Correlates of suicidal ideation related to the COVID-19 Pandemic: Repeated cross-sectional nationally representative Canadian data

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\textbf{ABSTRACT}

Objective: With significant levels of mental distress reported by populations, globally, the magnitude of suicidal ideation during and beyond the COVID-19 pandemic is a central concern. The goal of this study was to quantify the extent of pandemic-related suicidal ideation in the Canadian population during the first ten months of the pandemic and identify sociodemographic and pandemic-related stressors associated with increased risk of ideation.

Method: Data were derived from three rounds of a mental health monitoring survey, nationally representative by age, gender, household income, and region, delivered online in May 2020, September 2020, and January 2021. Bivariate analyses were used to quantify the proportion of respondents in Canada reporting suicidal ideation by sociodemographic factors and pandemic-related stressors. Unadjusted and adjusted multivariable logistic regression was used to study the association between suicidal ideation and correlates within four pandemic-related stressor categories (financial, relationship, substance use, COVID-19 exposure).

Results: Of the 7002 respondents, 6.2% (n = 433) reported experiencing suicidal thoughts or feelings as a result of the pandemic within the two weeks prior to taking the survey. In terms of sociodemographic factors, suicidal ideation was more commonly reported among those who were not cisgender, <65 years-old, single, Indigenous, LGBT2Q+, and who experience a pre-existing mental health condition. After adjusting for sociodemographic factors, indicators across all four pandemic-related stressor categories were associated with two or more times the odds of suicidal ideation.

Conclusion: Disparities in COVID-19 related suicidal ideation have persisted throughout the first year of the pandemic for specific sociodemographic sub-groups and those who have faced stressors related to finances, relationships, increased substance use, and COVID-19 virus exposure. To best address these disparities and to prevent a transition from suicidal ideation to action, appropriate planning, resources, and policies are needed to ensure health and well-being for everyone.

1. Introduction

Globally, almost 800,000 people die every year from suicide (\textit{World Health Organization, 2014}). In Canada, approximately 4000 people die from suicide annually, while 2.5\% of the population reports past-year suicidal thoughts (\textit{Public Health Agency of Canada [PHAC], 2016}). Research further indicates that suicidal risk is not evenly distributed across the population, due to structural and social factors (e.g., age, gender, mental illness, those who live alone and are unmarried, LGBT2Q+, Indigenous, etc.) that increase risk via harmful and
inequitable conditions that limit access to the determinants of good health for specific populations and groups (Findlay, 2017; Have et al., 2009; Nock et al., 2008). Since the onset of the COVID-19 pandemic, suicide risk has also been found to be elevated among those who have lost a job, are unemployed, or have a reduced household income (Findlay, 2017; Have et al., 2009; Kumar & Tijepkema, 2019; Teuton, 2018), and among those who experience interpersonal violence (Faust et al., 2021) or have increased their substance use (Canady, 2021; Faust et al., 2021).

While death by suicide has been referred to as a lagging indicator when assessing the severity of population mental health challenges, the prevalence of suicidal ideation (i.e., thoughts of suicide) is considered a more time-sensitive indicator for potential suicide risk (Botchway & Fazel, 2021; Nordt, Wramke, Seifritz, & Kawohl, 2015). In a global context, various risk factors have been identified for suicidal ideation, including age (<35 years-old) (Nock et al., 2008), presence of a mental health condition (Have et al., 2009; Nock et al., 2008; Teuton, 2018); living alone and/or being unmarried (Have et al., 2009; Nock et al., 2008); and LGBTQ+ identity (Canady, 2021; Casey, 2019), to name a few. In Canada, research has further shown that being Indigenous (Kumar & Tijepkema, 2019) or a woman, is associated with an increased likelihood of experiencing suicidal thoughts (Perro, Gorter, & Boyle, 2015).

