)	21.5	(14.1–28.8)	10.5	(2.9–18.1)	30.6	(18.8–42.5)

Data source: 2020 Survey on COVID and Mental Health.

Abbreviations: CI, confidence interval; MDD, major depressive disorder; SCMH, Survey on COVID and Mental Health.

Note: A Bonferroni adjustment for multiple comparisons was made when comparing estimates for provinces/territories.

[a] Significantly different from males ($p < 0.05$).

* Significantly different from reference ($p < 0.05$).

in this analysis may be regarded as stressful life events. Indeed, the COVID-19 pandemic itself may be perceived as a stressful life event.

Although we observed that those who increased their use of cannabis and alcohol were more likely to screen positive for MDD, it is possible that they increased use to alleviate their depressive symptoms. However, longitudinal studies have shown that both alcohol use disorders and cannabis use (particularly heavy use) are associated with increased risk of *subsequent* depressive disorders.[14,15] Among those who increased their consumption of alcohol, on the days they consumed alcohol, males reported an average of six drinks per day, and females an average of four drinks per day. These consumption levels considerably surpass what is recommended in Canada's low-risk drinking guidelines, which state that females should have no more than two drinks most days, and males no more than three drinks.[37] Among those who increased their cannabis use, 43% of males and 44% of females reported using it five or more days per week. According to Canada's low-risk cannabis guidelines, frequent users (daily or near-daily) are more likely to develop health problems.[38] It will be important to continue to monitor consumption levels, given that increased use of these substances to deal with stress is a predictor of problem usage and dependence.[39,40]

We observed that concern for family violence was associated with a higher risk of MDD. Longitudinal studies provide evidence of a bidirectional relationship between experiencing family violence and depressive symptoms.[41] Family violence has been shown to be associated with subsequent depression, but at the same

TABLE 5

Unadjusted and adjusted odds ratios for a positive screen for MDD, by gender and selected characteristics, household population aged 18 years or older, Canada, 2020

Variable	Total				Males				Females			
	Unadjusted odds ratio	95% CI	Adjusted odds ratio	95% CI	Unadjusted odds ratio	95% CI	Adjusted odds ratio	95% CI	Unadjusted odds ratio	95% CI	Adjusted odds ratio	95% CI
Number of COVID-19-related risk factors (continuous)	2.1*	(2.0–2.2)	1.7*	(1.6–1.8)	2.0*	(1.8–2.2)	1.7*	(1.5–1.9)	2.1*	(2.0–2.3)	1.8*	(1.6–1.9)
Protective factors												
Coping mechanisms (reference is no)												
Communicating with friends and family	0.9	(0.7–1.2)	1.0	(0.7–1.3)	0.9	(0.6–1.2)	0.9	(0.6–1.4)	0.8	(0.6–1.2)	1.1	(0.7–1.7)
Meditating	1.3*	(1.1–1.5)	1.1	(0.8–1.4)	1.2	(0.9–1.7)	1.0	(0.6–1.7)	1.2	(1.0–1.5)	1.2	(0.9–1.7)
Praying or seeking spiritual guidance	1.0	(0.8–1.2)	1.0	(0.7–1.2)	1.1	(0.8–1.4)	1.0	(0.7–1.6)	0.9	(0.7–1.1)	0.9	(0.7–1.3)
Exercising	0.5*	(0.4–0.6)	0.6*	(0.5–0.8)	0.5*	(0.4–0.7)	0.7*	(0.4–1.0)	0.4*	(0.3–0.5)	0.6*	(0.4–0.8)
Changing food choices	1.5*	(1.3–1.8)	1.3*	(1.0–1.6)	1.5*	(1.1–1.9)	1.3	(0.9–1.9)	1.5*	(1.2–1.8)	1.4*	(1.0–1.8)
Participating in hobbies	0.7*	(0.6–0.8)	0.6*	(0.5–0.7)	0.7*	(0.5–0.9)	0.6*	(0.4–0.9)	0.6*	(0.5–0.8)	0.5*	(0.4–0.7)
Changing sleep patterns	2.5*	(2.1–3.0)	1.4*	(1.1–1.8)	3.1*	(2.4–4.2)	1.8*	(1.2–2.6)	2.1*	(1.7–2.6)	1.2	(0.9–1.7)
Mastery quartile (reference is quartile 1)												
2	0.2*	(0.2–0.3)	0.3*	(0.2–0.4)	0.2*	(0.1–0.3)	0.2*	(0.2–0.3)	0.2*	(0.2–0.3)	0.3*	(0.2–0.4)
3	0.1*	(0.1–0.1)	0.2*	(0.1–0.2)	0.1*	(0.1–0.2)	0.2*	(0.1–0.4)	0.1*	(0.1–0.1)	0.1*	(0.1–0.2)
4	0.0*	(0.0–0.1)	0.1*	(0.1–0.1)	0.0*	(0.0–0.1)	0.1*	(0.0–0.1)	0.0*	(0.0–0.1)	0.1*	(0.1–0.2)
Sense of community belonging (reference is very weak)												
Very strong	0.1*	(0.0–0.1)	0.2*	(0.1–0.3)	0.0*	(0.0–0.1)	0.2*	(0.1–0.3)	0.1*	(0.0–0.1)	0.2*	(0.1–0.4)
Somewhat strong	0.1*	(0.1–0.1)	0.2*	(0.2–0.3)	0.1*	(0.1–0.2)	0.2*	(0.1–0.3)	0.1*	(0.1–0.2)	0.3*	(0.2–0.4)
Somewhat weak	0.3*	(0.2–0.4)	0.4*	(0.3–0.5)	0.3*	(0.2–0.4)	0.3*	(0.2–0.5)	0.3*	(0.2–0.4)	0.4*	(0.3–0.6)
Sociodemographic characteristics												
Female (reference is male)	1.5*	(1.2–1.7)	1.3*	(1.1–1.7)								
Age group (years; reference is 35 to 49)												
18–24	2.1*	(1.6–2.9)	1.6*	(1.0–2.6)	1.7*	(1.1–2.8)	1.8	(0.8–3.7)	2.9*	(1.9–4.4)	1.8	(1.0–3.3)
25–34	1.5*	(1.2–1.8)	1.2	(0.9–1.7)	1.3	(0.9–1.8)	1.2	(0.7–2.1)	1.5*	(1.1–2.1)	1.3	(0.9–1.9)
50–64	0.9	(0.7–1.1)	1.0	(0.7–1.3)	0.9	(0.7–1.2)	1.0	(0.6–1.7)	0.8	(0.6–1.1)	0.9	(0.6–1.4)
65 or older	0.4*	(0.3–0.5)	0.6*	(0.4–0.9)	0.3*	(0.2–0.4)	0.5	(0.3–1.0)	0.5*	(0.3–0.6)	0.6	(0.4–1.0)

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TABLE 5 (continued)

Unadjusted and adjusted odds ratios for a positive screen for MDD, by gender and selected characteristics, household population aged 18 years or older, Canada, 2020

Variable	Total				Males				Females			
	Unadjusted odds ratio	95% CI	Adjusted odds ratio	95% CI	Unadjusted odds ratio	95% CI	Adjusted odds ratio	95% CI	Unadjusted odds ratio	95% CI	Adjusted odds ratio	95% CI
Racialized group member (reference is White)	1.2	(1.0–1.4)	0.8	(0.6–1.1)	1.2	(0.9–1.6)	0.8	(0.4–1.3)	1.2	(0.9–1.5)	0.8	(0.5–1.2)
Immigrant (reference is non-immigrant)	0.7*	(0.6–0.9)	0.7*	(0.5–1.0)	0.8	(0.6–1.1)	0.7	(0.4–1.2)	0.7*	(0.5–1.0)	0.7	(0.5–1.1)
Place of residence urban centre (reference is rural)	1.5*	(1.2–1.8)	1.1	(0.8–1.4)	1.3	(0.9–1.8)	0.7	(0.5–1.2)	1.7*	(1.3–2.1)	1.3	(0.9–1.8)
Parent of child younger than 18 years (reference is non-parent)	1.0	(0.8–1.1)	0.9	(0.7–1.2)	1.0	(0.7–1.3)	0.9	(0.6–1.4)	1.0	(0.8–1.2)	0.8	(0.6–1.2)
Frontline worker (reference is not frontline worker)	1.5*	(1.2–2.0)	1.7*	(1.2–2.6)	1.5	(0.9–2.4)	1.5	(0.7–3.2)	1.5*	(1.0–2.1)	1.9*	(1.2–3.1)
Highest level of education attained (reference is high school)												
Less than high school	0.7*	(0.5–1.0)	1.0	(0.6–1.6)	0.4*	(0.2–0.8)	0.4*	(0.2–0.9)	0.9	(0.6–1.4)	1.5	(0.8–2.8)
Postsecondary certificate, diploma or degree	0.8	(0.7–1.0)	0.8	(0.6–1.1)	0.8	(0.6–1.2)	0.9	(0.6–1.4)	0.8	(0.6–1.1)	0.8	(0.6–1.1)
University certificate, diploma or degree above the bachelor's level	0.5*	(0.4–0.7)	0.7	(0.5–1.0)	0.5*	(0.3–0.8)	0.7	(0.4–1.4)	0.5*	(0.4–0.7)	0.7	(0.4–1.2)
Household income quintile (reference is quintile 3)												
1	1.1	(0.9–1.3)	1.2	(0.9–1.6)	1.1	(0.8–1.6)	1.4	(0.9–2.4)	1.1	(0.8–1.4)	1.1	(0.7–1.6)
2	1.0	(0.8–1.3)	1.2	(0.9–1.6)	1.0	(0.7–1.6)	1.5	(0.9–2.5)	0.9	(0.7–1.3)	1.0	(0.7–1.5)
4	0.8	(0.6–1.1)	0.9	(0.7–1.3)	0.8	(0.5–1.2)	1.0	(0.6–1.8)	0.9	(0.6–1.2)	0.9	(0.6–1.5)
5	0.7*	(0.5–0.9)	1.1	(0.7–1.5)	0.9	(0.6–1.3)	1.6	(0.9–2.9)	0.6*	(0.4–0.9)	0.8	(0.5–1.2)
Province/territorial capital (reference is Ontario)												
Newfoundland and Labrador	0.7	(0.5–0.9)	0.9	(0.6–1.3)	0.6	(0.4–1.1)	0.9	(0.5–1.8)	0.7	(0.5–1.0)	0.8	(0.5–1.3)
Prince Edward Island	0.9	(0.6–1.2)	1.2	(0.8–1.7)	1.0	(0.6–1.6)	1.3	(0.6–2.6)	0.8	(0.6–1.1)	1.1	(0.7–1.7)
Nova Scotia	1.0	(0.8–1.4)	1.0	(0.6–1.5)	1.0	(0.6–1.8)	0.8	(0.3–2.0)	1.1	(0.8–1.5)	0.9	(0.6–1.5)
New Brunswick	1.1	(0.8–1.5)	1.1	(0.8–1.7)	1.5	(0.9–2.3)	2.0	(1.0–4.0)	0.9	(0.6–1.2)	0.8	(0.5–1.2)
Quebec	0.6*	(0.5–0.8)	0.7	(0.5–1.0)	0.6*	(0.4–0.9)	0.8	(0.5–1.3)	0.6*	(0.5–0.8)	0.6	(0.4–0.9)
Manitoba	1.3	(1.0–1.7)	1.4	(1.0–1.9)	1.4	(0.9–2.1)	1.7	(0.9–3.0)	1.2	(0.9–1.7)	1.2	(0.8–1.8)
Saskatchewan	0.9	(0.7–1.2)	1.0	(0.7–1.5)	1.0	(0.6–1.7)	1.4	(0.7–2.8)	0.8	(0.6–1.1)	0.8	(0.5–1.2)
Alberta	1.2	(0.9–1.5)	0.9	(0.6–1.2)	1.1	(0.8–1.7)	0.8	(0.5–1.4)	1.2	(0.9–1.7)	0.8	(0.6–1.3)
British Columbia	1.1	(0.9–1.4)	1.2	(0.9–1.7)	1.4	(1.0–2.0)	1.5	(0.9–2.5)	0.9	(0.7–1.2)	1.0	(0.7–1.6)
Yukon (Whitehorse)	0.9	(0.7–1.3)	1.2	(0.8–1.9)	0.5	(0.2–0.9)	0.9	(0.3–2.5)	1.3	(0.9–1.9)	1.4	(0.8–2.3)
Northwest Territories (Yellowknife)	1.1	(0.7–1.6)	1.4	(0.8–2.4)	1.1	(0.5–2.3)	1.0	(0.4–2.5)	1.1	(0.7–1.8)	1.7	(0.8–3.6)
Nunavut (Iqaluit)	1.4	(0.9–2.3)	2.7	(1.3–5.6)	0.8	(0.3–2.1)	1.6	(0.5–4.9)	1.9	(1.0–3.5)	3.3	(1.2–9.2)

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TABLE 5 (continued)

Unadjusted and adjusted odds ratios for a positive screen for MDD, by gender and selected characteristics, household population aged 18 years or older, Canada, 2020

Variable	Total				Males				Females			
	Unadjusted odds ratio	95% CI	Adjusted odds ratio	95% CI	Unadjusted odds ratio	95% CI	Adjusted odds ratio	95% CI	Unadjusted odds ratio	95% CI	Adjusted odds ratio	95% CI
Odds ratios for individual COVID-19-related risk factors for depression[a] (reference is no)												
Loss of job or income due to COVID-19	2.1*	(1.8–2.5)	1.0	(0.7–1.3)	1.9*	(1.4–2.5)	0.8	(0.5–1.2)	2.3*	(1.9–2.9)	1.2	(0.8–1.6)
Difficulty meeting financial obligations or essential needs due to COVID-19	3.9*	(3.2–4.6)	1.5*	(1.1–2.0)	3.5*	(2.6–4.6)	1.4	(0.9–2.3)	4.3*	(3.4–5.5)	1.5*	(1.1–2.1)
Death of family member, friend or colleague due to COVID-19	2.2*	(1.7–2.9)	1.4	(1.0–2.1)	2.8*	(1.7–4.4)	2.1	(1.0–4.7)	1.8*	(1.3–2.6)	1.1	(0.7–1.7)
Feelings of loneliness or isolation due to COVID-19	6.2*	(5.2–7.4)	2.3*	(1.8–2.8)	6.3*	(4.7–8.3)	2.5*	(1.7–3.8)	5.9*	(4.7–7.5)	2.3*	(1.7–3.1)
Physical health problems due to COVID-19	7.4*	(6.2–8.7)	2.9*	(2.3–3.7)	8.1*	(6.1–10.6)	3.2*	(2.1–4.8)	6.6*	(5.3–8.2)	2.8*	(2.1–3.7)
Challenges in personal relationships with members of your household due to COVID-19	4.6*	(3.9–5.4)	1.5*	(1.2–2.0)	4.4*	(3.4–5.8)	1.2	(0.8–1.8)	4.5*	(3.6–5.5)	1.6*	(1.2–2.2)
Increased consumption of alcohol since onset of COVID-19	2.5*	(2.1–3.0)	1.5*	(1.2–2.0)	2.8*	(2.1–3.7)	1.5	(0.9–2.3)	2.2*	(1.8–2.8)	1.6*	(1.2–2.3)
Increased consumption of cannabis since onset of COVID-19	4.6*	(3.5–6.1)	1.9*	(1.3–2.8)	4.3*	(2.8–6.5)	1.7	(0.9–3.2)	5.3*	(3.7–7.5)	2.2*	(1.3–3.6)
Concern for family violence in your household	3.0*	(2.1–4.1)	1.9*	(1.2–3.1)	3.1*	(1.8–5.3)	2.1	(0.9–5.0)	3.1*	(2.0–4.7)	2.0*	(1.2–3.5)

Data source: 2020 Survey on COVID and Mental Health.

Abbreviations: CI, confidence interval; MDD, major depressive disorder.

Note: The 95% CIs for the odds ratios for some provinces/territories overlap with 1.0 but the result is nonsignificant because of the Bonferroni adjustment made to account for multiple comparisons.

[a] In the second set of models examining individual COVID-19-related risk factors, the adjusted odds control for all variables included in the first set of models, but the adjusted odds ratios are only presented for the COVID-19-related risk factors.

* Significantly different from reference ($p < 0.05$).

time, depressive symptoms predict subsequent family violence.

As found in previous research, mastery[26,29] and a sense of community belonging[27,28] were protective factors for MDD. In our study, mastery was a potent protective factor; those in the lowest mastery quartile were 17 times more likely to have MDD than were those in the highest quartile. Those reporting a very weak sense of community belonging were 10 times more likely to have MDD than were those with a very strong sense of belonging. It is hypothesized that feeling "connected" to one's community enhances social engagement. Having social ties can improve self-esteem, thereby enriching positive mental health.[27]

Consistent with other studies,[30,42] we found some evidence that coping strategies aimed at promoting health were protective factors for MDD. Exercising and participating in hobbies were associated with a decreased risk of MDD. However, changes in food choices and sleep patterns to promote health did not emerge as protective factors and were unexpectedly associated with an increased risk of MDD. The higher prevalence of MDD among those who changed their food choices and sleep patterns to promote health may reflect the use of these strategies by those who have MDD and are using these strategies to combat their depressive symptoms. It is still plausible that these strategies may be useful in preventing MDD and reducing symptoms among those with MDD.

The increased risk of MDD among females and the negative association with age have been found in most community epidemiological studies.[43-45] The decreased risk for immigrants is consistent with the "healthy immigrant" effect.[46] However, while recent immigrants are healthier on their arrival, over time, the initial health advantage diminishes.[46] The comparison of estimates between the CCHS and the SCMH suggests that the gap between immigrants and non-immigrants has narrowed since the onset of COVID-19. Consistent with our findings, a rapid review of the psychological impact of COVID-19 on frontline health care workers identified many studies that reported increased levels of depression, with female nurses having higher risk than other frontline workers.[47]

After more than two decades of stability,[16] the prevalence of MDD among Canadians has increased substantially. It is estimated that a third to half of those with first-time depression will have a recurrence.[44] Since SCMH respondents were not asked about lifetime symptoms of depression, it is not possible to quantify the extent of first-time episodes, but likely a sizable proportion of Canadians have experienced MDD for the first time during COVD-19. Research suggests that the etiology of subsequent episodes of depression is highly variable.[6,7,9,11-13] While the first occurrence of a depressive episode is more commonly associated with a severe stressful life event, subsequent episodes often arise in the absence of severe stressful life events.[6,7,9,11-13] The stress sensitization model postulates that after an initial episode of depression, individuals are more sensitized to stress, and over time, less severe and even minor events such as daily hassles can trigger an episode.[12,13] Regardless of the cause of subsequent episodes, a larger percentage of Canadians may be more susceptible to episodes of depression in the near future.

Strengths and limitations

A major strength of this study is that it is based on a large representative sample from the 10 Canadian provinces as well as data from the capitals of the three territories. The scale used to measure MDD has good psychometric properties, and the cut-point used to define MDD has high sensitivity and specificity.[31-33] As well, we were able to examine how social and financial upheavals related to COVID-19, changes in behaviour since the onset of COVID-19 and protective factors (mastery, sense of community belonging) are related to MDD.

Nonetheless, some limitations should be considered when interpreting the results of this analysis:

- Changes in estimates of the prevalence of MDD over time were based only on certain provinces, and the baseline years for comparisons differ, ranging from 2015 to 2019. We implicitly assumed stable estimates of MDD across these years. Sensitivity analyses based on the provinces of Ontario and Manitoba supported the conjecture of stable estimates followed by an increase in the SCMH in the fall of 2020. These results suggest that the increases in MDD occurred after the onset of COVID-19.
- Methodological differences between the SCMH and the CCHS may influence comparisons. Data collection modes differed.
- CCHS data were collected throughout the year. SCMH data were collected during the fall months, and are, therefore, potentially subject to seasonality bias.[48]
- For the comparison by household income, it should be noted that the SCMH is based on self-reported data, whereas the CCHS uses a combination of tax records, respondent-provided data and imputed data. It is unknown how this may have impacted the comparison of MDD estimates between the two surveys.
- The degree to which the response rates to the SCMH and the CCHS affect the prevalence of MDD in our study and the comparison of estimates between the two surveys is unknown.
- Marital status and social support were not collected in the SCMH. Being married and having social support have consistently been found to be protective factors for depression.[43,49]
- The SCMH and CCHS excluded subpopulations among whom the prevalence of depression is likely higher, such as individuals experiencing homelessness, residents of reserves and other Indigenous settlements and residents of institutions. Depression is more common among seniors living in long-term care facilities.[50] Our study did not address the impact of COVID-19 on the mental health of seniors in long-term care.
- Although the PHQ-9 has been found to be a reliable and valid measure of MDD,[31] these are unprecedented times. New validity studies may be needed to assess whether the pandemic has increased the relative number of positive screens that are false positives based on a clinical diagnosis. Furthermore, trends based on the clinical diagnosis of MDD may differ.
- The cross-sectional nature of the SCMH data precludes establishing the temporal order of events and conclusions regarding the causal nature of associations.

Conclusion

Depression is a highly recurrent chronic condition that causes substantial suffering and results in increased mortality risk.[44,51] The World Health Organization has identified depression as a leading cause of disability worldwide and a major contributor to the overall burden of disease.[52] The SCMH was administered from September to December 2020, a period during which COVID-19 cases, hospitalizations and deaths were rising. The psychological impact of and economic fallout from lockdowns have yet to be fully understood. Given the recurrent nature of MDD and the likelihood that less severe events may result in subsequent episodes,[12,13,44] the recent increase, particularly among young adults, is cause for concern. Our findings highlight the need to identify evidence-based approaches for assessment and treatment of depressive disorders that can be delivered through public health programing to meet the increased numbers of those experiencing symptoms indicative of MDD during the pandemic, rather than relying solely on existing clinical services.