During the first year of the COVID-19 pandemic, numerous studies documented a rising prevalence in suicidal thoughts among various population groups (Dubé, Smith, Sherry, Hewitt, & Stewart, 2021; Fitzpatrick, Harris, & Drewve, 2020; Jenkins et al., 2021; Xiong et al., 2020). This trend occurs alongside increases in depression and anxiety, which are associated with higher risk of suicidal ideation (Czeisler et al., 2020; Sher, 2020). According to Dubé and colleagues’ (2021) meta-analysis of 54 studies, an increase in suicidal ideation across all studies has been observed, with global pre-pandemic levels of ~5% (Liu, Bettis, & Burke, 2020) increasing to 10.8% during the pandemic (Dubé et al., 2021). Furthermore, several mental health-related risk factors for suicidal ideation have increased in the context of the COVID-19 pandemic, including distress, insomnia, isolation, loneliness, diminished sense of control, financial loss/strain, work pressure, inability to return to work, hopelessness, and helplessness (Statistics Canada, 2020; Canady, 2021; Mental Health Commission of Canada, 2020; Sher, 2020), as well as “CORONEX” — a term identified by da Silva (2021) referring to coronavirus “presence” or exhaustion. Within Canada, there has been a surge in reported calls to Canadian distress centres, including the Canada Suicide Prevention Service (up 50% in 2020), as well as a high demand for virtual crisis support (Basky, 2021; Mental Health Commission of Statistics Canada, 2020). Crisis line volunteers have also reported an increase in intense interactions, with 62% more active rescues (responder response to emergency calls due to imminent risk of harm or suicide in-progress) (Wright, 2020 in Mental Health Commission of Statistics Canada, 2020). Whether or not suicidal ideation advances to suicidal behaviours, there has been considerable impact on the burden of population-level mental health.

At present, mental health challenges continue to rise, with concerns about the extent of suicidal ideation during and beyond the pandemic. Although it is not possible to know the total number of deaths by suicide directly related to the COVID-19 pandemic, people worldwide are experiencing and reporting increased suicidal ideation and mental health challenges (Czeisler et al., 2020; Fitzpatrick et al., 2020; López-Stewart et al., 2021; Mental Health Commission of Statistics Canada, 2020; Tanaka & Okamoto, 2021). Moreover, those who experience financial-stressors (Canetto, 2015; Elbogen, Lanier, Blakney, Wagner, & Tsai, 2021; Kousoulis et al., 2020; Reger, Stanley, & Joiner, 2020) and/or relationship violence or stressors (Canetto, 2015; Iob, Septoe, & Fancourt, 2020; Monteith, Holliday, Brown, Brenner, & Mohatt, 2020; Soore, Köves, & De Leo, 2015; Usher, Bhullar, Durkin, Gyamfi, & Jackson, 2020) have increased risk of suicidal ideation. Given the rise in suicidal ideation and other suicide-related risk factors, there is a pressing need for research monitoring the extent of suicidal ideation and associated correlates to guide targeted intervention and prevention efforts. Therefore, the aims of this paper are: (1) to quantify the extent of suicidal ideation due to the COVID-19 pandemic in the adult population in Canada and within key sub-groups, and (2) to identify sociodemographic and pandemic-related stressors that may be associated with increased risk of suicidal ideation.

2. Methods

2.1. Survey Development and approach

This study was developed in partnership between researchers at the University of British Columbia (UBC) and the Canadian Mental Health Association (CMHA), with international collaboration from the Mental Health Foundation in the United Kingdom. Team members represent a variety of disciplines, work-sectors, and lived experiences, benefiting the development of the survey, and creating pathways for impact. Survey items were first informed by the Mental Health Foundation’s monitoring study, first commissioned in March 2020, which incorporated input from people with lived experience of mental health conditions and research on mental health impacts of past pandemics (Kousoulis et al., 2020). Modifications were then made by the UBC research team, in consultation with CMHA collaborators, to reflect the Canadian context.

Data are derived from three rounds of surveying conducted as part of the Assessing the Impacts of COVID-19 on Mental Health monitoring study examining the mental health impacts of the pandemic in Canada. Round 1 data were collected May 14–29, 2020, at a time when many Canadian provinces were opening back up following initial public health restrictions. Round 2 data were collected September 14–21, 2020, marking the end of summer months during which many public health restrictions were eased. At this time, many young people were returning to schools for the first time since spring. Round 3 data were collected January 22–28, 2021, following the winter holidays where many provinces had implemented strict public health restrictions, and vaccine rollout was in its early stages. National polling vendor Maru-Matchbox distributed surveys to their online panel consisting of approximately 125,000 members. Surveys, available in English and French (Canada’s two official languages), were sent to a random selection of panel members, stratified by current Canadian census-informed socio-economic characteristics (age, gender, household income, and province/territory). The sampling approach was further adjusted for response propensity to support representativeness according to the aforementioned census-informed socioeconomic stratifications.

Response-to-invitation ratios were 32% (Round 1), 36% (Round 2), and 36% (Round 3) resulting in 9061 completed surveys. Of these, 1993 (22%) were from respondents who participated in more than one survey round, resulting in a final sample of 7068 unique participants. A comparison of participant characteristics for those who did, versus those who did not, participate in multiple survey rounds indicated that the following groups were more likely to have repeat participation: <65 years of age, a household income greater than $100k, live in the province of Quebec, or experienced suicidal thoughts in the previous 2 weeks (See Supplementary Table 1 for details).