While delivery of mental health services is the responsibility of provinces and territories, planning should be based on up-to-date national estimates about the prevalence and associated risk factors of conditions such as MDD. This planning could include determining ways to make evidence-based treatments for depressive disorders, such as cognitive behavioural therapy, more broadly available, including remotely. Intervention strategies that enhance protective factors, such as identifying ways to promote community belonging, are important to consider. Ongoing monitoring is vital to determine if currently elevated levels of MDD persist.

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Conflicts of interest

The authors have no conflicts of interest.

Authors' contributions and statement

MS and LT conceived the project. MS and LT decided on the analytic approach. MS conducted the statistical analyses. MS, LT, AG, MW, SP, AMR, DLB and HM interpreted the results. MS drafted and revised the manuscript in response to feedback provided from LT, AG, MW, SP, AMR, DLB and HM.

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Original quantitative research

Positive mental health and perceived change in mental health among adults in Canada during the second wave of the COVID-19 pandemic

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Abstract

Introduction: Canadian surveys from spring/summer 2020 suggest the prevalence of some positive mental health (PMH) outcomes has declined compared to pre-pandemic levels. However, less is known about the state of PMH during the second wave of the COVID-19 pandemic.

Methods: We compared adults' self-rated mental health (SRMH), community belonging and life satisfaction in Fall 2020 versus 2019 in the overall population and across sociodemographic characteristics using cross-sectional data from the Survey on COVID-19 and Mental Health (September–December, 2020) and the 2019 Canadian Community Health Survey. We also conducted regression analyses to examine which sociodemographic factors were associated with reporting in Fall 2020 that one's mental health was about the same or better compared to before the pandemic.

Results: Fewer adults reported high SRMH in Fall 2020 (59.95%) than in 2019 (66.71%) and fewer reported high community belonging in Fall 2020 (63.64%) than in 2019 (68.42%). Rated from 0 (very dissatisfied) to 10 (very satisfied), average life satisfaction was lower in Fall 2020 (7.19) than in 2019 (8.08). Females, those aged under 65 years, those living in a population centre, and those absent from work due to COVID-19 had lower odds of reporting that their mental health was about the same or better in Fall 2020.

Conclusion: The PMH of adults was lower during the pandemic's second wave. However, the majority of individuals still reported high SRMH and community belonging. The findings identify certain sociodemographic groups whose mental health appears to have been more negatively impacted by the pandemic. Continued surveillance is important in ensuring mental health builds back better and stronger in Canada after the pandemic.

Keywords: *COVID-19, coronavirus, mental health, life satisfaction, community belonging, Canadian adults, public health*

Highlights

- Fewer adults in Canada reported high self-rated mental health in Fall 2020 (59.95%) than in 2019 (66.71%).
- Fewer adults reported high community belonging in Fall 2020 (63.64%) than in 2019 (68.42%).
- Average life satisfaction was lower in Fall 2020 (7.19) than in 2019 (8.08).
- Being female, being under 65 years old, living in a population centre and being absent from work due to COVID-19 were associated with a lower likelihood of reporting that one's mental health was about the same or better in Fall 2020.

Introduction

The COVID-19 pandemic and resultant public health measures have led to major changes in people's lives, presenting a pressing challenge to both the physical and mental health of Canadians. Health concerns, physical and social isolation, unemployment, uncertainty and the general disruption to people's everyday routines experienced during the pandemic have the potential to affect Canadians' mental health.

According to the Public Health Agency of Canada (PHAC), positive mental health (PMH) is "the capacity of each and all of us to feel, think, and act in ways that enhance our ability to enjoy life and deal with the challenges we face."[1,p.1] PMH includes measurable outcomes such as self-rated mental health (SRMH), life satisfaction and sense of community belonging.[2] By examining PMH outcomes, we can gain a better understanding of the well-being of the Canadian population, and uncover how the quality of life of some subpopulations might have been disproportionately impacted during the pandemic.[3]

Thus far, research suggests that SRMH in Canada has declined during the pandemic. In its Canadian Perspectives Survey Series (CPSS), Statistics Canada conducted a

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number of cross-sectional surveys during the pandemic with sub-samples of respondents from the Labour Force Survey.[4] The percentage of Canadians (aged 15+ years) who reported excellent/very good mental health was 68% in the 2018 Canadian Community Health Survey (CCHS) versus 54% from 29 March to 3 April 2020 in the first CPSS.[5] Subsequent CPSS surveys found similar (55%; 20–26 July 2020) or even lower (48%; 4–10 May 2020) percentages reporting excellent/very good mental health.[6,7] Frequent Leger surveys have asked Canadian adults how they would rate their mental health since the beginning of the COVID-19 crisis, with the percentage reporting excellent/very good fluctuating between 29% and 46% since April 2020.[8]

More generally, other representative surveys from spring 2020 found that roughly four in ten to one half of Canadian adults reported that their mental health had worsened,[9-11] while Fall 2020 data from the CCHS found between three and four in ten Canadians (aged 12+ years) reported worse mental health.[12] Similar percentages of individuals in other countries (e.g. Germany, France and the United States), when surveyed in early 2021, reported that their emotional and mental health had gotten worse since the beginning of the pandemic.[13]

Beyond SRMH and perceptions of change in mental health, there is some evidence that life satisfaction has decreased in Canada. Rated from 0 (very dissatisfied) to 10 (very satisfied), average life satisfaction among Canadians (aged 15+ years) was 8.09 in the 2018 CCHS versus 6.71 in the third CPSS (15–21 June 2020).[14] Furthermore, the World Happiness Report showed lower average life evaluation ratings in Canada and fewer Canadians reporting positive emotions in 2020 (vs. 2017–2019).[15] Lower average life evaluation/satisfaction ratings in 2020 have also been observed in other countries (e.g. the United Kingdom, Norway and Denmark).[15]

Just as the likelihood of being infected or dying from COVID-19 is unequal across sociodemographic factors,[3,16] research indicates that there are also disparities in the impact of the pandemic on mental health in Canada. Some of the aforementioned surveys have found larger declines in perceived mental health among women and young adults.[5,6,9,10] Some findings also suggest that parents with children under 18 years old and individuals who identify as LGBTQ2+ are more likely to report declines in mental health.[9,17] Furthermore, larger declines in life satisfaction have been reported among young adults.[14]

There remain gaps in what we know about PMH in Canada, however. First, PMH is multifaceted,[1,2] but most surveys during the pandemic have focussed on SRMH or perceived changes in mental health. It is important to also consider the impact on aspects of PMH such as social well-being (e.g. community belonging),[2,18] given COVID-19 public health interventions that limit in-person social interaction and community events. Second, many analyses used 2018 data for the pre-pandemic estimate of PMH; more recent pre-pandemic data has become available from the 2019 CCHS. Third, although differences in PMH for men and women have been examined, comprehensive gender-based analyses across sociodemographic characteristics with representative data have been limited. Fourth, data for most of the aforementioned Canadian surveys were collected in the spring or summer of 2020. Given the different context in Fall 2020 (e.g. a second wave of COVID-19 infections, many children returning to school) and that the effect of stressful events on mental health can be delayed or persist for some individuals,[19-21] it is essential to obtain updated PMH estimates.

This research addressed these gaps by comparing SRMH, community belonging and life satisfaction in the 2019 CCHS to Fall 2020 data from the Survey on COVID-19 and Mental Health (SCMH).[22] SRMH, community belonging and life satisfaction are well-established and validated outcomes that are included in PHAC's Positive Mental Health Surveillance Indicator Framework.[2,23-26] We documented how PMH has changed across numerous sociodemographic characteristics among adults overall and by gender. Beyond documenting differences in the prevalence of PMH outcomes in 2019 versus Fall 2020, we also investigated perceived changes in mental health in Fall 2020. We examined the likelihood of self-reporting in Fall 2020 that one's mental health is about the same or better compared to before the pandemic by various sociodemographic factors assessed in the SCMH.

Methods

Data

We used cross-sectional data collected from 11 September to 4 December 2020 for the SCMH to estimate PMH and perceived change in mental health during the pandemic.[22] The target population was individuals aged 18 years and older who were living in the 10 provinces and three territorial capitals in Canada. Within each province/territorial capital, a simple random sample of dwellings was selected and then an adult within each dwelling was sampled.[22] The Dwelling Universe File was used for the sampling frame. Individuals living on reserves; in institutions; in collective, vacant, inactive or unmailable dwellings; and outside capital cities in the territories were excluded from the sampling frame. Respondents voluntarily completed the 2020 SCMH by electronic questionnaire or through computer-assisted telephone interviewing. The response rate in the SCMH was 53.3%, with 14 689 respondents in total; we analyzed the data from the 12 344 respondents who agreed to share their data with PHAC.

We used cross-sectional data collected from 2 January to 24 December for the 2019 CCHS – Annual Component for pre-pandemic PMH estimates.[27] The CCHS target population is individuals aged 12 years and older who are living in the 10 provinces and three territories in Canada. Individuals who are full-time Canadian Forces members, institutionalized or living in foster homes, living on reserves and other Indigenous settlements or living in two specific Quebec health regions are excluded from the CCHS, and represent less than 3% of the population. For adults living in the provinces, the 2019 CCHS used the sampling frame from the Labour Force Survey.[28] A sample of dwellings was selected and then an adult within each dwelling was selected to participate in the 2019 CCHS.[27] The CCHS is voluntary, and is completed by computer-assisted telephone interview or personal interview. To match the 2020 SCMH, only data from respondents aged 18 and older were analyzed (N = 57 034; response rate: 54.9%). Data from 2019 CCHS respondents in the territories could not be analyzed because territorial data in the CCHS is only representative after two years of data collection. Due to the exclusion of territorial data in the CCHS 2019 dataset, we excluded data from the territorial capitals

in the 2020 SCMH when comparing 2020 versus 2019 estimates.

Measures

Positive mental health outcomes

SRMH was measured with the questions "In general, how is your mental health?" in the 2020 SCMH and "In general, would you say your mental health is …?" in the 2019 CCHS. Response options were "Excellent", "Very good", "Good", "Fair", and "Poor". We coded "Excellent" or "Very good" as high SRMH.[2]

Across both surveys, community belonging was measured with the question "How would you describe your sense of belonging to your local community?" Response options were "Very strong", "Somewhat strong", "Somewhat weak", and "Very weak". We coded "Very strong" or "Somewhat strong" as high community belonging.[2]

The following question assessed life satisfaction in both surveys: "Using a scale of 0 to 10 where 0 means 'Very dissatisfied' and 10 means 'Very satisfied', how do you feel about your life as a whole right now?" Life satisfaction was treated as a numerical variable.[2]

Perceived change in mental health

Respondents to the 2020 SCMH were asked "Compared to before the COVID-19 pandemic, how would you say your mental health is now?" Response options were "Much better now", "Somewhat better now", "About the same", "Somewhat worse now", and "Much worse now". We coded individuals who responded "Much better now", "Somewhat better now", and "About the same" as having perceptions of stable/improved mental health.[29,30]

Sociodemographic characteristics

There were numerous sociodemographic characteristics measured in both surveys, including gender (female, male), age (18–34, 35–49, 50–64, 65+), racialized group member (yes, no), immigrant status (yes, no), household income (divided into quintiles), place of residence (rural area, population centre), respondent educational attainment (high school or lower, post-secondary certificate/degree/diploma), the presence of children under 18 years at home (yes, no) and province/territorial capital. Visible minorities and individuals who identified as Indigenous were coded as racialized group members, while individuals who only identified as White were coded as non-racialized. Landed immigrants and non-permanent residents were coded as immigrants, while those born in Canada were coded as non-immigrants. Unique to the 2020 SCMH were questions that asked respondents about their work status, including whether they were a frontline worker, an essential worker or absent from work due to the pandemic (i.e. because of a business closure, a layoff or personal circumstances related to COVID-19). The sociodemographic characteristics of each sample are reported in Table 1.

Analysis

Analyses were conducted in SAS Enterprise Guide version 7.1 (SAS Institute Inc., Cary, NC, USA). To account for the complex survey design and to provide results that are representative at the national level, estimates were weighted using sampling weights provided by Statistics Canada. Standard errors, coefficients of variation and 95% confidence intervals were estimated using bootstrap weights.

The percentage of individuals reporting high SRMH and high community belonging were estimated in both surveys, along with the average level of life satisfaction in each survey. SAS's SURVEYMEANS procedure was used to calculate difference scores between each of these PMH outcomes across the two surveys. We identified significant differences by p-values < 0.05 and when difference scores had 95% confidence intervals that did not include 0. To examine differences in these PMH outcomes from 2019 to Fall 2020 among specific subpopulations, we conducted additional analyses for which results were stratified by sociodemographic characteristics measured in both surveys. We conservatively used nonoverlapping confidence intervals for difference scores to identify differences from 2019 to Fall 2020 that were significantly larger or smaller for one sociodemographic group versus another.

For perceived change in mental health compared to before the pandemic, we estimated the percentage of individuals in 2020 who reported stable/improved mental health in the overall population and across sociodemographic characteristics. To understand who is more likely or less likely to report stable/improved mental health, we conducted univariate logistic regression analyses with each sociodemographic variable as an explanatory variable (unadjusted models) and a multivariate logistic regression analysis with sociodemographic variables simultaneously included as explanatory variables (adjusted model). Data from the territorial capitals were included in these analyses.

All analyses were also conducted separately for males and females (insufficient cell sizes precluded separate analyses for individuals who specified other gender identities).

Results

Self-rated mental health

SRMH results are reported in Table 2. Overall, 59.95% of adults in Canada reported high SRMH in 2020, which is significantly lower than the 66.71% who reported high SRMH in 2019.

High SRMH was significantly less common for both males and females during the pandemic, with 64.50% of males reporting high SRMH in 2020 (vs. 69.25% in 2019) and 55.68% of females reporting high SRMH in 2020 (vs. 64.33% in 2019). The prevalence of high SRMH was significantly lower in 2020 than in 2019 among females under 65, but not among females aged 65 and older. Among males, the prevalence of high SRMH was significantly lower in 2020 than in 2019 among those under 65, but significantly higher in 2020 than in 2019 for those aged 65 and older.

High SRMH was significantly less prevalent in 2020 versus 2019 among White females and males, and racialized females (but not males). Similarly, high SRMH was significantly less prevalent in 2020 versus 2019 for Canadian-born females and males, and immigrant females (but not males).

The prevalence of high SRMH was significantly lower in 2020 than in 2019 for both females with and without children at home, but the difference was almost double for females with (vs. without) children at home. A significantly lower percentage of high SRMH in 2020 than in 2019 was also found for males with and without children at home.

TABLE 1
Sociodemographic characteristics, 2019 CCHS and 2020 SCMH

Variable	2019 CCHS (N = 57 034)	2020 SCMH (N = 11 324)	Chi-square test *p*-value
	% (95% CI)	% (95% CI)	
Gender			
Female	50.80 (50.74, 50.86)	50.78 (50.68, 50.87)	0.733
Male	49.20 (49.14, 49.26)	49.22 (49.13, 49.32)	
Age (years)			
18–34	28.36 (28.36, 28.36)	28.21 (28.21, 28.21)	< 0.001
35–49	24.58 (24.58, 24.58)	24.29 (23.80, 24.78)	
50–64	25.57 (25.57, 25.57)	25.31 (24.82, 25.80)	
65+	21.49 (21.49, 21.49)	22.19 (22.19, 22.19)	
Racialized group member			
Yes	27.22 (26.30, 28.13)	26.59 (25.41, 27.76)	0.392
No	72.78 (71.87, 73.70)	73.41 (72.24, 74.59)	
Immigrant status			
Yes	28.73 (27.88, 29.59)	27.03 (25.86, 28.20)	0.023
No	71.27 (70.41, 72.12)	72.97 (71.80, 74.14)	
Place of residence			
Population centre	82.91 (82.32, 83.51)	82.30 (81.51, 83.10)	0.231
Rural area	17.09 (16.49, 17.68)	17.70 (16.90, 18.49)	
Educational attainment			
High school or lower	34.36 (33.67, 35.06)	31.22 (29.96, 32.48)	< 0.001
Post-secondary	65.64 (64.94, 66.33)	68.78 (67.52, 70.04)	
Children < 18 years at home			
Yes	23.00 (22.40, 23.59)	27.58 (26.64, 28.52)	< 0.001
No	77.00 (76.41, 77.60)	72.42 (71.48, 73.36)	
Median household income (CAD)	85 483 (83 529, 87 437)	83 320 (80 559, 86 082)	

Abbreviations: CCHS, Canadian Community Health Survey; CI, confidence interval; SCMH, Survey on COVID-19 and Mental Health.

Note: Data from the territorial capitals (N = 1020) are excluded from the 2020 SCMH estimates in this table so that comparisons between 2019 and 2020 are based on data from the same geographical locations.

High SRMH was significantly less prevalent in 2020 than in 2019 across the four highest income quintiles for females and the three highest income quintiles for males. The prevalence of high SRMH was significantly lower in 2020 than in 2019 for both females with and without a post-secondary education, but the difference was more than two times larger among the former. High SRMH was also significantly less prevalent in 2020 than in 2019 among males with a post-secondary education (but not among males with a high school education or lower).

The prevalence of high SRMH was significantly lower in 2020 than in 2019 for males and females living in population centres, and females (but not males) living in rural areas. In the combined analysis, high SRMH was significantly less common in 2020 than in 2019 in every province except Nova Scotia, Prince Edward Island and Quebec.

Community belonging

Community belonging results are reported in Table 3. The percentage of adults in Canada reporting high community belonging was 63.64% in 2020, which is significantly lower than the 68.42% who reported high community belonging in 2019.

High community belonging was significantly less prevalent for females in 2020 (63.61%) than in 2019 (69.58%) and less prevalent for males in 2020 (63.74%) than in 2019 (67.25%). The prevalence of high community belonging was significantly lower in 2020 than in 2019 among males under 65, but significantly higher in 2020 than in 2019 among males aged 65 and older. Among females, high community belonging was significantly less common in 2020 than in 2019 for those aged 18 to 34 and 50 to 64 (with the former showing differences more than four times larger than the latter), but was not significantly different in 2020 versus 2019 for those aged 35 to 49 or 65 and older.

High community belonging was significantly less prevalent in 2020 than in 2019 among both racialized and White females (although the difference was almost three times larger among the former), and racialized males (but not among White males).

The prevalence of high community belonging was significantly lower in 2020 than in 2019 among both immigrant and Canadian-born females and males.

High community belonging was significantly less common in 2020 than in 2019 for females and males with children at home, and females (but not males) without children at home.

The prevalence of high community belonging was significantly lower in 2020 than in 2019 for females across all income quintiles. For males, a significantly lower prevalence of high community belonging in 2020 versus 2019 was only observed in the two highest income quintiles. For both males and females, the prevalence of high community belonging was significantly lower in 2020 than in 2019 for those with a post-secondary education, but not for those with a high school education or less.

The prevalence of high community belonging was significantly lower in 2020 than in 2019 among females and males living in population centres, and females (but not males) living in rural areas. In the combined analysis, high community belonging was significantly less common in 2020 than in 2019 in every province except New Brunswick, Prince Edward Island, Quebec and Saskatchewan. In Quebec, the prevalence of high community belonging was significantly higher in 2020 than in 2019.

Life satisfaction

Life satisfaction results are reported in Table 4. Average life satisfaction among adults in Canada was 7.19 in 2020, which

TABLE 2
Prevalence of high self-rated mental health in 2019 and 2020, overall and stratified by gender

Variable	Combined			Female			Male		
	2019 CCHS	2020 SCMH	Difference 2019–2020 (95% CI)	2019 CCHS	2020 SCMH	Difference 2019–2020 (95% CI)	2019 CCHS	2020 SCMH	Difference 2019–2020 (95% CI)
	% (95% CI)	% (95% CI)		% (95% CI)	% (95% CI)		% (95% CI)	% (95% CI)	
Overall	66.71 (66.00, 67.41)	59.95 (58.68, 61.22)	6.76* (5.33, 8.19)	64.33 (63.35, 65.31)	55.68 (53.87, 57.49)	8.65* (6.58, 10.71)	69.25 (68.22, 70.27)	64.50 (62.60, 66.39)	4.75* (2.64, 6.85)
Age (years)									
18–34	60.47 (58.85, 62.08)	50.64 (47.60, 53.69)	9.82* (6.49, 13.16)	55.81 (53.68, 57.94)	44.68 (40.48, 48.87)	11.14* (6.44, 15.83)	65.28 (62.94, 67.61)	56.84 (52.33, 61.35)	8.44* (3.50, 13.39)
35–49	66.30 (64.78, 67.82)	57.16 (54.63, 59.70)	9.14* (6.16, 12.12)	63.71 (61.62, 65.79)	51.32 (47.75, 54.89)	12.39* (8.19, 16.59)	68.93 (66.86, 70.99)	63.01 (59.47, 66.55)	5.92* (1.79, 10.04)
50–64	70.44 (69.05, 71.83)	62.00 (59.73, 64.27)	8.44* (5.75, 11.14)	68.86 (66.90, 70.83)	60.04 (56.75, 63.32)	8.83* (5.05, 12.61)	72.05 (69.99, 74.12)	63.97 (60.58, 67.37)	8.08* (4.01, 12.15)
65+	71.17 (70.16, 72.17)	72.49 (70.36, 74.62)	−1.32 (−3.68, 1.03)	70.59 (69.21, 71.96)	68.30 (65.32, 71.28)	2.29 (−1.01, 5.58)	71.85 (70.42, 73.28)	77.35 (74.39, 80.30)	−5.50* (−8.77, −2.22)
Racialized group member									
Yes	64.85 (63.17, 66.53)	60.78 (57.81, 63.76)	4.07* (0.66, 7.47)	60.92 (58.57, 63.26)	54.02 (49.68, 58.36)	6.90* (1.96, 11.83)	69.00 (66.54, 71.46)	67.03 (62.94, 71.12)	1.97 (−2.74, 6.68)
No	67.46 (66.72, 68.21)	59.66 (58.26, 61.06)	7.80* (6.22, 9.39)	65.50 (64.47, 66.53)	56.35 (54.45, 58.25)	9.15* (6.96, 11.34)	69.58 (68.49, 70.66)	63.37 (61.25, 65.49)	6.21* (3.85, 8.57)
Immigrant status									
Yes	68.62 (67.19, 70.05)	64.00 (61.24, 66.77)	4.62* (1.55, 7.68)	65.62 (63.45, 67.79)	58.52 (54.44, 62.60)	7.10* (2.52, 11.69)	71.72 (69.58, 73.86)	68.74 (64.78, 72.70)	2.98 (−1.50, 7.46)
No	65.96 (65.16, 66.75)	58.38 (56.92, 59.84)	7.58* (5.93, 9.22)	63.74 (62.66, 64.82)	54.68 (52.69, 56.67)	9.06* (6.79, 11.32)	68.34 (67.22, 69.47)	62.65 (60.47, 64.82)	5.70* (3.30, 8.09)
Household income									
Q1 (lowest)	57.33 (55.75, 58.92)	58.82 (55.95, 61.69)	−1.49 (−4.77, 1.79)	55.97 (53.95, 57.99)	54.50 (50.74, 58.27)	1.47 (−2.83, 5.76)	59.30 (56.78, 61.82)	63.54 (59.36, 67.72)	−4.24 (−9.09, 0.61)
Q2	65.85 (64.37, 67.32)	60.44 (57.56, 63.32)	5.41* (2.20, 8.61)	63.80 (61.70, 65.90)	55.47 (51.62, 59.32)	8.33* (3.91, 12.74)	68.22 (66.10, 70.35)	65.78 (61.39, 70.18)	2.44 (−2.36, 7.24)
Q3	68.64 (67.03, 70.25)	58.23 (55.24, 61.22)	10.41* (7.08, 13.74)	67.13 (64.78, 69.48)	57.26 (53.19, 61.34)	9.86* (5.21, 14.52)	70.27 (68.16, 72.38)	59.36 (54.81, 63.92)	10.90* (5.87, 15.94)
Q4	70.00 (68.36, 71.63)	60.59 (57.34, 63.85)	9.40* (5.77, 13.04)	67.56 (65.25, 69.88)	53.96 (49.28, 58.65)	13.60* (8.34, 18.86)	72.20 (69.88, 74.51)	67.03 (62.68, 71.39)	5.16* (0.27, 10.05)
Q5 (highest)	71.80 (70.09, 73.51)	61.83 (58.45, 65.22)	9.97* (6.24, 13.70)	68.81 (66.37, 71.26)	54.20 (49.29, 59.11)	14.62* (9.21, 20.02)	74.47 (72.12, 76.81)	68.84 (64.07, 73.60)	5.63* (0.32, 10.94)

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TABLE 2 (continued)
Prevalence of high self-rated mental health in 2019 and 2020, overall and stratified by gender

Variable	Combined			Female			Male		
	2019 CCHS % (95% CI)	2020 SCMH % (95% CI)	Difference 2019–2020 (95% CI)	2019 CCHS % (95% CI)	2020 SCMH % (95% CI)	Difference 2019–2020 (95% CI)	2019 CCHS % (95% CI)	2020 SCMH % (95% CI)	Difference 2019–2020 (95% CI)
Place of residence									
Population centre	66.48 (65.67, 67.28)	58.54 (57.07, 60.02)	7.93* (6.27, 9.60)	63.81 (62.69, 64.93)	54.34 (52.29, 56.39)	9.48* (7.13, 11.83)	69.35 (68.18, 70.52)	62.97 (60.76, 65.18)	6.38* (3.94, 8.82)
Rural area	67.83 (66.63, 69.02)	66.08 (63.45, 68.72)	1.74 (−1.13, 4.61)	66.92 (65.23, 68.61)	61.34 (57.78, 64.89)	5.58* (1.69, 9.48)	68.75 (67.07, 70.44)	71.38 (67.62, 75.14)	−2.63 (−6.80, 1.54)
Educational attainment									
High school or lower	60.53 (59.32, 61.75)	58.11 (55.61, 60.60)	2.43 (−0.35, 5.21)	58.31 (56.61, 60.02)	53.90 (50.53, 57.27)	4.41* (0.60, 8.23)	62.81 (60.96, 64.65)	62.61 (58.95, 66.28)	0.20 (−3.90, 4.29)
Post-secondary	69.88 (69.04, 70.73)	60.74 (59.22, 62.26)	9.14* (7.45, 10.83)	67.27 (66.11, 68.43)	56.37 (54.27, 58.47)	10.91* (8.54, 13.27)	72.72 (71.54, 73.91)	65.38 (63.10, 67.65)	7.35* (4.82, 9.88)
Children < 18 years at home									
Yes	69.52 (68.10, 70.94)	59.19 (56.80, 61.59)	10.33* (7.60, 13.06)	65.78 (63.84, 67.72)	52.28 (48.89, 55.66)	13.50* (9.59, 17.41)	73.88 (71.85, 75.92)	66.59 (63.19, 69.99)	7.29* (3.40, 11.18)
No	65.84 (65.04, 66.65)	60.29 (58.72, 61.86)	5.55* (3.81, 7.29)	63.85 (62.74, 64.96)	57.05 (54.86, 59.24)	6.80* (4.37, 9.24)	67.92 (66.74, 69.10)	63.79 (61.47, 66.11)	4.13* (1.57, 6.69)
Province/territory									
Alberta	66.78 (64.77, 68.79)	53.28 (49.90, 56.66)	13.50* (9.57, 17.44)	64.03 (61.21, 66.85)	47.09 (42.43, 51.75)	16.94* (11.51, 22.37)	69.49 (66.60, 72.39)	59.40 (54.29, 64.52)	10.09* (4.28, 15.90)
British Columbia	64.26 (62.41, 66.11)	55.56 (52.05, 59.06)	8.70* (4.71, 12.70)	60.54 (57.76, 63.32)	51.16 (46.59, 55.74)	9.38* (3.98, 14.78)	68.44 (65.82, 71.06)	60.16 (54.85, 65.46)	8.29* (2.32, 14.25)
Manitoba	63.46 (60.37, 66.56)	54.17 (50.66, 57.68)	9.29* (4.61, 13.97)	63.16 (58.96, 67.36)	49.20 (44.36, 54.03)	13.96* (7.59, 20.34)	63.73 (59.11, 68.35)	60.30 (54.89, 65.72)	3.43 (−3.64, 10.49)
New Brunswick	63.07 (60.13, 66.02)	52.24 (48.47, 56.01)	10.83* (6.09, 15.57)	61.51 (57.42, 65.61)	51.31 (46.31, 56.31)	10.20* (3.78, 16.62)	64.89 (60.23, 69.55)	53.22 (47.42, 59.02)	11.67* (4.11, 19.24)
Newfoundland and Labrador	68.74 (65.49, 71.99)	62.64 (59.04, 66.25)	6.10* (1.16, 11.04)	68.38 (63.82, 72.93)	58.82 (53.89, 63.76)	9.56* (2.66, 16.45)	69.13 (64.64, 73.63)	66.83 (61.55, 72.11)	2.30 (−4.58, 9.19)
Nova Scotia	62.05 (58.88, 65.22)	57.40 (53.64, 61.15)	4.65 (−0.13, 9.43)	60.13 (56.26, 63.99)	48.84 (44.52, 53.17)	11.28* (5.54, 17.02)	64.24 (59.85, 68.64)	66.55 (60.37, 72.73)	−2.31 (−9.62, 5.00)
Ontario	65.59 (64.27, 66.91)	58.90 (56.41, 61.39)	6.69* (3.91, 9.47)	63.63 (61.87, 65.40)	54.19 (50.73, 57.65)	9.45* (5.56, 13.33)	67.69 (65.71, 69.68)	63.96 (60.30, 67.63)	3.73 (−0.35, 7.81)
Prince Edward Island	60.85 (56.81, 64.90)	60.26 (56.16, 64.37)	0.59 (−5.28, 6.45)	59.88 (54.36, 65.41)	57.86 (53.01, 62.70)	2.03 (−5.53, 9.58)	62.21 (55.98, 68.45)	62.67 (56.08, 69.27)	−0.46 (−9.45, 8.53)

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TABLE 2 (continued)
Prevalence of high self-rated mental health in 2019 and 2020, overall and stratified by gender

Variable	Combined			Female			Male		
	2019 CCHS % (95% CI)	2020 SCMH % (95% CI)	Difference 2019–2020 (95% CI)	2019 CCHS % (95% CI)	2020 SCMH % (95% CI)	Difference 2019–2020 (95% CI)	2019 CCHS % (95% CI)	2020 SCMH % (95% CI)	Difference 2019–2020 (95% CI)
Quebec	71.76 (70.45, 73.06)	70.05 (67.58, 72.52)	1.70 (−1.03, 4.44)	68.96 (67.06, 70.85)	67.72 (64.42, 71.03)	1.23 (−2.55, 5.01)	74.64 (72.87, 76.40)	72.58 (68.87, 76.29)	2.06 (−2.01, 6.13)
Saskatchewan	62.71 (58.98, 66.43)	53.98 (50.05, 57.90)	8.73* (3.31, 14.15)	61.40 (56.66, 66.14)	50.33 (45.40, 55.27)	11.07* (4.16, 17.97)	64.06 (58.84, 69.28)	57.91 (51.71, 64.11)	6.14 (−1.92, 14.21)
Yukon (Whitehorse)	—	53.28 (47.51, 59.05)	—	—	46.36 (39.12, 53.61)	—	—	61.30 (52.50, 70.09)	—
Northwest Territories (Yellowknife)	—	49.20 (43.07, 55.32)	—	—	45.68 (37.66, 53.70)	—	—	52.71 (43.61, 61.81)	—
Nunavut (Iqaluit)	—	49.99 (42.28, 57.70)	—	—	41.62 (31.84, 51.40)	—	—	59.76 (48.92, 70.61)	—

Abbreviations: CCHS, Canadian Community Health Survey; CI, confidence interval; Q, quintile; SCMH, Survey on COVID-19 and Mental Health.

Notes: Data from the territorial capitals (N = 1020) are excluded from the 2020 SCMH estimates in this table (except the last three rows) so that comparisons between 2019 and 2020 are based on data from the same geographical locations. Positive values in the difference columns mean that the percentage of high self-rated mental health was higher in 2019 than 2020; negative values in the difference columns mean that the percentage was lower in 2019 than 2020.

* $p < 0.05$.

TABLE 3
Prevalence of high community belonging in 2019 and 2020, overall and stratified by gender

Variable	Combined			Female			Male		
	2019 CCHS % (95% CI)	2020 SCMH % (95% CI)	Difference 2019–2020 (95% CI)	2019 CCHS % (95% CI)	2020 SCMH % (95% CI)	Difference 2019–2020 (95% CI)	2019 CCHS % (95% CI)	2020 SCMH % (95% CI)	Difference 2019–2020 (95% CI)
Overall	68.42 (67.72, 69.12)	63.64 (62.36, 64.93)	4.78* (3.34, 6.22)	69.58 (68.63, 70.52)	63.61 (61.90, 65.33)	5.96* (3.99, 7.94)	67.25 (66.22, 68.28)	63.74 (61.83, 65.64)	3.52* (1.35, 5.68)
Age (years)									
18–34	62.58 (61.04, 64.11)	51.39 (48.22, 54.56)	11.19* (7.76, 14.62)	64.71 (62.60, 66.82)	48.74 (44.58, 52.89)	15.97* (11.36, 20.58)	60.55 (58.32, 62.78)	54.02 (49.32, 58.72)	6.53* (1.35, 11.71)
35–49	66.99 (65.52, 68.45)	62.74 (60.20, 65.28)	4.25* (1.34, 7.15)	69.19 (67.25, 71.14)	65.51 (62.13, 68.89)	3.68 (−0.23, 7.60)	64.78 (62.55, 67.01)	59.96 (56.24, 63.69)	4.82* (0.43, 9.21)
50–64	70.37 (69.04, 71.69)	65.89 (63.61, 68.17)	4.48* (1.88, 7.08)	70.75 (68.92, 72.59)	66.90 (63.71, 70.09)	3.85* (0.17, 7.53)	69.96 (67.93, 71.99)	64.82 (61.48, 68.17)	5.14* (1.24, 9.04)
65+	75.90 (74.93, 76.87)	77.70 (75.78, 79.63)	−1.81 (−3.98, 0.36)	74.87 (73.46, 76.28)	75.49 (72.79, 78.20)	−0.62 (−3.72, 2.47)	77.13 (75.74, 78.51)	80.27 (77.53, 83.02)	−3.15* (−6.23, −0.06)

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TABLE 3 (continued)
Prevalence of high community belonging in 2019 and 2020, overall and stratified by gender

Variable	Combined			Female			Male		
	2019 CCHS % (95% CI)	2020 SCMH % (95% CI)	Difference 2019–2020 (95% CI)	2019 CCHS % (95% CI)	2020 SCMH % (95% CI)	Difference 2019–2020 (95% CI)	2019 CCHS % (95% CI)	2020 SCMH % (95% CI)	Difference 2019–2020 (95% CI)
Racialized group member									
Yes	69.42 (67.84, 70.99)	59.84 (56.71, 62.97)	9.58* (6.08, 13.07)	69.96 (67.86, 72.07)	58.34 (53.89, 62.79)	11.62* (6.71, 16.54)	68.89 (66.44, 71.35)	61.08 (56.74, 65.41)	7.82* (2.77, 12.87)
No	68.14 (67.38, 68.90)	65.03 (63.60, 66.46)	3.10* (1.51, 4.70)	69.43 (68.44, 70.43)	65.38 (63.51, 67.25)	4.05* (1.93, 6.17)	66.81 (65.69, 67.93)	64.79 (62.65, 66.93)	2.02 (−0.36, 4.40)
Immigrant status									
Yes	70.78 (69.30, 72.26)	63.69 (60.89, 66.49)	7.09* (3.98, 10.19)	71.76 (69.74, 73.78)	63.77 (59.76, 67.79)	7.99* (3.58, 12.40)	69.80 (67.65, 71.95)	63.60 (59.67, 67.53)	6.21* (1.71, 10.70)
No	67.57 (66.77, 68.37)	63.67 (62.21, 65.14)	3.90* (2.24, 5.56)	68.72 (67.67, 69.77)	63.66 (61.75, 65.56)	5.07* (2.87, 7.27)	66.41 (65.24, 67.58)	63.79 (61.56, 66.02)	2.61* (0.12, 5.11)
Household income									
Q1 (lowest)	64.86 (63.36, 66.36)	61.54 (58.63, 64.46)	3.32 (−0.01, 6.64)	65.69 (63.68, 67.70)	61.06 (57.11, 65.00)	4.63* (0.17, 9.10)	63.89 (61.53, 66.26)	62.42 (58.08, 66.76)	1.47 (−3.57, 6.51)
Q2	67.89 (66.42, 69.35)	63.50 (60.55, 66.46)	4.38* (1.09, 7.67)	69.08 (67.14, 71.03)	61.61 (57.76, 65.46)	7.47* (3.14, 11.80)	66.59 (64.41, 68.77)	65.33 (60.93, 69.73)	1.26 (−3.80, 6.33)
Q3	68.03 (66.52, 69.53)	63.29 (60.27, 66.30)	4.74* (1.39, 8.09)	69.30 (67.25, 71.36)	63.66 (59.66, 67.66)	5.64* (1.10, 10.19)	66.73 (64.53, 68.93)	63.00 (58.53, 67.46)	3.73 (−1.17, 8.63)
Q4	70.53 (68.90, 72.16)	61.94 (58.75, 65.13)	8.59* (5.01, 12.17)	72.13 (69.90, 74.36)	59.88 (55.21, 64.55)	12.25* (7.02, 17.49)	69.12 (66.81, 71.43)	63.72 (59.37, 68.08)	5.40* (0.35, 10.44)
Q5 (highest)	70.84 (69.04, 72.64)	64.48 (61.09, 67.86)	6.36* (2.63, 10.10)	72.57 (70.17, 74.97)	65.62 (60.75, 70.50)	6.95* (1.58, 12.32)	69.27 (66.71, 71.82)	63.42 (58.49, 68.35)	5.85* (0.42, 11.27)
Place of residence									
Population centre	67.52 (66.71, 68.33)	62.31 (60.81, 63.82)	5.21* (3.52, 6.90)	68.94 (67.86, 70.02)	62.89 (60.90, 64.89)	6.05* (3.76, 8.34)	66.07 (64.88, 67.25)	61.80 (59.60, 64.01)	4.27* (1.74, 6.79)
Rural area	72.80 (71.59, 74.01)	69.91 (67.25, 72.57)	2.89 (−0.02, 5.79)	72.75 (71.08, 74.42)	67.37 (63.90, 70.83)	5.38* (1.56, 9.21)	72.86 (71.18, 74.54)	72.75 (68.78, 76.72)	0.11 (−4.13, 4.35)
Educational attainment									
High school or lower	67.55 (66.32, 68.78)	65.63 (63.15, 68.12)	1.92 (−0.86, 4.69)	69.31 (67.69, 70.93)	65.83 (62.46, 69.20)	3.48 (−0.25, 7.22)	65.89 (64.06, 67.72)	65.44 (61.76, 69.12)	0.45 (−3.76, 4.67)
Post-secondary	68.84 (67.98, 69.71)	62.70 (61.18, 64.23)	6.14* (4.40, 7.87)	69.73 (68.57, 70.90)	62.52 (60.43, 64.62)	7.21* (4.80, 9.63)	67.91 (66.60, 69.21)	62.99 (60.71, 65.27)	4.92* (2.32, 7.52)
Children < 18 years at home									
Yes	71.11 (69.65, 72.57)	64.83 (62.41, 67.25)	6.28* (3.45, 9.11)	72.11 (70.23, 73.99)	66.49 (63.28, 69.69)	5.62* (1.83, 9.42)	69.94 (67.62, 72.26)	63.05 (59.45, 66.66)	6.89* (2.60, 11.18)

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TABLE 3 (continued)
Prevalence of high community belonging in 2019 and 2020, overall and stratified by gender

Variable	Combined			Female			Male		
	2019 CCHS % (95% CI)	2020 SCMH % (95% CI)	Difference 2019–2020 (95% CI)	2019 CCHS % (95% CI)	2020 SCMH % (95% CI)	Difference 2019–2020 (95% CI)	2019 CCHS % (95% CI)	2020 SCMH % (95% CI)	Difference 2019–2020 (95% CI)
No	67.59 (66.77, 68.41)	63.21 (61.70, 64.72)	4.38* (2.68, 6.07)	68.74 (67.65, 69.82)	62.46 (60.41, 64.51)	6.28* (3.93, 8.63)	66.48 (65.27, 67.70)	64.06 (61.80, 66.33)	2.42 (−0.15, 4.99)
Province/territory									
Alberta	68.36 (66.34, 70.37)	59.83 (56.53, 63.13)	8.52* (4.56, 12.49)	68.18 (65.18, 71.19)	60.54 (56.12, 64.95)	7.65* (2.18, 13.11)	68.54 (65.73, 71.36)	59.18 (54.25, 64.11)	9.36* (3.72, 15.01)
British Columbia	70.57 (68.73, 72.41)	61.85 (58.47, 65.23)	8.71* (4.87, 12.55)	72.45 (70.08, 74.83)	62.97 (58.59, 67.35)	9.49* (4.56, 14.41)	68.73 (65.94, 71.53)	60.46 (55.41, 65.51)	8.27* (2.43, 14.11)
Manitoba	73.09 (70.20, 75.98)	60.08 (56.52, 63.63)	13.01* (8.42, 17.61)	74.56 (70.89, 78.23)	59.81 (54.94, 64.69)	14.75* (8.68, 20.81)	71.73 (67.53, 75.93)	60.96 (55.52, 66.39)	10.77* (3.90, 17.64)
New Brunswick	74.20 (71.42, 76.98)	70.01 (66.41, 73.62)	4.19 (−0.27, 8.64)	75.07 (71.36, 78.78)	68.98 (64.35, 73.61)	6.09* (0.11, 12.07)	73.42 (69.34, 77.51)	71.10 (65.36, 76.84)	2.32 (−4.47, 9.11)
Newfoundland and Labrador	79.25 (76.40, 82.10)	74.18 (70.64, 77.71)	5.07* (0.59, 9.55)	80.08 (75.98, 84.19)	73.33 (68.77, 77.89)	6.76* (0.57, 12.95)	78.38 (73.87, 82.89)	75.30 (69.77, 80.83)	3.07 (−3.87, 10.02)
Nova Scotia	74.72 (72.09, 77.35)	68.30 (64.72, 71.89)	6.41* (1.99, 10.84)	75.64 (72.54, 78.75)	68.18 (63.95, 72.41)	7.46* (2.22, 12.71)	73.75 (69.75, 77.75)	68.49 (62.50, 74.48)	5.25 (−1.93, 12.44)
Ontario	69.81 (68.49, 71.13)	63.26 (60.76, 65.76)	6.55* (3.77, 9.33)	71.29 (69.59, 72.98)	62.52 (59.20, 65.85)	8.76* (5.10, 12.42)	68.26 (66.32, 70.21)	64.11 (60.45, 67.76)	4.16 (−0.03, 8.34)
Prince Edward Island	73.73 (69.87, 77.60)	72.08 (68.36, 75.80)	1.65 (−3.65, 6.96)	72.09 (67.01, 77.17)	68.61 (63.96, 73.25)	3.49 (−3.61, 10.58)	75.88 (69.98, 81.77)	75.80 (70.06, 81.55)	0.07 (−8.04, 8.18)
Quebec	61.44 (60.15, 62.74)	64.96 (62.34, 67.57)	−3.51* (−6.37, −0.65)	62.45 (60.60, 64.30)	65.65 (62.26, 69.03)	−3.20 (−7.12, 0.72)	60.41 (58.50, 62.33)	64.37 (60.27, 68.47)	−3.95 (−8.42, 0.51)
Saskatchewan	74.67 (71.82, 77.52)	70.93 (67.33, 74.53)	3.74 (−0.93, 8.40)	74.26 (70.39, 78.13)	68.51 (64.12, 72.89)	5.75 (−0.15, 11.66)	75.07 (70.79, 79.34)	73.53 (67.96, 79.10)	1.54 (−5.55, 8.63)
Yukon (Whitehorse)	—	72.37 (67.55, 77.19)	—	—	69.05 (62.27, 75.84)	—	—	75.63 (68.71, 82.55)	—
Northwest Territories (Yellowknife)	—	74.78 (69.32, 80.23)	—	—	77.67 (70.62, 84.72)	—	—	71.89 (63.58, 80.21)	—
Nunavut (Iqaluit)	—	76.48 (68.84, 84.12)	—	—	74.81 (62.35, 87.27)	—	—	78.43 (69.57, 87.29)	—

Abbreviations: CCHS, Canadian Community Health Survey; CI, confidence interval; Q, quintile; SCMH, Survey on COVID-19 and Mental Health.