2.2. Ethics

Ethical approval for this study was obtained by the University of British Columbia Behavioural Research Ethics Board (H20-01273). Participants provided consent online prior to beginning the survey and were offered information on how to access mental health supports if needed. Maru/Matchbox provided a small honorarium for all participants who completed the survey.
2.4. Statistical analysis

Descriptive statistics were used to characterize the sample and quantify the extent of COVID-19 related suicidal ideation across the three survey rounds. Bivariate analyses (chi-square tests) were used to examine proportions of respondents reporting suicidal ideation by sociodemographic factors and pandemic-related stressors. To meet the assumptions of independent samples for chi square and subsequent regression analyses, we only included the earliest completed survey if participants had completed multiple survey rounds.

Multivariable logistic regression was used to examine the associations between COVID-19 related suicidal ideation and sociodemographic factors, as well as pandemic-related stressors within each of the four defined factor categories. To facilitate inclusion in the regression models, a “Non-cisgender” category was created containing respondents who identified as transgender woman, transgender man, or non-binary. Those who responded with Two-Spirit, not listed, and prefer not to answer were not included in the multivariate modeling, owing to important differences in the Two-Spirit (Indigenous) conceptualization of gender/sexuality, which differs from western identities (Pruden & Salway, 2020). Unadjusted models were used to examine the independent associations between each indicator variable and suicidal ideation. To account for potential confounding by sociodemographic differences, as well as changes in suicidal ideation over time, separate adjusted models were used to examine the independent associations between each indicator variable within each stressor category and suicidal ideation, adjusting for sociodemographic factors and survey round. Results are presented as odds ratios with 95% confidence intervals. All analyses were performed using SPSS version 27 (IBM Corp, 2020).

3. Results

Of the 7068 unique participants, 66 (1%) selected “Prefer not to say” for the assessment of suicidal ideation. These participants were excluded from subsequent analyses resulting in a final sample of 7002. Participants who selected “Prefer not to say” were more likely to be in the cisgender male or non-cisgender categories, aged 18–34 years, and have a household income less than $25k (see Supplementary Table 2 for details). In the final sample of 7002 participants, 6.2% of respondents (n = 433) indicated that within the past two weeks, they had experienced suicidal thoughts or feelings as a result of the COVID-19 pandemic. Table 1 characterizes the sample and presents the proportion of the sample experiencing COVID-19 related suicidal ideation by sociodemographic factors. Suicidal ideation in the previous two weeks was more frequently reported among those who were not cisgender (e.g., transgender women), were <65 years-old, single, identified as Indigenous or LGBTQ2+, or who had a pre-existing mental health condition.

Table 2 presents the distribution of the measured pandemic-related stressors across the full sample and for those who identified experiencing suicidal ideation. Across the full sample, a large proportion of respondents reported financial stressors including stress or worry about financial concerns (34.5%), relationship stressors including worry about experiencing relationship challenges (17.1%), and increased alcohol use (17.1%). With respect to other substance use, <7% reported increased use of individual substances other than alcohol (e.g., tobacco, cannabis, prescribed medications, and other psychoactive substances). In terms of COVID-19 exposure stressors, a small proportion (<6%) of respondents reported that they or someone in their family or household had tested positive for COVID-19, however 36.9% reported experiencing a fear of getting severely sick or dying. Those who reported experiencing suicidal thoughts or feelings in the past two weeks were more likely to also report experiencing each of the stressors except for having a family member/loved one living at a different address testing positive for COVID-19.

Results of the logistic regression models that included sociodemographic factors and study round are presented in Table 3. Compared to cisgender women, cisgender men reported higher odds of experiencing suicidal thoughts or feelings in the past two weeks (Adjusted Odds Ratio (AOR) = 1.28, 95% Confidence Interval (CI): 1.02, 1.61), as did those in the non-cisgender category (AOR = 2.88, 95% CI: 1.16, 7.15). Being 18–34 years old (AOR = 3.23, 95% CI: 2.13, 4.89), single (AOR = 1.65, 95% CI: 1.26, 2.17), having Indigenous origins (AOR = 1.88, 95% CI: 1.21, 2.92), identifying as LGBTQ2+ (AOR = 1.67, 95% CI: 1.23, 2.28), and having a pre-existing mental health condition (AOR = 5.32, 95% CI: 4.23, 6.70) were all associated with increased odds of experiencing COVID-related suicidal thoughts or feelings in the past two weeks. There was also an association between suicidal ideation and study round, with the odds of reporting suicidal thoughts or feelings being higher in Round 2 compared to Round 1 (AOR = 1.54, 95% CI: 1.20, 1.96). The results of a set of sensitivity analyses for the same models, with respondents who
Participants were asked, “Do you identify as a person who has a pre-existing mental health condition?”

\* Final sample is composed of 7068 participants who participated in only one survey round; descriptive analyses exclude 66 participants who selected “Prefer not to say” for the assessment of suicidal ideation.

\dagger Includes Northwest Territories, Nunavut, and Yukon.

\* Participants were asked, “Do you identify as being LGBT2Q+ (lesbian, gay, bisexual, trans, two-spirit, queer, etc.)?”

\dagger Participants were asked, “What is your family ethnicity” and were able to select multiple options. Respondents were classified as Indigenous if they self-identified having a family of Indigenous origins, even if they identified additional ethnic categories.

\* Participants were asked, “Do you identify as a person who has a pre-existing (prior to COVID-19) mental health condition?”

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### Table 1

Sample characteristics, overall and by reporting having experienced suicidal thoughts or feelings in the previous 2 weeks (n, row %).

| Gender                        | Overall study sample | Experienced suicidal thoughts or feelings in the previous 2 weeks | Chi-square test p-value |
|-------------------------------|----------------------|---------------------------------------------------------------|-------------------------|
|                               | (n, column %)        | (n – 7002)                                                  |                         |
| Cisgender man                 | 3350 (47.8)          | 3150 (48.0)                                                  | 200 (46.2)              |
| Cisgender woman               | 3577 (51.1)          | 3366 (51.2)                                                  | 211 (48.7)              |
| Transgender woman             | 22 (0.3)             | 11 (0.2)                                                    | 11 (2.5)                |
| Transgender man               | 7 (0.1)              | 7 (0.1)                                                     | 0 (0.0)                 |
| Non-binary                    | 20 (0.3)             | 14 (0.2)                                                    | 6 (1.4)                 |
| Two-spirit                    | 8 (0.1)              | 6 (0.1)                                                     | 2 (0.5)                 |
| Not listed                    | 4 (0.1)              | 3 (0.0)                                                     | 1 (0.2)                 |
| Prefer not to answer          | 14 (0.2)             | 12 (0.2)                                                    | 2 (0.5)                 |
| Age 18-34 years               | 874 (12.5)           | 763 (11.6)                                                  | 111 (25.6)              |
| Age 35-64 years               | 3942 (56.3)          | 3668 (55.8)                                                  | 274 (63.3)              |
| Age 65+ years                 | 2186 (31.2)          | 2138 (32.5)                                                  | 48 (11.1)               |
| Household income Under $25k   | 503 (7.3)            | 438 (6.8)                                                    | 65 (15.1)               |
| $25k--<$50k                   | 1258 (18.2)          | 1173 (18.1)                                                  | 85 (19.7)               |
| $50k--<$100k                  | 2456 (35.6)          | 2317 (35.8)                                                  | 139 (32.3)              |
| $100k+                        | 2688 (38.9)          | 2546 (39.3)                                                  | 142 (32.9)              |
| Province                      |                      |                                                              |                         |
| Alberta                       | 852 (12.2)           | 791 (12.0)                                                   | 61 (14.1)               |
| British Columbia              | 1048 (15.0)          | 985 (15.0)                                                   | 63 (14.5)               |
| Manitoba                      | 262 (3.7)            | 248 (3.8)                                                    | 14 (3.2)                |
| New Brunswick                 | 147 (2.1)            | 143 (2.2)                                                    | 4 (0.9)                 |
| Newfoundland and Labrador     | 103 (1.5)            | 96 (1.5)                                                     | 7 (1.6)                 |
| Nova Scotia                   | 360 (5.1)            | 336 (5.1)                                                    | 24 (5.5)                |
| Ontario                       | 2643 (37.7)          | 2464 (37.5)                                                  | 179 (41.3)              |
| Prince Edward Island          | 27 (0.4)             | 26 (0.4)                                                     | 1 (0.2)                 |
| Quebec                        | 1302 (18.6)          | 1245 (19.0)                                                  | 57 (13.2)               |
| Saskatchewan                  | 232 (3.3)            | 211 (3.2)                                                    | 21 (4.8)                |
| Territories                   | 26 (0.4)             | 24 (0.4)                                                     | 2 (0.5)                 |
| Marital status                |                      |                                                              |                         |
| Single                        | 1368 (19.5)          | 1216 (18.5)                                                  | 152 (35.1)              |
| Married or partnered          | 4655 (66.5)          | 4433 (67.5)                                                  | 222 (51.3)              |
| Separated, divorced, widowed  | 979 (14.0)           | 920 (14.2)                                                   | 59 (13.6)               |
| LGBT2Q+                       |                      |                                                              |                         |
| Yes or unsure                 | 495 (7.1)            | 410 (6.3)                                                    | 85 (20.0)               |
| No                            | 6471 (92.9)          | 6130 (93.7)                                                  | 341 (80.0)              |
| Ethnicity                     |                      |                                                              |                         |
| Indigenous                    | 209 (3.1)            | 177 (2.8)                                                    | 32 (7.9)                |
| Not Indigenous                | 6531 (96.9)          | 6156 (97.2)                                                  | 375 (92.1)              |
| Pre-existing mental health condition |              |                                                              |                         |
| Yes                           | 1182 (17.0)          | 955 (14.6)                                                   | 227 (54.3)              |
| No                            | 5755 (83.0)          | 5659 (85.4)                                                  | 191 (45.7)              |
| Study round                   |                      |                                                              |                         |
| Round 1 (May 2020)            | 2968 (42.4)          | 2792 (42.5)                                                  | 176 (40.6)              |
| Round 2 (September 2020)      | 2454 (35.0)          | 2271 (34.6)                                                  | 183 (42.3)              |
| Round 3 (January 2021)        | 1580 (22.6)          | 1506 (22.9)                                                  | 74 (17.1)               |