Notes: Data from the territorial capitals (N = 1020) are excluded from the 2020 SCMH estimates in this table (except the last three rows) so that comparisons between 2019 and 2020 are based on data from the same geographical locations. Positive values in the difference columns mean that the percentage of high community belonging was higher in 2019 than 2020; negative values in the difference columns mean that the percentage was lower in 2019 than 2020.

* $p < 0.05$.

is significantly lower than the average of 8.08 in 2019. Average life satisfaction was significantly lower for both females and males during the pandemic, although the difference from 2019 to 2020 was larger for females (8.10 to 7.12) than males (8.05 to 7.28). For both males and females, average life satisfaction was significantly lower in 2020 than in 2019 across all age groups, but the difference among those aged 65 and older was smaller than the difference among those under 65.

Significantly lower average life satisfaction in 2020 versus 2019 was observed among White and racialized males and females, and immigrant and Canadian-born males and females.

Average life satisfaction was significantly lower in 2020 than in 2019 among females with and without children at home. For males, average life satisfaction was also significantly lower in 2020 than in 2019 for those with and without children at home, although the difference was larger for the former group of males.

Average life satisfaction was significantly lower in 2020 than in 2019 across all income quintiles for both males and females. Furthermore, for both males and females, significantly lower average life satisfaction in 2020 than in 2019 was observed among those with a post-secondary education and those with a high school education or lower.

Significantly lower average life satisfaction in 2020 than in 2019 was observed for males and females living in both population centres and rural areas, but the magnitude of the difference was larger for those living in population centres. In the combined analysis, average life satisfaction was significantly lower in 2020 than in 2019 in all provinces, but the difference in Quebec and Prince Edward Island tended to be smaller than many of the other provinces.

Perceived change in mental health

Perceived change in mental health results are reported in Table 5. Overall, 66.51% of adults in Canada reported that their mental health is stable/improved compared to before the pandemic. Females were significantly less likely than males (62.29% vs. 70.96%) to indicate their mental health was stable/improved, even after adjustment. In unadjusted and adjusted analyses, reporting stable/improved mental health was less likely for males under 65 (vs. older males) and for females under 65 (vs. older females).

The likelihood of reporting stable/improved mental health did not significantly differ for males or females by racialized group membership or for males by immigrant status. Immigrant females were significantly more likely to report stable/improved mental health than Canadian-born females before and after adjustment.

Males in the highest and third-highest income quintiles were significantly less likely to report stable/improved mental health compared to males in the lowest income quintile, as were females in the highest (vs. lowest) income quintile, but these significant differences were absent after adjustment.

Across unadjusted and adjusted analyses, the likelihood of indicating stable/improved mental health was significantly lower among females and males living in population centres versus rural areas.

Although not significant after adjustment, in the unadjusted analyses females and males with a high school education or lower were significantly more likely to report stable/improved mental health than females and males with a post-secondary education. Similarly, in the unadjusted but not the adjusted analyses, males and females with children at home were significantly less likely to report stable/improved mental health than males and females without children at home.

Lastly, in the unadjusted analysis that was not gender stratified, the likelihood of reporting stable/improved mental health was significantly lower among frontline workers and those who were not working due to COVID-19. When controlling for covariates, frontline workers were not significantly less likely to report stable/improved mental health, but the likelihood remained significantly lower for those not working due to COVID-19 and became significantly higher for essential non-frontline workers.

Discussion

This study increases our understanding of the status of mental health in Canada during the second wave of the COVID-19 pandemic. Overall, fewer adults in Canada reported high SRMH and high community belonging in Fall 2020 than in 2019. The 6.76% overall difference in high SRMH corresponds to more than 2 072 000 adults no longer reporting high SRMH in Fall 2020; the 4.78% overall difference in high community belonging corresponds to more than 1 465 000 adults no longer reporting high community belonging in Fall 2020.[31] These individuals may be at a greater risk of experiencing depression,[32] and be less likely to engage in civic and political activities in their community.[33] Moreover, adults in Canada reported being less satisfied with their life on average in Fall 2020 than in 2019. The difference in average life satisfaction between 2019 and Fall 2020 among adults in Canada was around a third of the size of the difference between OECD countries with the highest versus lowest average life satisfaction.[34]

Although we found that the prevalence of PMH outcomes was lower in Fall 2020, the majority of individuals during Fall 2020 still reported high SRMH, high community belonging and that their mental health is about the same/better compared to before the pandemic. These results showcase the overall hardiness of the Canadian population in the midst of a global pandemic, while also indicating that more Canadians are not experiencing optimal mental health. A recent literature review also found some signs of resilience during the pandemic for some mental health outcomes internationally.[35]

This study's findings reinforce that the pandemic has had a disproportionate impact on some sociodemographic groups. For instance, while older adults have been the most likely to be hospitalized or die due to COVID-19,[36] we found lower prevalence of PMH in 2020 versus 2019 more consistently among those under 65. Age differences in mental health during the pandemic have been observed in other countries, with adults under 60 more likely to report loneliness than adults 60 and older in a spring 2020 longitudinal study from the United Kingdom,[37] and adults under 65 more likely to report symptoms of anxiety and depression and suicide ideation than adults 65 and older in a summer 2020 cross-sectional study from the United States.[38] We also observed lower prevalence of PMH in 2020 versus 2019 more consistently among individuals living in population centres than rural

TABLE 4
Life satisfaction in 2019 versus 2020, overall and stratified by gender

Variable	Combined			Female			Male		
	2019 CCHS	2020 SCMH	Difference 2019–2020 (95% CI)	2019 CCHS	2020 SCMH	Difference 2019–2020 (95% CI)	2019 CCHS	2020 SCMH	Difference 2019–2020 (95% CI)
	Mean (95% CI)	Mean (95% CI)		Mean (95% CI)	Mean (95% CI)		Mean (95% CI)	Mean (95% CI)	
Overall	8.08 (8.05, 8.10)	7.19 (7.14, 7.25)	0.88* (0.82, 0.94)	8.10 (8.07, 8.14)	7.12 (7.04, 7.19)	0.98* (0.90, 1.07)	8.05 (8.02, 8.08)	7.28 (7.20, 7.37)	0.77* (0.68, 0.86)
Age (years)									
18–34	8.07 (8.02, 8.11)	6.76 (6.63, 6.89)	1.30* (1.17, 1.44)	8.09 (8.03, 8.15)	6.63 (6.45, 6.80)	1.47* (1.28, 1.65)	8.05 (7.99, 8.11)	6.91 (6.72, 7.10)	1.13* (0.94, 1.33)
35–49	8.06 (8.02, 8.11)	7.14 (7.04, 7.24)	0.92* (0.81, 1.03)	8.04 (7.98, 8.10)	7.06 (6.92, 7.20)	0.98* (0.82, 1.14)	8.08 (8.02, 8.15)	7.23 (7.08, 7.37)	0.86* (0.70, 1.01)
50–64	8.04 (7.99, 8.09)	7.21 (7.10, 7.31)	0.83* (0.71, 0.95)	8.12 (8.06, 8.19)	7.17 (7.03, 7.31)	0.95* (0.80, 1.11)	7.95 (7.88, 8.03)	7.24 (7.08, 7.41)	0.71* (0.52, 0.89)
65+	8.15 (8.11, 8.19)	7.79 (7.70, 7.88)	0.36* (0.27, 0.46)	8.16 (8.10, 8.21)	7.69 (7.57, 7.82)	0.46* (0.33, 0.60)	8.15 (8.10, 8.20)	7.90 (7.77, 8.03)	0.25* (0.11, 0.39)
Racialized group member									
Yes	7.97 (7.91, 8.02)	6.92 (6.79, 7.06)	1.04* (0.90, 1.19)	7.95 (7.87, 8.03)	6.80 (6.61, 7.00)	1.14* (0.93, 1.36)	8.00 (7.92, 8.07)	7.04 (6.85, 7.23)	0.96* (0.75, 1.16)
No	8.12 (8.09, 8.14)	7.29 (7.23, 7.35)	0.83* (0.76, 0.89)	8.15 (8.12, 8.19)	7.22 (7.14, 7.30)	0.93* (0.84, 1.02)	8.08 (8.05, 8.12)	7.38 (7.29, 7.47)	0.71* (0.61, 0.80)
Immigrant status									
Yes	8.06 (8.01, 8.11)	7.11 (6.98, 7.24)	0.95* (0.81, 1.09)	8.08 (8.01, 8.16)	7.01 (6.82, 7.21)	1.07* (0.85, 1.28)	8.04 (7.97, 8.11)	7.19 (7.01, 7.37)	0.85* (0.66, 1.04)
No	8.08 (8.06, 8.11)	7.23 (7.17, 7.29)	0.86* (0.79, 0.92)	8.11 (8.07, 8.14)	7.15 (7.07, 7.23)	0.96* (0.87, 1.04)	8.06 (8.03, 8.10)	7.32 (7.23, 7.41)	0.74* (0.64, 0.84)
Household income									
Q1 (lowest)	7.65 (7.59, 7.71)	7.10 (6.98, 7.23)	0.54* (0.40, 0.68)	7.72 (7.64, 7.79)	7.12 (6.97, 7.26)	0.60* (0.43, 0.76)	7.56 (7.47, 7.65)	7.11 (6.89, 7.32)	0.45* (0.23, 0.68)
Q2	8.00 (7.95, 8.05)	7.10 (6.97, 7.24)	0.90* (0.75, 1.04)	8.04 (7.97, 8.10)	6.94 (6.76, 7.11)	1.10* (0.91, 1.29)	7.97 (7.89, 8.04)	7.28 (7.09, 7.48)	0.69* (0.48, 0.90)
Q3	8.18 (8.13, 8.23)	7.11 (6.98, 7.25)	1.06* (0.92, 1.20)	8.19 (8.12, 8.26)	7.13 (6.95, 7.31)	1.06* (0.87, 1.25)	8.16 (8.10, 8.23)	7.11 (6.92, 7.30)	1.05* (0.85, 1.25)
Q4	8.20 (8.15, 8.24)	7.28 (7.14, 7.42)	0.92* (0.77, 1.06)	8.24 (8.17, 8.30)	7.09 (6.88, 7.29)	1.15* (0.93, 1.37)	8.17 (8.10, 8.23)	7.46 (7.27, 7.65)	0.71* (0.51, 0.90)
Q5 (highest)	8.36 (8.31, 8.41)	7.33 (7.20, 7.46)	1.03* (0.89, 1.17)	8.41 (8.35, 8.47)	7.21 (7.02, 7.41)	1.20* (1.00, 1.40)	8.31 (8.24, 8.38)	7.43 (7.24, 7.63)	0.87* (0.67, 1.08)

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TABLE 4 (continued)
Life satisfaction in 2019 versus 2020, overall and stratified by gender

Variable	Combined			Female			Male		
	2019 CCHS	2020 SCMH	Difference 2019–2020 (95% CI)	2019 CCHS	2020 SCMH	Difference 2019–2020 (95% CI)	2019 CCHS	2020 SCMH	Difference 2019–2020 (95% CI)
	Mean (95% CI)	Mean (95% CI)		Mean (95% CI)	Mean (95% CI)		Mean (95% CI)	Mean (95% CI)	
Place of residence									
Population centre	8.04 (8.01, 8.07)	7.11 (7.04, 7.17)	0.93* (0.86, 1.01)	8.07 (8.03, 8.10)	7.03 (6.94, 7.12)	1.04* (0.94, 1.13)	8.02 (7.98, 8.05)	7.19 (7.10, 7.29)	0.82* (0.72, 0.93)
Rural area	8.25 (8.21, 8.29)	7.59 (7.48, 7.70)	0.66* (0.55, 0.78)	8.29 (8.23, 8.34)	7.50 (7.36, 7.63)	0.79* (0.64, 0.93)	8.22 (8.17, 8.27)	7.69 (7.51, 7.86)	0.53* (0.35, 0.71)
Educational attainment									
High school or lower	7.93 (7.89, 7.97)	7.17 (7.06, 7.29)	0.76* (0.64, 0.89)	7.96 (7.90, 8.03)	7.13 (6.98, 7.29)	0.83* (0.66, 1.01)	7.90 (7.85, 7.96)	7.23 (7.05, 7.40)	0.68* (0.49, 0.86)
Post-secondary	8.15 (8.13, 8.18)	7.20 (7.14, 7.26)	0.95* (0.88, 1.02)	8.17 (8.13, 8.20)	7.10 (7.02, 7.19)	1.06* (0.97, 1.16)	8.14 (8.10, 8.18)	7.31 (7.22, 7.40)	0.83* (0.73, 0.93)
Children < 18 years at home									
Yes	8.26 (8.22, 8.30)	7.18 (7.08, 7.28)	1.08* (0.97, 1.19)	8.23 (8.18, 8.29)	7.10 (6.95, 7.24)	1.14* (0.98, 1.29)	8.29 (8.23, 8.35)	7.27 (7.13, 7.42)	1.02* (0.86, 1.17)
No	8.02 (7.99, 8.05)	7.20 (7.13, 7.27)	0.82* (0.75, 0.89)	8.06 (8.02, 8.10)	7.13 (7.04, 7.22)	0.93* (0.83, 1.03)	7.98 (7.94, 8.02)	7.29 (7.18, 7.39)	0.70* (0.59, 0.81)
Province/territory									
Alberta	8.04 (7.98, 8.10)	6.86 (6.71, 7.01)	1.18* (1.02, 1.34)	8.12 (8.03, 8.21)	6.79 (6.59, 6.98)	1.33* (1.12, 1.55)	7.96 (7.87, 8.04)	6.95 (6.73, 7.17)	1.01* (0.77, 1.25)
British Columbia	8.01 (7.95, 8.07)	6.94 (6.79, 7.09)	1.07* (0.91, 1.23)	8.05 (7.97, 8.13)	6.95 (6.78, 7.12)	1.10* (0.91, 1.29)	7.98 (7.90, 8.07)	6.94 (6.71, 7.18)	1.04* (0.78, 1.29)
Manitoba	8.04 (7.94, 8.13)	6.91 (6.76, 7.07)	1.12* (0.94, 1.30)	8.01 (7.88, 8.15)	6.89 (6.69, 7.10)	1.12* (0.88, 1.36)	8.06 (7.92, 8.20)	7.01 (6.76, 7.25)	1.06* (0.78, 1.34)
New Brunswick	8.13 (8.00, 8.25)	7.34 (7.17, 7.51)	0.79* (0.58, 1.00)	8.17 (8.02, 8.32)	7.24 (7.03, 7.46)	0.93* (0.66, 1.20)	8.09 (7.91, 8.28)	7.44 (7.17, 7.71)	0.65* (0.32, 0.98)
Newfoundland and Labrador	8.23 (8.11, 8.36)	7.53 (7.37, 7.69)	0.71* (0.50, 0.91)	8.26 (8.10, 8.42)	7.41 (7.19, 7.64)	0.85* (0.56, 1.13)	8.20 (8.02, 8.39)	7.66 (7.43, 7.88)	0.55* (0.26, 0.84)
Nova Scotia	8.09 (7.98, 8.19)	7.21 (7.03, 7.40)	0.87* (0.66, 1.08)	8.03 (7.90, 8.15)	7.11 (6.93, 7.29)	0.92* (0.70, 1.14)	8.15 (8.00, 8.31)	7.32 (6.99, 7.65)	0.83* (0.48, 1.18)
Ontario	8.02 (7.97, 8.07)	7.05 (6.95, 7.16)	0.97* (0.85, 1.08)	8.05 (7.99, 8.11)	6.92 (6.77, 7.08)	1.12* (0.96, 1.29)	7.99 (7.93, 8.05)	7.19 (7.04, 7.35)	0.80* (0.63, 0.97)
Prince Edward Island	8.06 (7.93, 8.19)	7.63 (7.46, 7.80)	0.43* (0.22, 0.64)	8.15 (8.00, 8.30)	7.59 (7.41, 7.77)	0.56* (0.33, 0.80)	7.97 (7.74, 8.19)	7.67 (7.40, 7.94)	0.29 (−0.06, 0.65)

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TABLE 4 (continued)
Life satisfaction in 2019 versus 2020, overall and stratified by gender

Variable	Combined			Female			Male		
	2019 CCHS	2020 SCMH	Difference 2019–2020 (95% CI)	2019 CCHS	2020 SCMH	Difference 2019–2020 (95% CI)	2019 CCHS	2020 SCMH	Difference 2019–2020 (95% CI)
	Mean (95% CI)	Mean (95% CI)		Mean (95% CI)	Mean (95% CI)		Mean (95% CI)	Mean (95% CI)	
Quebec	8.21 (8.17, 8.25)	7.75 (7.65, 7.85)	0.46* (0.35, 0.57)	8.20 (8.15, 8.26)	7.71 (7.58, 7.84)	0.49* (0.35, 0.63)	8.22 (8.16, 8.27)	7.80 (7.64, 7.95)	0.42* (0.26, 0.59)
Saskatchewan	8.11 (8.02, 8.20)	7.19 (7.06, 7.32)	0.92* (0.77, 1.08)	8.23 (8.10, 8.35)	7.13 (6.95, 7.31)	1.10* (0.88, 1.32)	8.00 (7.87, 8.13)	7.27 (7.07, 7.46)	0.73* (0.50, 0.96)
Yukon (Whitehorse)	—	7.13 (6.90, 7.35)	—	—	6.89 (6.60, 7.19)	—	—	7.37 (7.04, 7.70)	—
Northwest Territories (Yellowknife)	—	7.25 (7.03, 7.46)	—	—	7.12 (6.82, 7.42)	—	—	7.37 (7.08, 7.67)	—
Nunavut (Iqaluit)	—	7.26 (6.92, 7.60)	—	—	6.91 (6.41, 7.41)	—	—	7.65 (7.29, 8.02)	—

Abbreviations: CCHS, Canadian Community Health Survey; CI, confidence interval; Q, quintile; SCMH, Survey on COVID-19 and Mental Health.

Notes: Life satisfaction was rated on a scale from 0 (very dissatisfied) to 10 (very satisfied). Data from the territorial capitals (N = 1020) are excluded from the 2020 SCMH estimates in this table (except the last three rows) so that comparisons between 2019 and 2020 are based on data from the same geographical locations. Positive values in the difference columns mean that average life satisfaction was higher in 2019 than 2020; negative values in the difference columns mean that average life satisfaction was lower in 2019 than 2020.

* $p < 0.05$.