### Table 2

Pandemic-related stressors, overall and by reporting having experienced suicidal thoughts or feelings in the previous 2 weeks (n, column %).

| Financial stressors indicators | Overall study sample | Experienced suicidal thoughts or feelings in the previous 2 weeks | Chi-square test p-value |
|--------------------------------|----------------------|---------------------------------------------------------------|-------------------------|
|                                | (n, column %)        | (n – 7002)                                                  |                         |
| Financial concerns             |                      |                                                              |                         |
| Yes                            | 2415                 | 2139 (17.1)                                                  | 276 (29.1)              |
| No                             | 5567                 | 5360 (15.3)                                                  | 247 (32.6)              |
| Losing my job                  |                      |                                                              |                         |
| Yes                            | 1395                 | 1209 (15.8)                                                  | 186 (23.4)              |
| No                             | 5607                 | 5360 (15.3)                                                  | 247 (32.6)              |
| Increased substance use        |                      |                                                              |                         |
| Drinking alcohol               |                      |                                                              |                         |
| More                           | 1198                 | 1061 (13.2)                                                  | 137 (17.1)              |
| Not more                       | 5802                 | 5534 (18.4)                                                  | 268 (32.6)              |
| Use of tobacco products        |                      |                                                              |                         |
| More                           | 379                  | 298 (19.6)                                                   | 81 (11.9)               |
| Not more                       | 5804                 | 5508 (18.4)                                                  | 296 (36.9)              |
| Use of prescribed medication   |                      |                                                              |                         |
| More                           | 463                  | 356 (23.7)                                                   | 107 (14.7)              |
| Not more                       | 6539                 | 6213 (32.6)                                                  | 326 (42.7)              |
| Use of other psychoactive substances |              |                                                              |                         |
| More                           | 90                   | 53 (5.8)                                                     | 37 (8.5)                |
| Not more                       | 6912                 | 6516 (9.2)                                                   | 396 (5.9)               |
| COVID-19 stressors             |                      |                                                              |                         |
| Tested positive for COVID-19   |                      |                                                              |                         |
| Yes                            | 48 (0.7)             | 26 (0.4)                                                     | 22 (5.1)                |
| No                             | 6594                 | 643 (9.9)                                                    | 411 (8.8)               |

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those who reported drinking more alcohol (AOR 2.88, 95% CI: 2.26, 3.67), and being safe from physical or emotional loss (AOR 3.51, 95% CI: 2.48, 4.96), or psychoactive substances (AOR 4.55, 95% CI: 2.57, 8.06).

Indicators in the COVID-19 exposure stressors category that were associated with higher odds of suicidal ideation included having previously tested positive for COVID-19 (AOR = 2.48, 95% CI: 1.97, 3.13), job loss (AOR = 2.61, 95% CI: 2.07, 3.29), relationship challenges (AOR = 2.88, 95% CI: 2.26, 3.67), and being safe from physical or emotional domestic violence (AOR = 2.03, 95% CI: 1.47, 2.80).

Increased substance use was also associated with higher odds of suicidal ideation. Specifically, odds of suicidal ideation were higher for those who reported stress or worry about financial concerns (AOR = 2.48, 95% CI: 1.97, 3.13), job loss (AOR = 2.61, 95% CI: 2.07, 3.29), relationship challenges (AOR = 2.88, 95% CI: 2.26, 3.67), and being safe from physical or emotional domestic violence (AOR = 2.03, 95% CI: 1.47, 2.80).

Table 2 (continued)

| Suicidal ideation risk factor group | Indicators | Overall study sample | Experienced suicidal thoughts or feelings in the previous 2 weeks |
|-----------------------------------|------------|----------------------|---------------------------------------------------------------|
|                                   |            | (n, %)               | (n = 6569, 93.8%)                                              |
| positive for COVID-19             |            |                      |                                                              |
| Yes                               | 50 (0.7%)  | 33 (0.5%)            | 17 (3.9)                                                      |
| No                                | 6952 (99.3%) | 6536 (99.5%)     | 416 (96.1%)                                                   |
| Family member/loved one living at a different address tested positive for COVID-19 | |                      |                                                              |
| Yes                               | 300 (4.3%) | 275 (4.2%)          | 25 (5.8)                                                      |
| No                                | 6702 (95.7 %) | 6294 (95.8%)  | 408 (94.2)                                                    |
| Fear of getting severely sick or dying |            |                      | <.001                                                          |
| Yes                               | 2583 (36.9%) | 2356 (35.9%)      | 227 (52.4)                                                    |
| Not yes                           | 4419 (63.1%) | 4213 (64.1%)      | 206 (47.6)                                                    |

* Final sample is composed of 7688 participants who participated in only one survey round; descriptive analyses exclude 66 participants who selected “Prefer not to say” for the assessment of suicidal ideation.

Results of the logistic regression models for each stressor and substance use variable with adjustment for sociodemographic characteristics are presented in Table 4. All indicators in the financial and relationship stressor categories were associated with higher odds of suicidal ideation in the unadjusted and adjusted models. For example, odds of suicidal ideation were higher for those who reported stress or worry about financial concerns (AOR = 2.48, 95% CI: 1.97, 3.13), job loss (AOR = 2.61, 95% CI: 2.07, 3.29), relationship challenges (AOR = 2.88, 95% CI: 2.26, 3.67), and being safe from physical or emotional domestic violence (AOR = 2.03, 95% CI: 1.47, 2.80).

Increased substance use was also associated with higher odds of suicidal ideation. Specifically, odds of suicidal ideation were higher for those who reported drinking more alcohol (AOR = 1.99, 95% CI: 1.56, 2.55), or using more tobacco products (AOR = 2.56, 95% CI: 1.83, 3.57), cannabis products (AOR = 2.91, 95% CI: 2.18, 3.89), prescribed medication (AOR = 3.51, 95% CI: 2.48, 4.96), or psychoactive substances (AOR = 4.55, 95% CI: 2.57, 8.06).

Indicators in the COVID-19 exposure stressors category that were associated with higher odds of suicidal ideation included having previously tested positive for COVID-19 (AOR = 4.85, 95% CI: 2.05, 11.45) and reporting a fear of getting severely sick or dying (AOR = 1.67, 95% CI: 1.34, 2.08). The results of a set of sensitivity analyses for the same models with respondents who answered the suicidal ideation question with “Prefer not to say” all coded as “Yes” and then coded as “No” yielded the same pattern of results as the analyses with these respondents removed (see Supplementary Tables 4a and 4b respectively).

4. Discussion

Current research has generated limited knowledge on COVID-19-related suicidal thoughts or feelings in the previous 2 weeks – Sample characteristics (odds ratio, 95% confidence interval) (n = 6976 ).