TABLE 5
Frequency estimates and logistic regression analyses with perceptions of stable/improved mental health as the criterion variable and sociodemographic characteristics as the explanatory variables, overall and stratified by gender, 2020 SCMH

Variable	Combined			Female			Male		
	% (95% CI)	OR (95% CI)	aOR (95% CI)	% (95% CI)	OR (95% CI)	aOR (95% CI)	% (95% CI)	OR (95% CI)	aOR (95% CI)
Overall	66.51 (65.18, 67.84)	—	—	—	—	—	—	—	—
Gender									
Female	62.29 (60.55, 64.04)	**0.68 (0.60, 0.76)**	**0.66 (0.58, 0.75)**	—	—	—	—	—	—
Male	70.96 (68.98, 72.93)	(Ref.)	(Ref.)	—	—	—	—	—	—
Age (years)									
18–34	58.65 (55.54, 61.76)	**0.36 (0.31, 0.43)**	**0.33 (0.27, 0.41)**	52.27 (48.00, 56.55)	**0.38 (0.31, 0.48)**	**0.36 (0.27, 0.47)**	65.03 (60.33, 69.73)	**0.31 (0.23, 0.41)**	**0.29 (0.21, 0.40)**
35–49	62.39 (59.81, 64.97)	**0.43 (0.36, 0.50)**	**0.41 (0.33, 0.51)**	59.74 (56.22, 63.26)	**0.52 (0.42, 0.63)**	**0.53 (0.39, 0.71)**	65.11 (61.44, 68.78)	**0.31 (0.24, 0.40)**	**0.29 (0.21, 0.40)**

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TABLE 5 (continued)
Frequency estimates and logistic regression analyses with perceptions of stable/improved mental health as the criterion variable and sociodemographic characteristics as the explanatory variables, overall and stratified by gender, 2020 SCMH

Variable	Combined			Female			Male		
	% (95% CI)	OR (95% CI)	aOR (95% CI)	% (95% CI)	OR (95% CI)	aOR (95% CI)	% (95% CI)	OR (95% CI)	aOR (95% CI)
50–64	67.82 (65.59, 70.05)	**0.54 (0.46, 0.63)**	**0.53 (0.45, 0.64)**	64.57 (61.39, 67.76)	**0.64 (0.52, 0.78)**	**0.66 (0.52, 0.83)**	71.12 (67.75, 74.48)	**0.41 (0.31, 0.53)**	**0.40 (0.30, 0.54)**
65+	79.56 (77.67, 81.45)	(Ref.)	(Ref.)	74.16 (71.49, 76.83)	(Ref.)	(Ref.)	85.82 (83.30, 88.34)	(Ref.)	(Ref.)
Racialized group member									
Yes	68.15 (65.09, 71.20)	1.11 (0.95, 1.30)	**1.25 (1.01, 1.56)**	64.66 (60.37, 68.96)	1.15 (0.94, 1.42)	1.15 (0.87, 1.53)	71.57 (67.44, 75.71)	1.05 (0.83, 1.31)	1.37 (0.998, 1.89)
No	65.82 (64.33, 67.30)	(Ref.)	(Ref.)	61.37 (59.46, 63.28)	(Ref.)	(Ref.)	70.64 (68.46, 72.82)	(Ref.)	(Ref.)
Immigrant status									
Yes	71.03 (68.34, 73.72)	**1.34 (1.16, 1.54)**	**1.31 (1.07, 1.61)**	69.62 (65.81, 73.43)	**1.54 (1.27, 1.88)**	**1.61 (1.24, 2.10)**	72.38 (68.51, 76.26)	1.11 (0.89, 1.39)	1.06 (0.78, 1.42)
No	64.71 (63.21, 66.20)	(Ref.)	(Ref.)	59.78 (57.86, 61.69)	(Ref.)	(Ref.)	70.23 (67.96, 72.50)	(Ref.)	(Ref.)
Household income									
Q1 (lowest)	69.67 (66.89, 72.45)	(Ref.)	(Ref.)	64.96 (61.36, 68.55)	(Ref.)	(Ref.)	74.70 (70.63, 78.77)	(Ref.)	(Ref.)
Q2	68.56 (65.77, 71.35)	0.95 (0.79, 1.14)	1.05 (0.86, 1.28)	63.25 (59.59, 66.91)	0.93 (0.74, 1.17)	1.08 (0.85, 1.37)	74.30 (70.37, 78.23)	0.98 (0.73, 1.31)	0.99 (0.72, 1.35)
Q3	63.00 (60.05, 65.95)	**0.74 (0.62, 0.89)**	0.92 (0.76, 1.12)	59.73 (55.58, 63.88)	0.80 (0.63, 1.01)	1.04 (0.80, 1.35)	66.53 (62.40, 70.65)	**0.67 (0.51, 0.89)**	0.77 (0.57, 1.04)
Q4	65.79 (62.31, 69.27)	0.84 (0.68, 1.03)	1.11 (0.89, 1.40)	61.09 (56.36, 65.82)	0.85 (0.66, 1.09)	1.23 (0.92, 1.64)	70.05 (65.18, 74.91)	0.79 (0.58, 1.08)	0.96 (0.68, 1.36)
Q5 (highest)	61.53 (58.05, 65.02)	**0.70 (0.57, 0.85)**	0.93 (0.73, 1.17)	55.96 (50.97, 60.96)	**0.69 (0.53, 0.89)**	0.96 (0.71, 1.31)	66.63 (61.59, 71.67)	**0.68 (0.49, 0.93)**	0.85 (0.59, 1.21)
Place of residence									
Population centre	65.35 (63.83, 66.88)	**0.74 (0.64, 0.85)**	**0.74 (0.64, 0.87)**	61.35 (59.38, 63.32)	**0.80 (0.68, 0.95)**	**0.81 (0.68, 0.98)**	69.52 (67.24, 71.80)	**0.65 (0.51, 0.82)**	**0.66 (0.51, 0.85)**
Rural area	71.88 (69.38, 74.38)	(Ref.)	(Ref.)	66.45 (63.10, 69.79)	(Ref.)	(Ref.)	77.95 (74.30, 81.60)	(Ref.)	(Ref.)

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TABLE 5 (continued)
Frequency estimates and logistic regression analyses with perceptions of stable/improved mental health as the criterion variable and sociodemographic characteristics as the explanatory variables, overall and stratified by gender, 2020 SCMH

Variable	Combined			Female			Male		
	% (95% CI)	OR (95% CI)	aOR (95% CI)	% (95% CI)	OR (95% CI)	aOR (95% CI)	% (95% CI)	OR (95% CI)	aOR (95% CI)
Educational attainment									
High school or lower	71.08 (68.60, 73.57)	**1.36 (1.19, 1.56)**	1.18 (0.999, 1.38)	66.99 (63.76, 70.21)	**1.35 (1.14, 1.60)**	1.22 (0.995, 1.50)	75.43 (71.77, 79.09)	**1.39 (1.11, 1.73)**	1.13 (0.88, 1.45)
Post-secondary	64.34 (62.80, 65.88)	(Ref.)	(Ref.)	60.07 (58.00, 62.13)	(Ref.)	(Ref.)	68.83 (66.56, 71.10)	(Ref.)	(Ref.)
Work status									
Frontline worker	61.88 (57.04, 66.73)	**0.78 (0.63, 0.98)**	1.09 (0.85, 1.38)	58.92 (52.77, 65.07)	0.82 (0.63, 1.07)	1.10 (0.81, 1.48)	66.35 (58.55, 74.14)	0.79 (0.54, 1.13)	1.03 (0.70, 1.50)
Essential non-frontline worker	66.08 (63.04, 69.13)	0.94 (0.81, 1.10)	**1.18 (1.001, 1.40)**	60.06 (55.83, 64.29)	0.86 (0.71, 1.04)	1.08 (0.87, 1.34)	71.07 (66.77, 75.37)	0.98 (0.77, 1.24)	1.28 (0.99, 1.64)
Not working due to COVID-19	49.77 (38.14, 61.40)	**0.48 (0.30, 0.77)**	**0.51 (0.30, 0.88)**	42.32[E] (26.61, 58.03)	**0.42[E] (0.21, 0.82)**	0.49[E] (0.23, 1.05)	—[F]	—[F]	—[F]
Other	67.42 (65.85, 68.98)	(Ref.)	(Ref.)	63.67 (61.66, 65.67)	(Ref.)	(Ref.)	71.50 (69.19, 73.81)	(Ref.)	(Ref.)
Children < 18 years at home									
Yes	62.36 (59.93, 64.80)	**0.78 (0.69, 0.88)**	0.98 (0.83, 1.16)	58.37 (54.98, 61.77)	**0.80 (0.68, 0.94)**	0.98 (0.78, 1.23)	66.72 (63.21, 70.22)	**0.76 (0.63, 0.92)**	1.00 (0.79, 1.27)
No	68.04 (66.47, 69.62)	(Ref.)	(Ref.)	63.80 (61.77, 65.83)	(Ref.)	(Ref.)	72.48 (70.15, 74.81)	(Ref.)	(Ref.)

Abbreviations: SCMH, Survey on COVID-19 and Mental Health; OR, odds ratio; aOR, adjusted odds ratio; Ref., reference group.

Notes: Dummy coding was used to create the reference groups. Estimates are based on data from 2020 SCMH respondents living in the provinces and territorial capitals. Statistically significant odds ratios are bolded.

[E] Interpret estimate with caution because the data are deemed of marginal quality.

[F] Estimate could not be reported because the data do not meet Statistics Canada's quality standards.

areas. Interventions to limit the spread of COVID-19 may have been more disruptive to the lives of younger adults and those living in population centres. Links between place of residence and age with other sociodemographic characteristics might explain why some explanatory variables did not remain significant in the multivariate analysis (e.g. income, education).[39]

In line with some earlier surveys,[5,9,10] we found some evidence that the mental health of females has been more negatively impacted by the pandemic, including larger differences in life satisfaction from 2019 to 2020 and lower likelihoods of reporting stable/improved mental health. The gender difference in reporting stable/improved mental health remained after controlling for the presence of children at home, work status and other sociodemographic factors. It is still possible that gender differences in time use, which have been observed in multiple countries during the pandemic, might explain these mental health differences.[40]

Being absent from work due to COVID-19 was negatively associated with stable/improved mental health, which echoes previous analyses of the 2020 SCMH that found that the likelihood of screening positive for a mental disorder was higher among individuals who reported income or job loss due to the pandemic.[41] Economic hardship has also been linked with feelings of depression in spring 2020 labour force survey data from numerous European countries.[42]

These results could inform public health policy by identifying sociodemographic groups and individuals with specific experiences who may benefit the most from targeted interventions aimed at promoting mental health directly or indirectly by increasing protective factors or reducing risk factors. This is one way in which an equitable recovery from the pandemic could be encouraged.

The importance of taking into account different PMH outcomes to obtain a complete understanding of people's experiences is also highlighted by this study. For instance, immigrant and racialized males did not have a significantly lower prevalence of high SRMH in 2020 than in 2019, but evidence for lower community belonging for these sociodemographic groups was found. As well, while males above age 64 had a significantly higher prevalence of high SRMH and high community belonging in Fall 2020 than in 2019 and although females above age 64 did not show a significant difference, both reported lower life satisfaction on average during the second wave (albeit to a lesser degree than those who were younger). Similarly, while all provinces had significantly lower life satisfaction on average in Fall 2020, the difference tended to be smaller in Quebec and Prince Edward Island, where the prevalence of high SRMH and community belonging either showed no difference or was even higher in 2020 than in 2019. Based on these results, it is recommended that future surveys examining the impact of the pandemic on mental health measure multiple aspects of PMH.

While some of our results support the idea of the pandemic exacerbating pre-existing health inequalities (e.g. young vs. older adults),[3] other findings suggest a levelling of PMH across some sociodemographic characteristics. For instance, in 2019, individuals with a post-secondary education reported higher life satisfaction and more frequently reported high SRMH than those with a high school education or less, but these PMH outcomes were more similar across educational attainment in Fall 2020. Smaller differences in life satisfaction across household income levels and among individuals with versus without children in Fall 2020 compared to 2019 were also observed. These examples suggest that the effect of the pandemic on health inequality is nuanced.

Strengths and limitations

This study's strengths include the representative and large samples in both the 2019 CCHS and the 2020 SCMH, which allowed us to conduct comprehensive gender-stratified analyses. Additionally, we used the most recent pre-pandemic data from 2019 and examined multiple indicators of PMH, including a measure of social well-being.

In terms of limitations, methodological differences between the two data sources could have impacted the results. For instance, the CCHS data was collected across the whole year, while the 2020 SCMH data was only collected during the fall. However, when we compared 2020 SCMH data to 2019 CCHS data collected in the fall, we still observed significantly lower overall prevalence of high SRMH (difference = 5.67, 95% CI: 3.79, 7.55) and high community belonging (difference = 4.18, 95% CI: 2.30, 6.06) and lower average life satisfaction (difference = 0.85, 95% CI: 0.78, 0.92) in Fall 2020.

The methods of completing the surveys differed between the two data sources, as did the distribution of some sociodemographic characteristics. Furthermore, although the vast majority of dwellings are included in both sampling frames, they are not identical and the sampling strategy for the 2019 CCHS is more complex. Respondents were less likely to share their data with PHAC if they completed the 2020 SCMH online (vs. by telephone interview). PMH estimates in the territorial capitals in 2019 could not be calculated, so estimated differences from 2019 to 2020 only include provincial data. Moreover, this study can only speak to PMH and perceived change in mental health among adults, as the 2020 SCMH excluded those under 18. Exclusion of some subpopulations from the surveys (e.g. individuals living on reserves or in institutions) also limits generalizability. We had to rely on self-reported household income for the 2020 SCMH; data linkages and imputation done for the majority of 2019 CCHS respondents were not done in the 2020 SCMH. The variables used to code the presence of children at home were also not identical. The coding of some sociodemographic characteristics was admittedly broad to keep the reporting and interpretation of results manageable. The response rates of the two surveys were relatively low and, although sampling weights were used for all estimates, nonresponse bias cannot be completely ruled out.[43]

Our analyses do not explain why differences in PMH from 2019 to 2020 were absent or larger among some groups, and our conservative approach to comparing differences in the magnitude of change between groups could have overlooked some meaningful differences.[44,45] Caution is especially warranted when interpreting results involving perceived change in mental health, given that we do not know respondents' level of mental health before the pandemic and responses could be subject to recall bias. Future research involving perceived change in mental health could also distinguish between those who reported "about the same" versus "better" mental health. Finally, although declines

in PMH outcomes were observed, we did not examine the consequences of lower PMH at the individual level in the current study.

Conclusion

In general, the COVID-19 pandemic appears to have negatively impacted PMH in Canada. Given subsequent waves and that the effect of stressful events on mental health can be delayed or persist for some individuals,[19-21] ongoing surveillance of PMH and other mental health outcomes is needed in 2021 and beyond. For example, data from the second SCMH that was collected from February to May 2021 could be analyzed to examine the mental health of adults in Canada during the pandemic's third wave.[36,46]

In addition, PMH during and after the pandemic could be placed in the context of long-term changes in mental health in Canada (e.g. the lowered prevalence of high SRMH observed before the pandemic from 2015 to 2019; lower average life evaluations in 2017–2019 compared to 2008–2012).[47,48] Longitudinal research would also be ideal to examine within-person changes in mental health over time.

Furthermore, as some sociodemographic groups showed larger differences in PMH from 2019 to 2020 and were less likely to report stable/improved mental health than others, continued monitoring of mental health across a variety of sociodemographic characteristics is necessary to ensuring mental health builds back better and stronger in Canada post-pandemic.

Conflicts of interest

The authors have no conflicts of interest.

Authors' contributions and statement

CC conceived the project. CC, LL and RD decided on the analytic approach. LL conducted the statistical analyses. CC, LL and RD interpreted the results. CC drafted and revised the manuscript in response to feedback provided from LL and RD.

The content and views expressed in this article are those of the authors and do not necessarily reflect those of the Government of Canada.

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Original quantitative research

Suicide ideation in Canada during the COVID-19 pandemic

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Abstract

Introduction: Many Canadians report decreased mental health during the COVID-19 pandemic, and concerns have been raised about possible increases in suicide. This study investigates the pandemic's potential impact on adults' suicide ideation.

Methods: We compared self-reported suicide ideation in 2020 versus 2019 by analyzing data from the Survey on COVID-19 and Mental Health (11 September to 4 December 2020) and the 2019 Canadian Community Health Survey. Logistic regression was conducted to determine which populations were at higher risk of suicide ideation during the pandemic.

Results: The percentage of adults reporting suicide ideation since the pandemic began (2.44%) was not significantly different from the percentage reporting suicide ideation in the past 12 months in 2019 (2.73%). Significant differences in the prevalence of recent suicide ideation in 2020 versus 2019 also tended to be absent in the numerous sociodemographic groups we examined. Risk factors of reporting suicide ideation during the pandemic included being under 65 years, Canadian-born or a frontline worker; reporting pandemic-related income/job loss or loneliness/isolation; experiencing a lifetime highly stressful/traumatic event; and having lower household income and educational attainment.

Conclusion: Evidence of changes in suicide ideation due to the pandemic were generally not observed in this research. Continued surveillance of suicide and risk/protective factors is needed to inform suicide prevention efforts.

Keywords: *COVID-19 pandemic, coronavirus, suicide ideation, Canadian adults, public health*

Highlights

- Recent suicide ideation was not significantly different in 2020 versus 2019 in the overall population, nor in almost every sociodemographic group examined.
- Some individuals were more likely than others to report contemplating suicide since the pandemic began: adults under 65 years old; Canadian-born people; frontline workers; those with a high school or lower education level and lower household income; individuals who had experienced a highly stressful/traumatic event in their lifetime; and people who lost their job/income or experienced loneliness/isolation due to the pandemic.

Introduction

Since early in the COVID-19 pandemic, concerns have been raised about the potential impacts of the pandemic and the unintended consequences of public health interventions on the mental health of individuals and, in particular, on suicide-related outcomes.[1-3] Indeed, mental health helplines in Canada have had a substantial increase in demand during the pandemic compared to previous years.[4-6] Available data from 19 Canadian police services reveal more mental health–related calls for service in the first eight months of the pandemic compared to the same months in 2019.[7] Surveys have found that as many as half of Canadians report that their mental health had worsened since the pandemic began,[8-14] and around one-fifth of Canadians screened positive for anxiety, depression or post-traumatic stress disorder during Fall 2020.[15]

Other risk factors of suicide have also increased. For instance, the higher unemployment rate due to the pandemic[16] was projected to lead to more suicide deaths in Canada and globally.[17,18] Alcohol consumption has also been implicated in suicide,[19-21] and while the majority of Canadians surveyed report no changes in their alcohol use during the pandemic, a portion report increasing their consumption.[11,22-28]

With physical distancing guidelines limiting in-person social interactions to reduce the spread of COVID-19, loneliness has become relatively common, with 4 in 10 adults in Canada reporting feelings of loneliness or isolation due to the pandemic in Fall 2020.[15] This is a concern because a sense of belonging and connectedness with others is considered to be a basic psychological need and an important aspect of positive mental health.[29,30] Furthermore, loneliness has been associated with subsequent suicide ideation and suicide-related behaviour.[31] More generally, evidence of higher suicide mortality

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(at least in some subpopulations) has been found in studies investigating the impact of previous infectious disease–related public health emergencies.[32]

Thus far, there have been no signs of higher numbers of suicide deaths or self-harm hospitalizations/emergency department visits in Canada during the pandemic.[33,34] Higher than expected suicide mortality in the initial months of the pandemic was also typically not observed in analyses of data from 21 countries, with some places even showing lower than expected suicide mortality.[35] While data from numerous Canadian police services show more mental health–related calls for service during the pandemic than in 2019, higher numbers of calls for service for suicide/attempted suicide have not been reported.[7]

Suicide ideation in Canada has been assessed during the pandemic in three surveys by the Canadian Mental Health Association (CMHA) and researchers at the University of British Columbia. Respondents were asked if they had experienced suicidal thoughts/feelings as a result of the COVID-19 pandemic in the past two weeks. The percentage indicating "yes" ranged from 6% in May 2020, to 10% in September 2020 and 8% in January 2021.[9-11] In contrast, the 2016 Canadian Community Health Survey (CCHS) recorded 2.5% of Canadians reporting seriously contemplating suicide in the past 12 months.[36] This has led some to conclude that suicide ideation has become more prevalent during the pandemic.[24,37]

However, these comparisons are not ideal given the different ways the surveys assessed suicide ideation. For instance, the prevalence of suicide ideation during the pandemic could be overestimated as people may be less likely to report seriously contemplating suicide versus experiencing thoughts or feelings related to suicide that may be more fleeting and/or ambivalent. Alternatively, the prevalence of suicide ideation during the pandemic may be greater if people described their experiences since the beginning of the pandemic (not just the past two weeks). Furthermore, estimates of suicide ideation during the pandemic were compared to data from 2016, but pre-pandemic estimates from more recent data would be a more appropriate baseline for determining the pandemic's potential impact.

Fortunately, the 2019 Canadian Community Health Survey (CCHS)[38] and the 2020 Survey on COVID-19 and Mental Health (SCMH)[39] both assessed suicide ideation. The similarly worded questions about suicide ideation and the relatively large sample sizes in these two surveys allowed us to compare the prevalence of self-reported serious contemplation of suicide before the pandemic versus during it in the overall population and in various sociodemographic groups.

Because other surveys suggested that feelings/thoughts of suicide were more prevalent in certain population subgroups during the pandemic (e.g. young adults; those who identify as LGBTQ2+; those with a pre-existing mental health condition; parents with children under 18 years living at home),[24,37] we investigated how the likelihood of seriously contemplating suicide during the pandemic differed by numerous sociodemographic characteristics and by potentially high-risk experiences (e.g. being a frontline worker, experiencing income/job loss or loneliness/isolation due to the pandemic).[15,31,40-42] We also stratified findings by gender as some surveys suggest that the pandemic has had a more negative impact on the mental health of women[8,11,43] and because suicide-related outcomes often differ between males and females.[44-46]

Methods

Data and participants

To obtain estimates of suicide ideation before the COVID-19 pandemic, we analyzed data from the 2019 CCHS – Annual Component.[38] Respondents were surveyed from 2 January to 24 December 2019. The target population was people aged 12 years and older living in the provinces and territories.[38] The CCHS excludes full-time members of the Canadian forces and people living on First Nations reserves/settlements, in foster homes, in two remote health regions in Quebec or in institutions; these exclusions represent less than 3% of the population.[38] Statistics Canada used the Labour Force Survey sampling frame to sample adults in the provinces for the 2019 CCHS.[47] After a dwelling is sampled, an adult living in that dwelling is selected as the respondent.[38] Respondents complete the CCHS voluntarily via computer-assisted personal interviews or telephone interviews.[38] We only analyzed data from adults in the 2019 CCHS as individuals under 18 years were excluded from the 2020 SCMH.[39] Moreover, as CCHS data from respondents living in the territories are only released by Statistics Canada after two consecutive years of data collection, we were only able to analyze 2019 CCHS data from individuals living in the provinces. The response rate for adults in the 2019 CCHS was 54.9%.