Table 3

Results of logistic regression models for reporting having experienced COVID-related suicidal thoughts or feelings in the previous 2 weeks – Sample characteristics (odds ratio, 95% confidence interval).

| Gender | Unadjusted models | Adjusted model (including all sociodemographic factors and study round) |
|--------|-------------------|-----------------------------------------------------------------------|
|        |                    |                                                                       |
| Cisgender man | 1.01 (0.83, 1.24) | 1.28 (1.02, 1.61)                                                      |
| Cisgender woman | Reference | Reference                                                              |
| Non-cisgender | 8.47 (4.63, 15.51) | 2.88 (1.16, 7.15)                                                      |
| Age     |                   |                                                                       |
| 18–34 years | 6.41 (4.52, 9.09)  | 3.23 (2.13, 4.89)                                                      |
| 35–64 years | 3.27 (2.40, 4.47) | 2.56 (1.68, 3.31)                                                      |
| 65+ years | Reference | Reference                                                              |
| Household income Under $25k | 2.66 (1.94, 3.63) | 1.29 (0.87, 1.89)                                                      |
| $25k–< $50k | 1.31 (0.99, 1.73)  | 1.05 (0.76, 1.46)                                                      |
| $50k–< $100k | 1.06 (0.83, 1.35) | 0.89 (0.68, 1.17)                                                      |
| $100k + | Reference | Reference                                                              |
| Province |                   |                                                                       |
| Alberta | 1.06 (0.79, 1.43)  | 0.97 (0.69, 1.37)                                                      |
| British Columbia | 0.88 (0.65, 1.18) | 1.03 (0.74, 1.42)                                                      |
| Manitoba | 0.78 (0.44, 1.36)  | 0.78 (0.42, 1.44)                                                      |
| New Brunswick | 0.39 (0.14, 1.05)  | 0.50 (0.18, 1.39)                                                      |
| Newfoundland and Labrador | 1.00 (0.46, 2.19) | 1.58 (0.68, 3.64)                                                      |
| Nova Scotia | 0.98 (0.63, 1.53)  | 0.81 (0.50, 1.33)                                                      |
| Ontario | Reference | Reference                                                              |
| Prince Edward Island | 0.53 (0.07, 3.92) | 0.51 (0.06, 4.07)                                                      |
| Quebec | 0.63 (0.46, 0.86)  | 0.85 (0.61, 1.19)                                                      |
| Saskatchewan | 1.37 (0.85, 2.20) | 1.23 (0.71, 2.12)                                                      |
| Territories | 1.15 (0.27, 4.89) | 1.46 (0.30, 7.02)                                                      |
| Marital status |                   |                                                                       |
| Single | 2.55 (2.05, 3.16)  | 1.65 (1.26, 2.17)                                                      |
| Married or partnered Separated, divorced, widowed | 1.28 (0.95, 1.73) | 1.33 (1.04, 1.88)                                                      |
| LGBT2Q+: Yes or unsure | 3.63 (2.80, 4.72) | 1.67 (1.23, 2.28)                                                      |
| Ethnicity: Indigenous | 2.94 (1.98, 4.37) | 1.88 (1.21, 2.92)                                                      |
| Pre-existing mental health condition: Yes | 6.89 (5.61, 8.45) | 5.32 (4.23, 6.70)                                                      |
| Study round |                   |                                                                       |
| Round 1 (May 2020) | Reference | Reference                                                              |
| Round 2 (September 2020) | 1.27 (1.02, 1.57) | 1.54 (1.20, 1.96)                                                      |
| Round 3 (January 2021) | 0.78 (0.59, 1.03) | 1.02 (0.75, 1.40)                                                      |

* Final sample is composed of 7688 participants who participated in only one survey round; regression analyses exclude 66 participants who selected “Prefer not to say” in the assessment of suicidal ideation and 26 participants who selected “Two-Spirit”, “Not listed”, or “Prefer not to answer” in the gender question.

Includes transgender woman, transgender man, and non-binary.

Includes Northwest Territories, Nunavut, and Yukon.

Participants were asked, “Do you identify as being LGBT2Q+ (lesbian, gay, bisexual, trans, two-spirit, queer, etc.)?”
Participants were asked, “What is your family ethnicity” and were able to select multiple options. Respondents were classified as Indigenous if they self-identified having a family of Indigenous origins, even if they identified additional ethnic categories.

Participants were asked, “Do you identify as a person who has a pre-existing (prior to COVID-19) mental health condition?”