To obtain estimates of suicide ideation during the COVID-19 pandemic, we analyzed data from the 2020 SCMH.[39] Respondents were surveyed from 11 September to 4 December 2020, and the target population was people aged 18 years and older living in the provinces and the three territorial capitals.[39] The 2020 SCMH frame was stratified by province; a simple random sample of dwellings was selected within each province and territorial capital from the Dwelling Universe File, and an adult within each dwelling was then sampled to participate.[39] The sampling frame for the 2020 SCMH excluded people living in non-capital cities in the territories, in institutions, in collective/unmailable/inactive/vacant dwellings and on reserves.[39] Respondents completed the 2020 SCMH voluntarily via electronic questionnaire or computer-assisted telephone interview.[39] The total number of respondents in the 2020 SCMH was 14 689, a response rate of 53.3%. We analyzed 2020 SCMH data from the 12 344 respondents who agreed to share their information with Public Health Agency of Canada (PHAC).

Measures

Suicide ideation

Lifetime suicide ideation was assessed in both surveys by asking respondents "Have you ever seriously contemplated suicide?". To assess recent suicide ideation, those who reported seriously contemplating suicide were asked "Has this happened in the past 12 months?" in the 2019 CCHS and "Have you seriously contemplated suicide since the COVID-19 pandemic began?" in the 2020 SCMH.

Sociodemographic characteristics and experiences

A number of sociodemographic variables were included in both surveys, including age, gender, household income, immigrant

status, racialized group member, educational attainment, place of residence (population centre, rural area), presence of children at home who are less than 18 years (yes, no) and province/territorial capital.

We coded individuals into three age groups: young adults (18–34 years), middle-aged adults (35–64 years) and older adults (65 years and older).

Gender identity was assessed by asking respondents "What is your gender?", with "male," "female" and "or please specify" as response options.

We coded household income into tertiles, representing low-income, middle-income and high-income households.

For the immigrant status variable, immigrants included landed immigrants and non-permanent residents, and non-immigrants included those born in Canada.

Individuals classified as a visible minority or who identified as Indigenous were coded as a racialized group member, while individuals who identified only as White were coded as non-racialized.

We coded highest educational attainment into two groups: respondents with a high school education or less, and respondents with a post-secondary certificate/degree/diploma.

Some potentially high-risk experiences that were only included in the 2020 SCMH were also of interest. Respondents were asked "Have you experienced any of the following impacts due to the COVID-19 pandemic?", with "Loss of job or income" (yes, no) and "Feelings of loneliness or isolation" (yes, no) listed among other experiences. The 2020 SCMH respondents were also asked "Have you ever experienced a highly stressful or traumatic event during your life?", with "yes" and "no" as response options.

The 2020 SCMH also asked respondents if during the past 7 days they were considered an "essential worker" (yes, no, don't know), defined as "an individual who works in a service, facility or in an activity that is necessary to preserving life, health, public safety and basic societal functions of Canadians." Respondents were also asked if they were considered a "frontline worker" (yes, no, don't know), defined as "an individual who has the potential to come in direct contact with COVID-19 by assisting those who have been diagnosed with the virus," with police officers, doctors, nurses, firefighters and paramedics listed as examples. We coded respondents as frontline workers if they answered "yes" to being a frontline worker and as essential non-frontline workers if they only answered "yes" to being an essential worker; the remaining respondents we coded as having an "other" work status.

Analysis

We used SAS Enterprise Guide version 7.1 (SAS Institute Inc., Cary, NC, USA) to conduct analyses. All estimates were weighted by sampling weights provided by Statistics Canada so that the complex survey design was accounted for and the results were representative. We used bootstrap weights to estimate the coefficients of variation, standard errors and 95% confidence intervals. Clopper–Pearson confidence intervals were obtained when estimating the proportion of individuals reporting suicide ideation so that adequate coverage was obtained even when proportions were small.[48] We identified statistically significant results when *p*-values were under 0.05.

The percentage of individuals reporting recent suicide ideation in 2019 and in 2020 was estimated overall and for each sociodemographic group. Chi-square tests were conducted using PROC SURVEYFREQ to determine whether the 2019 versus 2020 estimates differed significantly. The same analyses were also conducted for lifetime suicide ideation. Separate univariate logistic regression analyses for 2019 and 2020 were conducted to examine how the likelihood of reporting recent suicide ideation differed by sociodemographic characteristic. As the 2019 CCHS data did not include responses from individuals living in the territories, data from 2020 SCMH respondents in the territorial capitals were excluded from these analyses so that we compared similar groups of individuals across the two surveys.

The percentage of individuals reporting recent suicide ideation by potential high-risk experiences (i.e. pandemic-related job/income loss; pandemic-related loneliness/isolation; lifetime highly stressful/traumatic event; frontline/essential worker) was also estimated. Univariate logistic regression analyses were conducted to examine how the likelihood of reporting recent suicide ideation during the pandemic differed by experience. As these potential high-risk experiences were only assessed in the 2020 SCMH, we used data from 2020 SCMH respondents living in the provinces and territorial capitals in analyses involving those variables.

All analyses were also stratified by gender. Individuals who specified a different gender identity beyond "male" or "female" were not included in gender-stratified analyses because of insufficient sample sizes (< 1.00%).

Results

The distribution of the sociodemographic characteristics and experiences in the 2019 CCHS and the 2020 SCMH are shown in Table 1.

Suicide ideation before versus during the pandemic

Overall, the percentage of adults in Fall 2020 who reported seriously contemplating suicide since the COVID-19 pandemic began was 2.44%, which did not differ significantly from the 2.73% who reported seriously contemplating suicide in the past 12 months in 2019 (see Table 2). Significant differences in the percentage of recent suicide ideation in 2020 versus 2019 were found in almost none of the sociodemographic groups examined. The percentage of males aged 65 years and older, males with middle household income and individuals living in Quebec who reported seriously contemplating suicide since the pandemic began was significantly lower than the percentage who reported seriously contemplating suicide in the past 12 months in 2019. However, it is unclear whether recent suicide ideation was actually lower in 2020 in these groups or if these results were due to the shorter timeframe that was asked about in 2020 versus 2019 (i.e. since the pandemic began 6–8 months ago versus the past 12 months).

Significant differences also tended to be absent when we examined lifetime suicide ideation (see Table 3). Specifically, the percentage of adults who reported ever seriously contemplating suicide did not differ significantly in 2019 (12.58%) compared with Fall 2020 (12.21%). Moreover, no significant differences in lifetime suicide ideation from 2019 to 2020 were

TABLE 1
Sociodemographic characteristics and experiences

Sociodemographic characteristics	Distribution, % (95% CI)		*p*-value
	2019 CCHS (N = 57 034)	2020 SCMH (N = 11 324)	
Gender			
Female	50.80 (50.74, 50.86)	50.78 (50.68, 50.87)	0.733
Male	49.20 (49.14, 49.26)	49.22 (49.13, 49.32)	
Age, years			
18–34	28.36 (28.36, 28.36)	28.21 (28.21, 28.21)	<0.001
35–64	50.14 (50.14, 50.14)	49.60 (49.60, 49.60)	
65+	21.49 (21.49, 21.49)	22.19 (22.19, 22.19)	
Racialized group member			
Yes	27.22 (26.30, 28.13)	26.59 (25.41, 27.76)	0.392
No	72.78 (71.87, 73.70)	73.41 (72.24, 74.59)	
Immigrant status			
Yes	28.73 (27.88, 29.59)	27.03 (25.86, 28.20)	0.023
No	71.27 (70.41, 72.12)	72.97 (71.80, 74.14)	
Place of residence			
Population centre	82.91 (82.32, 83.51)	82.30 (81.51, 83.10)	0.231
Rural area	17.09 (16.49, 17.68)	17.70 (16.90, 18.49)	
Educational attainment			
High school or lower	34.36 (33.67, 35.06)	31.22 (29.96, 32.48)	<0.001
Post-secondary	65.64 (64.94, 66.33)	68.78 (67.52, 70.04)	
Children <18 years at home			
Yes	23.00 (22.40, 23.59)	27.58 (26.64, 28.52)	<0.001
No	77.00 (76.41, 77.60)	72.42 (71.48, 73.36)	
Median household income, $	85 483 (83 529, 87 437)	83 320 (80 559, 86 082)	–
Experiences		**2020 SCMH (N = 12 344)**	
Lost job/income			
Yes		25.34 (24.12, 26.55)	
No		74.66 (73.45, 75.88)	
Feelings of loneliness/isolation			
Yes		39.00 (37.72, 40.29)	
No		61.00 (59.71, 62.28)	
Lifetime stressful/traumatic event			
Yes		62.29 (61.01, 63.56)	
No		37.71 (36.44, 38.99)	
Work status			
Frontline worker		6.53 (5.89, 7.18)	
Essential non-frontline worker		20.72 (19.61, 21.82)	
Other		72.75 (71.59, 73.91)	

Abbreviations: CCHS, Canadian Community Health Survey; CI, confidence interval; SCMH, Survey on COVID-19 and Mental Health.

Note: Data from the territorial capitals (N = 1020) were excluded from the 2020 SCMH estimates of sociodemographic characteristics in this table so that comparisons between 2019 and 2020 are based on data from the same geographical locations. Data from the provinces and territorial capitals are included for the 2020 SCMH estimates of experiences in this table; the experience variables were not measured in the 2019 CCHS.

found in any of the sociodemographic groups, with the one exception being females with high household income who more frequently reported ever seriously contemplating suicide in Fall 2020 (12.97%) than in 2019 (9.44%).

Sociodemographic characteristics and experiences associated with suicide ideation during the pandemic

Table 4 presents logistic regression results examining the likelihood of reporting serious suicide contemplation since the pandemic began across numerous sociodemographic characteristics and experiences.

Overall, females (2.67%) were not significantly more likely to report recent suicide ideation than males (2.07%) during the pandemic. Adults aged 18 to 34 years (4.24%) and 35 to 64 years (2.27%) were significantly more likely to report recent suicide ideation than those aged 65 years and older (0.54%). Individuals born in Canada (2.85%) were significantly more likely to report recent suicide ideation than individuals who immigrated to Canada (1.38%).

Adults with low household income (3.34%) were significantly more likely to report recent suicide ideation than those with high household income (1.47%). Individuals with a high school education or lower (3.30%) were significantly more likely to report recent suicide ideation than individuals with a post-secondary education (2.06%). Quebec (1.33%) was the only province where recent suicide ideation significantly differed from that in Ontario (2.48%).

Significant differences by racialized group membership, place of residence and presence of children at home were not observed.

As seen in Table 4, similar patterns tended to be present in 2019. The only exceptions were individuals with children at home being less likely to report recent suicide ideation than those without children at home in 2019, and the prevalence of recent suicide ideation being significantly different in New Brunswick (but not Quebec) compared to Ontario in 2019.

Of the variables only measured in the 2020 SCMH (see Table 5 for logistic regression results), recent suicide ideation was

TABLE 2
Prevalence of recent suicide ideation in 2019 versus 2020, overall and stratified by gender

Variable	Prevalence, % (95% CI)								
	Combined			Female			Male		
	2019 CCHS	2020 SCMH	*p*-value	2019 CCHS	2020 SCMH	*p*-value	2019 CCHS	2020 SCMH	*p*-value
Overall	2.73 (2.49, 2.99)	2.44 (2.05, 2.89)	0.242	2.79 (2.46, 3.14)	2.67 (2.16, 3.26)	0.712	2.66 (2.31, 3.04)	2.07 (1.50, 2.78)	0.134
Age, years									
18–34	5.04 (4.37, 5.77)	4.24 (3.14, 5.59)	0.267	5.61 (4.64, 6.70)	5.18 (3.68, 7.06)	0.666	4.44 (3.58, 5.44)	2.88 (1.46, 5.07)	0.168
35–64	2.15 (1.86, 2.47)	2.27 (1.82, 2.80)	0.657	2.06 (1.73, 2.44)	2.27 (1.71, 2.96)	0.538	2.23 (1.78, 2.75)	2.28 (1.61, 3.11)	0.917
65+	0.98 (0.80, 1.19)	0.54 (0.29, 0.90)	0.030	0.86 (0.64, 1.14)	0.58 (0.26, 1.13)	0.286	1.11 (0.82, 1.46)	0.49 (0.18, 1.05)	0.044
Racialized group member									
Yes	2.60 (2.11, 3.17)	1.83 (1.06, 2.92)	0.181	2.86 (2.18, 3.68)	1.89 (1.05, 3.13)	0.150	2.33 (1.66, 3.16)[E]	1.66 (0.55, 3.82)	0.477
No	2.77 (2.51, 3.05)	2.61 (2.16, 3.12)	0.566	2.79 (2.43, 3.20)	2.85 (2.26, 3.56)	0.873	2.72 (2.33, 3.16)	2.21 (1.62, 2.93)	0.198
Immigrant status									
Yes	1.67 (1.27, 2.15)	1.38 (0.69, 2.46)	0.571	1.75 (1.20, 2.46)	1.56 (0.84, 2.64)	0.720	1.58 (1.05, 2.30)[E]	1.23 (0.27, 3.45)	0.676
No	3.17 (2.87, 3.48)	2.85 (2.38, 3.38)	0.279	3.18 (2.79, 3.62)	3.04 (2.42, 3.78)	0.721	3.13 (2.70, 3.61)	2.44 (1.82, 3.21)	0.115
Household income									
Low	3.45 (3.04, 3.90)	3.34 (2.64, 4.15)	0.797	3.54 (3.00, 4.15)	3.73 (2.70, 5.01)	0.768	3.31 (2.71, 3.99)	2.89 (2.03, 3.98)	0.470
Middle	2.86 (2.41, 3.37)	2.33 (1.64, 3.22)	0.262	2.76 (2.20, 3.42)	2.86 (1.93, 4.08)	0.864	2.96 (2.26, 3.81)	1.51 (0.70, 2.82)	0.049
High	1.79 (1.46, 2.18)	1.47 (0.96, 2.14)	0.362	1.84 (1.36, 2.45)	1.25 (0.64, 2.19)	0.234	1.73 (1.29, 2.26)	1.66 (0.90, 2.78)	0.891
Place of residence									
Population centre	2.76 (2.48, 3.05)	2.61 (2.15, 3.13)	0.605	2.81 (2.44, 3.21)	2.85 (2.26, 3.55)	0.902	2.70 (2.30, 3.15)	2.21 (1.55, 3.05)	0.275
Rural area	2.59 (2.15, 3.10)	1.68 (1.06, 2.52)	0.056	2.70 (2.02, 3.52)	1.82 (0.98, 3.07)	0.199	2.47 (1.93, 3.10)	1.52 (0.71, 2.84)	0.154
Educational attainment									
High school or lower	4.01 (3.49, 4.59)	3.30 (2.42, 4.38)	0.217	4.16 (3.39, 5.06)	3.20 (2.26, 4.38)	0.170	3.84 (3.15, 4.63)	2.97 (1.62, 4.96)	0.357
Post-secondary	2.08 (1.84, 2.35)	2.06 (1.67, 2.51)	0.917	2.11 (1.82, 2.42)	2.45 (1.86, 3.15)	0.316	2.05 (1.67, 2.49)	1.66 (1.17, 2.27)	0.263
Children <18 years at home									
Yes	1.80 (1.43, 2.24)	2.29 (1.63, 3.12)	0.211	1.94 (1.51, 2.44)	2.70 (1.72, 4.01)	0.169	1.64 (1.02, 2.48)[E]	1.86 (1.01, 3.11)	0.711
No	3.02 (2.73, 3.33)	2.50 (2.02, 3.05)	0.095	3.07 (2.67, 3.52)	2.66 (2.07, 3.36)	0.299	2.95 (2.55, 3.40)	2.16 (1.46, 3.06)	0.105
Province/territory									
Alberta	3.15 (2.41, 4.04)	3.74 (2.68, 5.06)	0.393	3.63 (2.55, 5.00)[E]	3.81 (2.42, 5.67)	0.856	2.67 (1.81, 3.80)[E]	3.42 (1.94, 5.55)	0.422
British Columbia	2.84 (2.15, 3.68)	2.39 (1.49, 3.62)	0.479	2.72 (1.90, 3.75)[E]	2.21 (1.21, 3.70)	0.505	2.93 (1.81, 4.47)[E]	2.59 (1.20, 4.82)	0.749
Manitoba	3.33 (2.23,4.76)[E]	4.14 (2.73, 6.00)	0.397	3.43 (1.93, 5.60)[E]	4.11 (2.09, 7.19)	0.627	3.21 (1.82, 5.21)[E]	3.21 (1.74, 5.39)	0.999

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TABLE 2 (continued)
Prevalence of recent suicide ideation in 2019 versus 2020, overall and stratified by gender

Variable	Prevalence, % (95% CI)								
	Combined			Female			Male		
	2019 CCHS	2020 SCMH	*p*-value	2019 CCHS	2020 SCMH	*p*-value	2019 CCHS	2020 SCMH	*p*-value
New Brunswick	4.20 (2.88,5.90)[E]	2.91 (1.53, 5.00)	0.266	3.38 (2.11,5.11)[E]	2.61 (1.00, 5.49)	0.558	5.09 (2.78, 8.44)[E]	3.23 (1.19, 6.93)	0.346
Newfoundland and Labrador	3.35 (2.00, 5.24)[E]	2.20 (1.26, 3.56)	0.225	–[F]	2.92 (1.47, 5.15)	–	5.28 (2.88, 8.78)[E]	–[S]	–
Nova Scotia	3.88 (2.63, 5.51)[E]	3.90 (2.21, 6.34)	0.988	4.10 (2.44, 6.40)[E]	4.41 (2.81, 6.54)	0.813	3.57 (1.78, 6.33)[E]	3.36 (0.84, 8.76)	0.922
Ontario	2.62 (2.21, 3.08)	2.48 (1.70, 3.48)	0.772	2.69 (2.16, 3.29)	2.93 (1.95, 4.22)	0.690	2.55 (1.99, 3.22)	1.83 (0.82, 3.51)	0.351
Prince Edward Island	3.45 (1.96, 5.60)[E]	2.06 (0.96, 3.82)	0.205	3.53 (1.59, 6.72)[E]	1.83 (0.85, 3.43)	0.149	–[F]	2.29 (0.57, 6.02)	–
Quebec	2.18 (1.77, 2.67)	1.33 (0.82, 2.03)	0.041	2.41 (1.84, 3.09)	1.64 (0.90, 2.73)	0.194	1.94 (1.36, 2.68)[E]	1.02 (0.42, 2.04)	0.099
Saskatchewan	3.27 (2.06, 4.90)[E]	2.34 (1.23, 4.02)	0.340	2.42 (1.25, 4.22)[E]	1.64 (0.74, 3.12)	0.366	4.11 (2.08, 7.22)[E]	3.04 (1.15, 6.42)	0.541
Yukon (Whitehorse)	–	1.66 (0.65, 3.46)	–	–	2.08 (0.70, 4.71)	–	–	–[S]	–
Northwest Territories (Yellowknife)	–	2.51 (0.99, 5.18)	–	–	3.46 (0.94, 8.65)	–	–	–[S]	–
Nunavut (Iqaluit)	–	3.28 (0.94, 8.02)	–	–	–[S]	–	–	–[S]	–

Abbreviations: CCHS, Canadian Community Health Survey; SCMH, Survey on COVID-19 and Mental Health; CI, Clopper–Pearson confidence interval.

Notes: Data from the territorial capitals (N = 1020) are excluded from the 2020 SCMH estimates in this table (except the last three rows) so that comparisons between 2019 and 2020 are based on data from the same geographical locations.

Due to missing/excluded data on different variables, the sample sizes in the 2019 CCHS ranged from 54 641 to 55 090 for the combined analyses, from 29 913 to 30 143 for the female-stratified analyses and from 24 680 to 24 899 for the male-stratified analyses. For similar reasons, the sample sizes in the 2020 SCMH ranged from 10 181 to 12 292 for the combined analyses, from 5726 to 7033 for the female-stratified analyses and from 4435 to 5233 for the male-stratified analyses.

[E]: Interpret estimate with caution because coefficient of variation is between 15 and 35.

[F]: Estimate is unreleasable because coefficient of variation is greater than 35.

[S]: Estimate supressed because of small cell size.

significantly more likely among individuals who reported pandemic-related job/income loss (4.04%) versus those who did not (1.94%), and among individuals who reported having feelings of pandemic-related loneliness/isolation (5.19%) versus those who did not (0.72%). Moreover, seriously contemplating suicide since the pandemic began was more likely among those who reported experiencing a highly stressful/traumatic event during their life (3.18%) versus those who did not (1.22%), and among frontline workers (4.47%) versus other work status (2.50%).

All of these differences remained significant for females in the gender-stratified analyses, but only the difference between those who did versus did not report loneliness/isolation remained significant for males.

Discussion

The COVID-19 pandemic has had negative consequences for the physical and mental health of many Canadians. Despite some risk factors of suicide increasing during the pandemic (e.g. unemployment),[16-18] we did not find evidence for recent suicide ideation becoming more prevalent in the current study. This is consistent with preliminary surveillance data of other suicide-related outcomes in Canada, including suicide mortality, self-harm hospitalizations/emergency department visits and police calls for service concerning suicide.[7,33,34]

Previous surveys finding higher prevalence of suicide ideation than what we observed could be due to differences in how suicide ideation was asked about in those surveys (i.e. experiencing suicidal thoughts/feelings) compared to the CCHS and the SCMH (i.e. seriously contemplating suicide).[9-11]

There are a number of plausible explanations for why projected increases in suicide-related outcomes have generally not been observed thus far. Investments in mental health services as well as financial support for individuals negatively impacted by lockdowns may have buffered the pandemic's impact on the most severe and acute experiences of distress.[35,49] People experiencing worse mental health during the pandemic may be accessing help before suicide is seriously considered or attempted. It is also possible that Fall 2020 may be too early to detect the pandemic's impact on suicide as some research suggests that there can be a delay in the effect of large-scale events on suicide-related outcomes.[50,51] This highlights the importance of continued suicide surveillance to understand

TABLE 3
Prevalence of lifetime suicide ideation in 2019 versus 2020, overall and stratified by gender

Variable	Prevalence, % (95% CI)								
	Combined			Female			Male		
	2019 CCHS	2020 SCMH	*p*-value	2019 CCHS	2020 SCMH	*p*-value	2019 CCHS	2020 SCMH	*p*-value
Overall	12.58 (12.09, 13.08)	12.21 (11.35, 13.10)	0.474	13.34 (12.66, 14.05)	13.58 (12.36, 14.87)	0.741	11.69 (10.99, 12.43)	10.57 (9.36, 11.88)	0.140
Age, years									
18–34	17.27 (16.10, 18.48)	16.83 (14.52, 19.35)	0.749	17.81 (16.17, 19.54)	19.25 (16.00, 22.84)	0.430	16.48 (14.69, 18.40)	13.75 (10.54, 17.49)	0.191
35–64	12.09 (11.45, 12.76)	12.33 (11.29, 13.43)	0.712	13.01 (12.10, 13.97)	13.71 (12.21, 15.32)	0.445	11.15 (10.25, 12.10)	10.94 (9.52, 12.50)	0.811
65+	7.24 (6.72, 7.78)	6.07 (5.02, 7.27)	0.071	8.37 (7.60, 9.19)	6.71 (5.24, 8.45)	0.083	5.89 (5.21, 6.63)	5.34 (3.92, 7.09)	0.525
Racialized group member									
Yes	13.67 (13.14, 14.22)	12.97 (12.01, 13.98)	0.227	14.33 (13.56, 15.14)	13.85 (12.52, 15.26)	0.549	12.89 (12.11, 13.70)	11.82 (10.42, 13.35)	0.218
No	9.81 (8.75, 10.95)	10.00 (8.26, 11.97)	0.863	11.00 (9.62, 12.49)	12.62 (9.81, 15.89)	0.310	8.51 (7.00, 10.22)	7.37 (5.26,9.98)	0.441
Immigrant status									
Yes	6.37 (5.56, 7.26)	7.00 (5.62, 8.61)	0.448	7.31 (6.11, 8.66)	8.67 (6.45, 11.34)	0.296	5.37 (4.34, 6.57)	5.50 (3.83,7.61)	0.905
No	15.13 (14.55, 15.73)	14.20 (13.18, 15.27)	0.129	15.81 (15.00, 16.64)	15.22 (13.81, 16.72)	0.487	14.32 (13.46, 15.23)	12.79 (11.27, 14.43)	0.108
Household income									
Low	15.44 (14.56, 16.36)	14.55 (13.11, 16.08)	0.296	15.99 (14.86, 17.18)	15.44 (13.43, 17.62)	0.641	14.60 (13.38, 15.89)	13.45 (11.35, 15.78)	0.369
Middle	12.78 (11.89, 13.71)	12.17 (10.53, 13.97)	0.540	13.73 (12.50, 15.03)	13.61 (11.24, 16.26)	0.932	11.80 (10.48, 13.23)	10.24 (8.11, 12.71)	0.263
High	9.17 (8.38, 10.01)	10.22 (8.76, 11.82)	0.212	9.44 (8.36, 10.60)	12.97 (10.59, 15.65)	0.005	8.87 (7.72, 10.13)	7.64 (5.97, 9.60)	0.273
Place of residence									
Population centre	12.60 (12.04, 13.18)	12.38 (11.41, 13.42)	0.716	13.16 (12.39, 13.96)	13.42 (12.04, 14.89)	0.748	11.91 (11.10, 12.77)	11.07 (9.66, 12.61)	0.341
Rural area	12.46 (11.56, 13.41)	11.79 (10.12, 13.64)	0.503	14.25 (12.91, 15.68)	14.61 (11.99, 17.56)	0.818	10.66 (9.52, 11.88)	8.63 (6.70, 10.90)	0.103
Educational attainment									
High school or lower	14.78 (13.87, 15.72)	13.22 (11.52, 15.06)	0.131	15.37 (14.06, 16.74)	13.03 (10.91, 15.39)	0.089	14.09 (12.84, 15.40)	13.03 (10.41, 16.04)	0.505
Post-secondary	11.51 (10.94, 12.09)	11.79 (10.83, 12.80)	0.627	12.38 (11.61, 13.19)	13.89 (12.41, 15.47)	0.077	10.50 (9.64, 11.40)	9.44 (8.19, 10.80)	0.188
Children <18 years at home									
Yes	9.88 (9.03, 10.79)	10.53 (9.13, 12.07)	0.443	11.13 (9.89, 12.46)	12.43 (10.40, 14.70)	0.283	8.43 (7.30, 9.68)	8.50 (6.66, 10.66)	0.952
No	13.40 (12.82, 14.00)	12.82 (11.77, 13.93)	0.354	14.07 (13.28, 14.89)	14.00 (12.51, 15.61)	0.940	12.63 (11.80, 13.49)	11.31 (9.83, 12.94)	0.157
Province/territory									
Alberta	14.00 (12.50, 15.62)	15.14 (12.79, 17.72)	0.426	15.15 (12.94, 17.58)	16.68 (13.35, 20.46)	0.461	12.86 (10.78, 15.18)	13.41 (10.05, 17.38)	0.788
British Columbia	12.01 (10.69, 13.44)	12.18 (10.13, 14.47)	0.898	12.01 (10.45, 13.71)	12.15 (9.39, 15.36)	0.937	11.75 (9.67, 14.11)	12.09 (8.99, 15.80)	0.866
Manitoba	15.41 (12.98, 18.10)	16.42 (13.66, 19.49)	0.593	16.55 (13.17, 20.40)	17.07 (13.17, 21.58)	0.849	14.20 (10.86, 18.10)	14.55 (10.74, 19.08)	0.895

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TABLE 3 (continued)
Prevalence of lifetime suicide ideation in 2019 versus 2020, overall and stratified by gender

Variable	Prevalence, % (95% CI)								
	Combined			Female			Male		
	2019 CCHS	2020 SCMH	*p*-value	2019 CCHS	2020 SCMH	*p*-value	2019 CCHS	2020 SCMH	*p*-value
New Brunswick	15.14 (12.81, 17.71)	13.47 (10.87, 16.43)	0.358	15.97 (12.31, 20.21)	14.59 (11.12, 18.65)	0.600	14.06 (10.80, 17.85)	12.30 (8.50, 17.02)	0.522
Newfoundland and Labrador	11.07 (8.71, 13.81)	11.02 (8.58, 13.86)	0.978	9.54 (6.39, 13.55)[E]	12.84 (9.46, 16.90)	0.201	12.74 (9.25, 16.95)	8.82 (5.53, 13.19)	0.152
Nova Scotia	13.98 (11.71, 16.50)	13.41 (10.84, 16.33)	0.745	14.92 (12.19, 18.00)	14.28 (11.20, 17.83)	0.760	12.85 (9.78, 16.48)	12.41 (8.36, 17.49)	0.870
Ontario	11.96 (11.11, 12.85)	11.89 (10.27, 13.67)	0.946	12.80 (11.70, 13.96)	13.68 (11.30, 16.36)	0.518	10.98 (9.67, 12.39)	9.76 (7.66, 12.20)	0.379
Prince Edward Island	10.84 (8.31, 13.82)	11.68 (9.08, 14.72)	0.660	13.60 (9.86, 18.10)	11.37 (8.30, 15.08)	0.390	7.41 (4.32,11.72)[E]	11.82 (7.73, 17.05)	0.115
Quebec	12.47 (11.58, 13.41)	10.70 (9.05, 12.53)	0.083	13.52 (12.26, 14.87)	12.40 (10.33, 14.73)	0.396	11.38 (10.14, 12.73)	8.78 (6.38, 11.73)	0.103
Saskatchewan	13.27 (10.76, 16.13)	10.79 (8.60, 13.31)	0.162	13.24 (10.14, 16.88)	11.17 (8.43, 14.43)	0.346	13.26 (9.48,17.85)[E]	10.47 (7.12, 14.70)	0.315
Yukon (Whitehorse)	–	13.58 (10.11, 17.70)	–	–	15.74 (11.02, 21.48)	–	–	10.80 (6.09, 17.34)	–
Northwest Territories (Yellowknife)	–	18.03 (13.60, 23.19)	–	–	19.66 (13.26, 27.46)	–	–	16.41 (10.55, 23.82)	–
Nunavut (Iqaluit)	–	19.91 (13.73, 27.37)	–	–	19.40 (11.35, 29.86)	–	–	20.50 (11.49, 32.33)	–

Abbreviations: CCHS, Canadian Community Health Survey; SCMH, Survey on COVID-19 and Mental Health; CI, Clopper–Pearson confidence interval.

Notes: Data from the territorial capitals (N = 1020) are excluded from the 2020 SCMH estimates in this table (except the last three rows) so that comparisons between 2019 and 2020 are based on data from the same geographical locations.

Due to missing/excluded data on different variables, the sample sizes in the 2019 CCHS ranged from 54 650 to 55 099 for the combined analyses, from 29 919 to 30 149 for the female-stratified analyses and from 24 683 to 24 902 for the male-stratified analyses. For similar reasons, the sample sizes in the 2020 SCMH ranged from 10 187 to 12 298 for the combined analyses, from 6402 to 7037 for the female-stratified analyses and from 4760 to 5235 for the male-stratified analyses.

[E]: Interpret estimate with caution because coefficient of variation is between 15 and 35.

TABLE 4
Univariate logistic regression analyses comparing likelihood of reporting recent suicide ideation by sociodemographic characteristic in 2019 and 2020

Variable	OR (95% CI)					
	2019 CCHS			2020 SCMH		
	Combined	Female	Male	Combined	Female	Male
Gender						
Female	1.05 (0.87, 1.27)	–	–	1.30 (0.90, 1.88)	–	–
Male	(Ref.)	–	–	(Ref.)	–	–
Age, years						
18–34	5.38 (4.25, 6.82)***	6.81 (4.83, 9.60)***	4.14 (2.94, 5.84)***	8.18 (4.38, 15.31)***	9.32 (4.12, 21.06)***	6.07 (1.89, 19.51)**
35–64	2.22 (1.75, 2.82)***	2.41 (1.74, 3.34)***	2.03 (1.44, 2.87)***	4.30 (2.39, 7.72)***	3.96 (1.78, 8.80)***	4.76 (1.66, 13.67)**
65+	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Racialized group member						
Yes	0.94 (0.75, 1.17)	1.02 (0.76, 1.38)	0.85 (0.60, 1.20)[E]	0.70 (0.41, 1.18)	0.66 (0.36, 1.18)	0.75 (0.28, 2.02)
No	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Immigrant status						
Yes	0.52 (0.39, 0.68)***	0.54 (0.37, 0.79)**	0.50 (0.33, 0.75)[E]***	0.48 (0.25, 0.90)*	0.50 (0.27, 0.94)*	0.50 (0.13, 1.98)
No	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)

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TABLE 4 (continued)
Univariate logistic regression analyses comparing likelihood of reporting recent suicide ideation by sociodemographic characteristic in 2019 and 2020

Variable	OR (95% CI)					
	2019 CCHS			2020 SCMH		
	Combined	Female	Male	Combined	Female	Male
Household income						
Low	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Middle	0.83 (0.67, 1.02)	0.77 (0.59, 1.01)	0.89 (0.64, 1.25)	0.69 (0.46, 1.04)	0.76 (0.46, 1.25)	0.51 (0.25, 1.07)
High	0.51 (0.40, 0.65)***	0.51 (0.37, 0.71)***	0.51 (0.36, 0.73)***	0.43 (0.27, 0.70)***	0.33 (0.16, 0.66)**	0.57 (0.29, 1.11)
Place of residence						
Population centre	1.07 (0.86, 1.32)	1.04 (0.77, 1.42)	1.10 (0.82, 1.46)	1.57 (0.99, 2.49)	1.58 (0.85, 2.95)	1.46 (0.68, 3.15)
Rural area	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Educational attainment						
High school or lower	1.96 (1.63, 2.36)***	2.02 (1.58, 2.58)***	1.91 (1.44, 2.53)***	1.63 (1.13, 2.33)**	1.32 (0.86, 2.02)	1.82 (0.95, 3.46)
Post-secondary	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Children <18 years at home						
Yes	0.59 (0.46, 0.75)***	0.62 (0.48, 0.82)***	0.55 (0.34, 0.87)E*	0.91 (0.62, 1.35)	1.01 (0.62, 1.65)	0.86 (0.44, 1.69)
No	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Province						
Alberta	1.21 (0.89, 1.63)	1.37 (0.92, 2.03)E	1.05 (0.68, 1.61)E	1.53 (0.94, 2.49)	1.31 (0.73, 2.36)	1.90 (0.78, 4.63)
British Columbia	1.09 (0.79, 1.50)	1.01 (0.69, 1.49)E	1.15 (0.68, 1.96)E	0.96 (0.54, 1.72)	0.75 (0.37, 1.50)	1.43 (0.52, 3.90)
Manitoba	1.28 (0.85, 1.92)E	1.29 (0.74, 2.22)E	1.27 (0.70, 2.29)E	1.70 (0.98, 2.93)	1.42 (0.68, 2.98)	1.78 (0.70, 4.51)
New Brunswick	1.63 (1.08, 2.46)E*	1.27 (0.78, 2.07)E	2.05 (1.05, 3.99)E*	1.18 (0.58, 2.39)	0.89 (0.34, 2.33)	1.79 (0.54, 5.91)
Newfoundland and Labrador	1.29 (0.74, 2.26)E	–F	2.13 (1.04, 4.38)E*	0.88 (0.47, 1.68)	1.00 (0.47, 2.10)	–S
Nova Scotia	1.50 (0.99, 2.29)E	1.55 (0.90, 2.66)E	1.41 (0.69, 2.90)E	1.60 (0.85, 2.99)	1.53 (0.86, 2.73)	1.87 (0.46, 7.52)
Ontario	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Prince Edward Island	1.33 (0.75, 2.35)E	1.33 (0.60, 2.91)E	–F	0.83 (0.38, 1.81)	0.62 (0.28, 1.36)	1.26 (0.11, 14.39)
Quebec	0.83 (0.64, 1.08)	0.89 (0.64, 1.25)	0.76 (0.50, 1.15)E	0.53 (0.30, 0.94)*	0.55 (0.28, 1.11)	0.55 (0.20, 1.55)
Saskatchewan	1.26 (0.81, 1.95)E	0.90 (0.48, 1.67)E	1.64 (0.86, 3.13)E	0.94 (0.46, 1.91)	0.55 (0.24, 1.25)	1.68 (0.52, 5.38)

Abbreviations: SCMH, Survey on COVID-19 and Mental Health; CI, Clopper–Pearson confidence interval; OR, odds ratio; Ref., reference group.

Note: Data from the territorial capitals (N = 1020) are excluded from the 2020 SCMH estimates in this table so that odds ratios from 2019 and 2020 are based on data from the same geographical locations.

E: Interpret estimate with caution because coefficient of variation is between 15 and 35.

F: Estimate is unreleasable because coefficient of variation is greater than 35; S, estimate suppressed because of small cell size.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

how the pandemic might impact suicide-related outcomes in the short- and long-term in Canada.[52,53]

Although differences in the prevalence of suicide ideation in 2020 versus 2019 were largely not observed in the overall population or in specific sociodemographic groups, we did find that some people were more likely than others to report seriously contemplating suicide since the pandemic began. Those at higher risk of recent suicide ideation before the pandemic also tended to be at higher risk during the pandemic, including individuals under 65 years old, those born in Canada and those with lower household income and educational attainment. These results provide further evidence for the "healthy immigrant effect,"[54] and the link between socioeconomic status and suicide.[55]

Of note, having children at home was a protective factor against suicide ideation before but not during the pandemic, which may hint at the difficulties associated with increased childcare responsibilities and work-life balance experienced by parents/guardians due to school/daycare closures, isolation from extended family, and other reasons.

Given previous research findings on associations between suicide-related outcomes and loneliness, unemployment/socioeconomic status and stressful life events,[31,42,55,56]

TABLE 5
Prevalence and likelihood of reporting recent suicide ideation by potential high-risk sociodemographic characteristics and experiences during the COVID-19 pandemic, SCMH 2020

Variable	Combined		Female		Male	
	% (95% CI)	OR	% (95% CI)	OR	% (95% CI)	OR
Lost job/income						
Yes	4.04 (3.09, 5.17)	2.13 (1.49, 3.05)***	4.98 (3.55, 6.76)	2.60 (1.69, 3.99)***	3.07 (1.89, 4.69)	1.78 (0.97, 3.26)
No	1.94 (1.51, 2.44)	(Ref.)	1.98 (1.49, 2.57)	(Ref.)	1.75 (1.13, 2.58)	(Ref.)
Feelings of loneliness/isolation						
Yes	5.19 (4.25, 6.27)	7.50 (4.99, 11.27)***	5.17 (4.09, 6.43)	7.60 (4.33, 13.33)***	4.86 (3.33, 6.82)	6.88 (3.61, 13.12)***
No	0.72 (0.49,1.03)	(Ref.)	0.71 (0.41, 1.16)	(Ref.)	0.74 (0.41, 1.22)	(Ref.)
Lifetime stressful/traumatic event						
Yes	3.18 (2.64, 3.79)	2.66 (1.52, 4.65)***	3.64 (2.90, 4.50)	4.61 (2.13, 9.96)***	2.42 (1.73, 3.30)	1.55 (0.72, 3.33)
No	1.22 (0.68, 2.01)	(Ref.)	0.81 (0.37, 1.54)	(Ref.)	1.58 (0.70, 3.05)	(Ref.)
Work status						
Frontline worker	4.47 (2.69, 6.93)	1.83 (1.07, 3.12)*	5.61 (3.05, 9.32)	2.30 (1.22, 4.36)*	2.75 (0.98, 5.99)	1.20 (0.42, 3.40)
Essential non-frontline worker	1.47 (0.92, 2.22)	0.58 (0.36, 0.94)*	1.92 (1.07, 3.18)	0.76 (0.42, 1.39)	1.08 (0.46, 2.16)	0.46 (0.20, 1.11)
Other	2.50 (2.02, 3.05)	(Ref.)	2.51 (1.95, 3.19)	(Ref.)	2.30 (1.58, 3.24)	(Ref.)

Abbreviations: SCMH, Survey on COVID-19 and Mental Health; CI, Clopper–Pearson confidence interval; OR, odds ratio; Ref., reference group.

Note: Estimates are based on data from 2020 SCMH respondents living in the provinces and territorial capitals. Odds ratios are from univariate logistic regression analyses.

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

it is not surprising that suicide ideation during the pandemic was more common among individuals who reported pandemic-related job/income loss and loneliness/isolation, and those who had experienced a highly stressful/traumatic event during their life.

Finally, frontline workers were more likely to report seriously considering suicide since the pandemic began compared to individuals with other work statuses. This could be due to overall declines in mental health due to the unique demands placed on this group during the pandemic,[41,57] and/or it could reflect the elevated risk of suicide among some frontline workers that was observed before the pandemic.[40,58] Regardless, these findings identify high-risk characteristics and experiences that targeted mental health promotion and suicide prevention efforts may want to focus on.

Strengths and limitations

This study contributes to suicide surveillance in Canada by examining suicide ideation before versus during the COVID-19 pandemic using representative data from the relatively large and recent samples of the 2019 CCHS and the 2020 SCMH. Our estimates based on surveys with probability sampling answer recent calls for better quality estimates of population mental health in Canada during the pandemic.[59] We investigated differences in suicide ideation in 2020 versus 2019 in numerous sociodemographic groups, and examined how various characteristics and experiences were associated with suicide ideation both before and during the pandemic.

However, caution is warranted when interpreting the results of this study due to methodological differences between the 2019 CCHS and 2020 SCMH data. The 2019 CCHS had a full year for data collection, compared to approximately three months for the 2020 SCMH. Nevertheless, when we restricted analyses to data from the same time of the year, there was not a significant difference in Fall 2019 versus Fall 2020 in the overall prevalence of recent suicide ideation (2.81% versus 2.44%, chi-square test p-value = 0.267) or in the overall prevalence of lifetime suicide ideation (12.96% versus 12.21%, chi-square test p-value = 0.256).

The 2019 CCHS asked about serious suicide contemplation over the past 12 months whereas the 2020 SCMH asked about serious suicide contemplation "since the COVID-19 pandemic began," which is closer to a six- to eight-month recall period. While it is possible that this shorter time period may explain why the prevalence of recent suicide ideation was not higher in 2020, it is unlikely as we found largely similar results when lifetime suicide ideation was examined.

Other differences between surveys that could have affected the responses and the estimates we obtained include the sampling frames, how some of the sociodemographic factors were distributed and the mode of data collection (i.e. 2020 SCMH respondents could complete the survey online on their own; this data collection method was associated with a lower likelihood of agreeing to share data with PHAC).

It is possible that other differences between respondents who did versus did not agree to share their data, or who did versus did not respond to the survey, could have biased estimates. In addition, respondents' household income in the 2019 CCHS was based on tax data, self-reported income and imputed income amounts, while it was only self-reported in the 2020 SCMH. Moreover, the presence of children under 18 years at home was measured by different variables in the two surveys.

We were not able to examine additional important sociodemographic characteristics (e.g. marital status, LGBTQ2+ status)[60,61] as they were not measured in the 2020 SCMH. We solely examined univariate associations in the logistic regression analyses; some of the associations found between suicide ideation and high-risk experiences in Fall 2020 could be accounted for by sociodemographic factors.

Our study only included adults aged 18 and over; additional research is needed to examine how suicide-related outcomes among youth in Canada might have changed due to the pandemic. Given data availability issues, analyses comparing suicide ideation in 2020 to 2019 were restricted to the provinces. Lastly, to maximize statistical power, we adopted a lenient alpha level of 0.05 to identify statistically significant results. Given the numerous comparisons made in this research, it is possible that some significant findings are false positives.

Conclusion

The current research suggests that, in general, the prevalence of suicide ideation in 2020 has neither increased nor decreased compared to 2019. It is possible that suicide-related outcomes may change as the COVID-19 pandemic continues and as Canada recovers. Continued surveillance of suicide and risk/protective factors (e.g. through analyzing data from the 2021 SCMH)[62] will be important for informing suicide prevention efforts.

Conflicts of interest

The authors have no conflicts of interest.

Authors' contributions and statement

LL conceived the project.

LL, CC and RD decided on the analytic approach.

LL conducted the statistical analyses.

LL, CC and RD interpreted the results.

CC and RD drafted and revised sections of the manuscript.

LL, CC and RD provided feedback on manuscript drafts.

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Commentary

Completing the picture: a proposed framework for child maltreatment surveillance and research in Canada

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Introduction

The rapid spread and high morbidity and mortality of COVID-19 led to unprecedented disruption of people's lives worldwide. The evolution and protracted nature of the pandemic created uncertainty and unpredictability. Multiple waves of infections, hospitalizations and deaths, and the associated public health restrictions, drastically altered everyday functioning for millions of people and increased the risk of mental health problems.[1-3] However the data are not always consistent; one report suggesting that during the first few months of the pandemic, psychological distress increased but that most metrics of distress returned to baseline by mid-2020 and that loneliness, life satisfaction and suicide rates remained stable overall.[4]

This special issue of the journal underscores the negative effects of the first year of the pandemic on Canadians' mental health and well-being. During the first 10 months after the pandemic was officially declared, alcohol and cannabis use[5,6] and depression[7] increased, and self-rated positive mental health, life satisfaction and community belonging[8] declined, with no changes in suicidal ideation noted.[9] However, Canadians were not equally impacted. As Varin et al.[5] maintain, "understanding the social determinants of health is key to developing harm reduction and mitigation strategies." Indeed, younger age, living in an urban area and having co-morbidities of mental health issues were related to an increased likelihood of negative outcomes.[5-7] Similarly, Canadian females, especially those who are caregivers of children younger than 18 years, tended to be more seriously affected, a finding that is consistent with international research results.[3]

While informative, these findings were restricted by the nature of the data collected, sociodemographic characteristics, a limited set of individual factors (e.g. anxiety, depressive symptoms and mastery), community factors (e.g. sense of belonging) and exposures to pandemic-related stressors. A major gap remains in our understanding of the full impact of COVID-19 on women and children, whether it created a "shadow pandemic" of increased family violence, notably child maltreatment.

In addition to disease and death, the pandemic brought social and physical isolation, financial insecurity, increases in alcohol use and mental health problems, school closures and reduced access to medical and social services, all of which contributed to children's risk of maltreatment. Several studies support this interpretation of the situation,[10,11] as does anecdotal evidence of an upturn in calls to domestic violence shelters and kids' phone helplines.[12] However, little empirical Canadian data exist.

This commentary reviews what is known about violence against children during the pandemic. It highlights data gaps that existed pre-pandemic, and how our failure to address them hampers our ability to mitigate the harm to children. The authors advocate *ongoing* surveillance and research with a focus on social determinants of health to target resources and health promotion and prevention efforts.

Highlights

- The COVID-19 pandemic has increased risk factors associated with family violence.
- In Canada, we do not know whether the pandemic has exacerbated the risk of child maltreatment.
- Recommendations to strengthen our surveillance and research framework for child maltreatment include the addition of questions about maltreatment to national surveys on health and victimization, for example, in the upcoming Canadian Health Survey on Children and Youth.
- Robust surveillance and research on child maltreatment provide crucial information on trends over time among subgroups, generate hypotheses to be tested and interventions to be evaluated and implemented.
- Strengthening our maltreatment surveillance and research framework will support our commitments to end violence against all children.

This aligns with the priorities of the Minister of Health and the Public Health Agency of Canada (PHAC).[13] We suggest a multi-pronged approach to child maltreatment surveillance and research that addresses not only our lack of knowledge during the pandemic, but more broadly, shortcomings in family violence information in Canada.

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Child maltreatment during COVID-19

Long before the COVID-19 pandemic, child maltreatment was recognized as a global problem that extends across the sociodemographic spectrum.[14] Crises such as the pandemic and related economic and social effects are potential catalysts for family violence. As the pandemic continues, information on children's exposure to violence is emerging.[15] The data generally indicate an increased risk of victimization; however, findings are mixed and have fluctuated, depending on the source and time. In fact, referrals of suspected child abuse to police and child protection services have decreased worldwide—by as much as 70%[12,16-18]—although calls to the police for domestic disturbances increased by 12% in Canada.[19]

Trends in calls to helplines are unclear, with some reporting increases, others decreases, and half reporting no change.[12,19] These variations may reflect differences in stay-at-home orders, educators and other service providers no longer seeing children, and victims' inability to safely or privately access services during lockdowns.

Based on hospital records, several studies observed an increase in abuse-related pediatric injuries.[12,20] For example, the Children's Hospital of Eastern Ontario reported a greater than two-fold increase in fractures and head trauma in children younger than one year during the period September to January 2021 compared with the same period in pre-pandemic years.[21] This is consistent with reports from the United Kingdom.[22] Community surveys of caregivers of children have shown that pandemic-related stressors such as job loss, social isolation and parental distress were associated with increased emotional/psychological abuse, physical/supervisory neglect and greater use of harsh disciplinary practices.[10-12,23]

The mixed picture underscores the persistent challenges affecting the availability and quality of data on violence against children.[12,15] Some of these problems are related to inadequate investment in routine and longitudinal surveys and other methods of data collection necessary to estimate prevalence and incidence estimates of child maltreatment. Designs that combine cross-sectional surveillance with the ability to collect longitudinal data are needed to develop the full picture. What's more, they can be adapted from existing approaches in research conducted with youth.[24] Routinely collected cross-sectional data provide prevalence estimates over time, and longitudinal data can detect changes in the characteristics of the target population at both the group and the individual level.

Administrative data systems that might provide national estimates of the incidence of reports to authorities and service providers have been found to be deficient,[15] with challenges related to underreporting within the welfare system[25] and concerns about screening tools that are currently utilized by hospital systems.[26] Lack of consistent, reliable data has made it difficult to understand child maltreatment related to COVID-19, to track patterns and to make plans. The pandemic exposed a major deficiency in the system—under-identification of the extent of child maltreatment in Canada. As we emerge from the pandemic, a comprehensive approach to collecting child maltreatment data is needed.

Surveillance and research in Canada

In many ways, Canada's public health system has prioritized the issue of family violence with support across the political spectrum and from numerous federal departments and agencies.[27] However, more can be done.

The federal government ratified and implemented the United Nations (UN) Convention on the Rights of the Child, and offered its support to the UN Sustainable Development Goals 2030 Agenda, including Goal 16.2 to end abuse, exploitation, trafficking and all forms of violence against and torture of children by 2030.[28]

In 2018, Canada joined the Global Partnership to End Violence Against Children as "pathfinding country," reinforcing its commitment to expanding political support, mobilizing additional resources and preparing practitioners to address violence against children. As part of this pledge, Canada agreed to accelerate domestic actions over three to five years.[28] Increased surveillance is also aligned with calls to action by the Truth and Reconciliation Commission, which highlighted the need to report on First Nations, Inuit and Métis children in care as well as the reasons for their apprehension; increased surveillance would also respond to the recommendation to monitor and assess neglect and indirectly reduce the number of Indigenous children in care through the provision of evidence to inform interventions.[29]

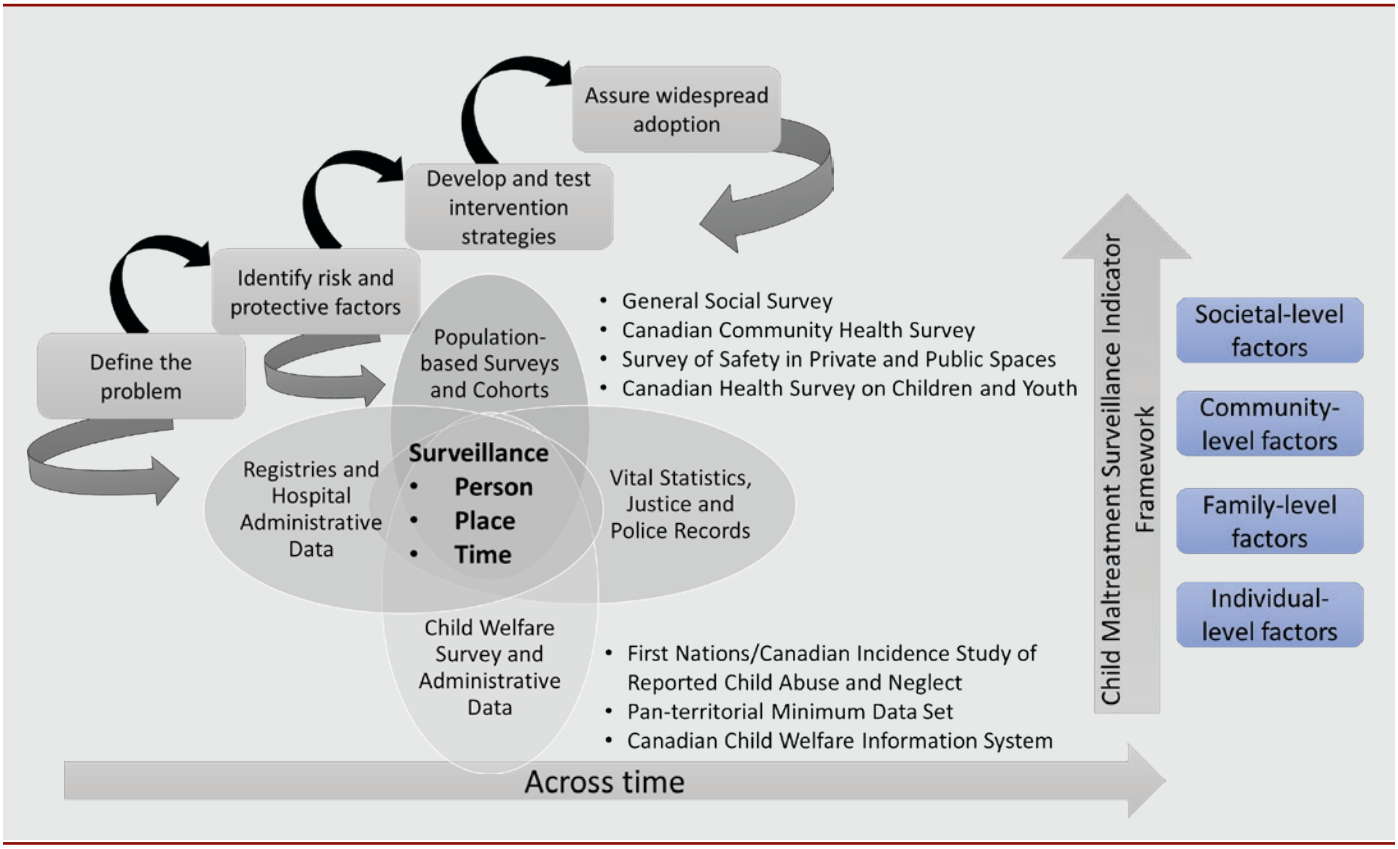
To determine if Canada is fulfilling its commitment as outlined by the UN Convention and the calls to action by the Truth and Reconciliation Commission, and to monitor progress towards achieving our Sustainable Development Goal target of eliminating violence against children by 2030, a rigorous and robust framework of surveillance and research, integrating multiple sources of information, must be in place.

Public health surveillance is traditionally defined as the *ongoing*, systematic collection, recording, analysis, interpretation and dissemination of data to inform and evaluate public health practice.[30] Surveillance data are used for monitoring, generating hypotheses and examining differences over time between subgroups, for example, by sex or province, and focusses on systems at a broader level. We also need research to test hypotheses generated by surveillance and answer specific questions around causal effect and the effects of context. Evidence from both surveillance and research can inform the design, evaluation and implementation of public health interventions and to address the questions of what works for whom, and why. This helps empower decision makers to determine effects of policies through timely and useful evidence.[31] Successful examples of this have been used in assessments of parenting programs in Manitoba.[32]

Data on family violence can be collected from a variety of sources such as child welfare agencies, hospital and police records, and population-based surveys. The data should include, whenever possible, associations with risk and protective factors at the individual, family, community and societal levels (see Figure 1).

A four-step public health approach to violence prevention adopted by the Violence Prevention Alliance provides a framework to guide data collection on child maltreatment. Step one includes surveillance, which provides understanding of the size and scope of the problem. Step two is research to identify risk and protective factors. Step three includes the development

FIGURE 1
Proposed surveillance and research framework for child maltreatment



and evaluation of interventions. Step four is the broad dissemination, evaluation and continual assessment to ensure all components of the strategy fit with the community context and have the desired effect of preventing violence.[33]

Two of the opportunities for action recognized in *Canada's Roadmap to End Violence Against Children*[28] are tied to key principles of surveillance and the Minister of Health's Departmental Plan.[13] These are (1) to enhance data collection, quality and monitoring, and (2) to strengthen the evidence about what works and mobilizing knowledge.

To achieve these goals, numerous initiatives have been undertaken or planned. For example, the General Social Survey (GSS) on Canadians' Safety (conducted every five years using a nationally representative sample of individuals aged 15 years or older) contains questions about recent victimization and about childhood physical and sexual abuse and exposure to intimate partner violence older. In 2012, the Canadian Community Health Survey–Mental Health, the 2019 Canadian Community Health Survey and the 2018 Survey of Safety in Private and Public Spaces included questions related to childhood abuse and exposure to intimate partner violence.

Statistics Canada assembles family violence information from various administrative data sources, such as police reports, youth court reporting and victims service agency data. The Canadian Incidence Study of Reported Child Abuse and Neglect (CIS) is a national initiative to collect data about children and families who come to the attention of child welfare authorities owing to alleged or suspected child abuse and/or neglect.[28] Several waves have been conducted—in 1998, 2003, 2008 and most recently in 2018/2019, led by the Assembly of First Nations (First Nations Incidence Study of Reported Child Abuse and Neglect/CIS).[28] Two relatively new initiatives include the Canadian Child Welfare Information System (CCWIS) and the Pan-territorial Minimum Data Set.

While these data sources provide valuable information, there is room for improvement. Below, we offer recommendations as steps to be taken in developing a strong surveillance and research framework in Canada.

Recommendations

1. National surveys should encompass all forms of child maltreatment. Currently, only three subtypes are included: physical and sexual abuse and exposure to intimate partner violence. Although difficult to measure, emotional abuse and neglect should also be covered. Inclusion of questions should be guided by established and comprehensive definitions and consistent measurement.
2. To fully understand associations between child maltreatment and diverse outcomes, it is necessary to include a core set of questions on maltreatment in all national surveys focussing on health and victimization.
3. The upcoming Canadian Health Survey on Children and Youth should include child maltreatment

questions. The General Social Survey (GSS) asks such questions of respondents aged 15 years or older, but Canada has no national data on younger age groups or data that can be related to a number of child-related outcomes and factors.

4. It is necessary to develop specific, sensitive protocols to ethically collect data on child maltreatment while balancing the rights, dignity and safety of participants as well as the duty to report in certain instances. Much of the reluctance to ask questions about family violence stems from concerns about ensuring safety and the possibility of creating distress. However, international experience suggests that with proper protocols in place, questions can be asked.[34,35]
5. As recommended by the Child Maltreatment Surveillance Indicator Framework,[36] information on multidimensional risk and protective factors should be extracted from administrative databases and from national surveys.
6. Longitudinal data should also be collected to understand trajectories of health and well-being in individuals exposed to child maltreatment. This may be accomplished through successive waves of data collection (national surveys) or through administrative data linkages.
7. For administrative data, an established, acceptable theoretical definition of family violence is needed to facilitate the extraction of child maltreatment data across agencies. Strong collaborative links between the organizations that are responsible for collecting family violence are needed, across sectors and provinces/territories, to ensure uniform measurement to obtain a national picture of child maltreatment. Some of this work has already begun; however, continued support and investment in the Canadian Child Welfare Information System (CCWIS) are required to develop a robust infrastructure of administrative maltreatment data.
8. We need systemic changes to child welfare and more universal supports for families with a focus on primary prevention, and adequate resources to monitor implementation of interventions and what works for whom and why.

This may seem to be a daunting endeavour, but we can learn from other countries. For example, the US Department of Justice, the US Children's Bureau, the US Centers for Disease Control and the Australia Institute for Health and Welfare gather information from multiple sources, from household surveys to official administrative data, including state-based surveillance of child maltreatment from youth aged 10 to 17 years and caregivers of children younger than 9 years old.[34,35]

Conclusion

Family violence is a pressing social and public health issue for all Canadians.[37] The COVID-19 pandemic exposed a considerable gap in the availability and quality of child maltreatment data in Canada. The lack of such data systems has not only hindered our ability to readily understand the negative outcomes of the pandemic on children and families, but also limits our ability to respond in an evidence-based manner to the needs of children and families to assist with recovery.

This commentary highlights the significant impact of the pandemic on the mental health and well-being of Canadian adults and that these effects are not equal. What is unknown is whether, and to what extent, the pandemic has created a "shadow pandemic" that placed children at greater risk for maltreatment.

International research suggests that there has been an increase in violence towards children. Even if the increases are relatively short-lived, given the multitude of long-term health consequences associated with maltreatment, the effects will be long lasting.

As we move into post-pandemic recovery and planning, we need to capitalize on our knowledge of the deficiencies within our system and adopt a new framework for surveillance and research for child maltreatment. Some of the infrastructure to collect rigorous surveillance and research data on child maltreatment exists and can be used to increase the feasibility and success of what we propose in this commentary. The success of this framework will depend on consistent commitment and investment to collect and synthesize routinely collected data from a number of sources including national surveys conducted by Statistics Canada, hospitalization/injury data, criminal and police reports as well as a national child abuse and neglect databases such as the Canadian Child Welfare Information System (CCWIS). Improving the quality, consistency and scope of child maltreatment data is critical not only to understand the extent of maltreatment and to monitor trends, but also to ensure our commitments to the Sustainable Development Goal to eliminate violence against all children.

Conflicts of interest

Tracie O. Afifi is an Associate Scientific Editor with *Health Promotion and Chronci Disease Prevention in Canada*, but has recused herself from the review process for this commentary. The authors have no conflicts of interest.

Authors' contributions and statement

AG, TOA and LT informed the concept and contributed to the design, writing and critical review of this commentary.

The content and views expressed in this article are those of the authors and do not necessarily reflect those of the Government of Canada.

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https://doi.org/10.24095/hpcdp.41.11.08

Release notice

Knowledge products related to symptoms of PTSD, anxiety and depression from the Survey on COVID-19 and Mental Health, Cycle 1

(Published online 27 September 2021)

The Public Health Agency of Canada has produced two infographics and a data blog using data from Cycle 1 of the Survey on COVID-19 and Mental Health. All of these may be viewed on the Canada.ca website: (1) an infographic on symptoms of posttraumatic stress disorder (PTSD); (2) an infographic on symptoms of generalized anxiety disorder (GAD) and of major depressive disorder (MDD); and (3) a data blog to supplement these infographics. These products focus on the prevalence of screening positive (i.e. meeting a threshold score for "moderate to severe symptoms" on validated screening tools) for PTSD, GAD and MDD among Canadian adults aged 18 years and over. Prevalence of screening positive is examined in the context of age group, gender and other demographic factors, as well as factors related to mental health and substance use.

https://doi.org/10.24095/hpcdp.41.11.09

Release notice

Canadian Cancer Statistics 2021

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Just released!

Canadian Cancer Statistics 2021 was released on November 3, 2021.

This publication is produced through a collaboration between the Canadian Cancer Society, Statistics Canada and the Public Health Agency of Canada, with data provided by the provincial and territorial cancer registries. It provides current-year projected estimates of cancer incidence and mortality counts and rates by cancer type, sex, age group and geography. This publication also includes the probability of developing and dying from cancer, incidence and mortality trends over time, and net survival by cancer type, sex, age group, geography and time period.

Highlights include:

- Cancer remains the leading cause of death in Canada. An estimated 2 in 5 Canadians will be diagnosed with cancer in their lifetime and about 1 in 4 will die from cancer.
- In 2021, an estimated 229 200 Canadians will be diagnosed with cancer and 84 600 will die from cancer.
- Lung, breast, colorectal and prostate cancers are expected to remain the most commonly diagnosed cancers, accounting for 46% of all diagnoses in 2021. Melanoma cancer continues to increase, despite being a highly preventable cancer, while thyroid cancer is decreasing.
- It is expected that the three leading causes of cancer death in 2021 will be lung cancer (25%), colorectal cancer (11%) and pancreatic cancer (7%). The death rate for lung cancer is declining, with the rate for females finally decreasing similarly to the rate for males.
- Current five-year net cancer survival is estimated to be 64% for all cancers combined.

Access or download the latest *Canadian Cancer Statistics* and related resources.

Other PHAC publications

Researchers from the Public Health Agency of Canada also contribute to work published in other journals. Look for the following articles published in 2021:

Bergeron CD, Boolani A, Jansen EC, et al. Practical solutions to address COVID-19-related mental and physical health challenges among low-income older adults. Front Public Health. 2021;9:674847. https://doi.org/10.3389/fpubh.2021.674847

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Bird M, **Cerutti S**, **Jiang Y**, **Srugo SA**, **de Groh M**. Implementation of the CANRISK tool: a qualitative exploration among allied health professionals in Canada. Can J Diabetes. 2021;S1499-2671(21)00179-9. https://doi.org/10.1016/j.jcjd.2021.06.006

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