Table 4
Results of logistic regression models for reporting having experienced COVID-related suicidal thoughts or feelings in the previous 2 weeks – Pandemic-related stressors (odds ratio, 95% confidence interval) (n = 6976).

| Stressor                                | Unadjusted models | Adjusted models (individual models for each stressor that include adjustments for sociodemographic factors and study round) |
|-----------------------------------------|-------------------|------------------------------------------------------------------------------------------------------------------|
| Financial concerns                      | 3.65 (2.97, 4.47) | 2.48 (1.97, 3.13)                                                                                                  |
| Losing their job                         | 3.37 (2.76, 4.12) | 2.61 (2.07, 3.29)                                                                                                  |
| Relationship challenges                 | 3.32 (2.70, 4.07) | 2.88 (2.26, 3.67)                                                                                                  |
| Being safe from physical or emotional domestic violence | 2.55 (1.95, 3.33) | 2.03 (1.47, 2.80)                                                                                                  |
| Increased substance use                  |                   |                                                                                                                  |
| Drinking alcohol                         | 2.39 (1.93, 2.96) | 1.99 (1.56, 2.55)                                                                                                  |
| Use of tobacco products                  | 4.78 (3.65, 6.27) | 2.56 (1.83, 3.57)                                                                                                  |
| Use of cannabis products                 | 5.60 (4.38, 7.16) | 2.91 (2.18, 3.89)                                                                                                  |
| Use of prescribed medication             | 8.04 (6.09, 10.62)| 3.51 (2.48, 4.96)                                                                                                  |
| Use of other psychoactive substances     | 11.25 (7.28, 17.39)| 4.55 (2.57, 8.06)                                                                                                 |
| COVID-19 stressors                       |                   |                                                                                                                  |
| Tested positive for COVID-19             | 12.94 (7.22, 23.20)| 4.85 (2.05, 11.45)                                                                                                 |
| Someone in their household tested positive for COVID-19 | 7.67 (4.19, 14.04)| 1.88 (0.69, 5.14)                                                                                                 |
| Family member/loved one living at a different address tested positive for COVID-19 | 1.42 (0.93, 2.16) | 1.14 (0.68, 1.89)                                                                                                  |
| Fear of getting severely sick or dying   | 1.98 (1.63, 2.41) | 1.67 (1.34, 2.08)                                                                                                  |

b Includes transgender woman, transgender man, and non-binary.

Final sample is composed of 7068 participants who participated in only one survey round; regression analyses exclude 66 participants who selected “Prefer not to say” in the assessment of suicidal ideation and 26 participants who reported experiencing COVID-19 mental health condition.

Our findings related to the sociodemographic correlates of suicidal ideation are further aligned with research conducted during the pandemic. For example, those who are younger (18–34 years) have been identified in other studies as one of the groups most likely to experience suicidal ideation (Czeisler et al., 2020; Czeisler et al., 2021; Dubé et al., 2021; Fitzpatrick et al., 2020; Jenkins et al., 2021; López Steinmetz et al., 2020). Also aligned was our finding that those who are living alone or who are not partnered tend to be more likely to experience suicidal ideation (Fitzpatrick et al., 2020). Differences in suicidal thoughts and behaviours by race and/or ethnicity have also been documented. For example, those who identify as Indigenous have been described as two to four times more likely to report suicidal thoughts compared to their non-Indigenous counterparts (Fitzpatrick et al., 2020; Mental Health Commission of Statistics Canada, 2020). This is likely a result of the continued legacy of colonization that creates conditions (e.g., poverty, food insecurity, violence/abuse, disrupted social supports, etc.) in which suicide may feel like the better option for some (Walker et al., 2019). Moreover, while declines in overall suicide death rates have been identified during the early months of the pandemic, a recent study in the U.S. concluded that while the trend was encouraging, it “was due entirely to a significant 2.2% decrease in suicide among white people. No other racial or ethnic group saw a statistically significant change in suicide rates” (Stone, 2021 in; Kuehn, 2021, p. 1386). Indeed, multiple U.S. national surveys have shown higher rates of both suicide deaths and ideation among Indigenous populations (Fitzpatrick et al., 2020; Mitchell & Li, 2021; Polanco-Roman & Miranda, 2021). Overall, our study highlights the importance of capturing disaggregated data, leading to meaningful understandings regarding current trends for those most inequitably impacted by suicidality during the pandemic.

Our findings have also illuminated gender differences in experiences of suicidality during the pandemic. Specifically, our data indicate that cisgender men are more likely to report COVID-19 related suicidal ideation than cisgender women. This finding was surprising given that prior to the pandemic, women have consistently been identified as more likely to experience suicidal ideation compared to men (Farré et al., 2015). However, these findings mirror those recently observed in the UK (Joll et al., 2020; O’Connor et al., 2021; Sueki & Ueda, 2021) and in the US (Czeisler et al., 2020; Elbogen et al., 2021). The impacts of the “secession”, where job and income loss has been more heavily concentrated among women (Holpuch, 2020), as well as the “pulling together” phenomenon, associated with strengthened social connectedness and a unifying of communities, may be helpful areas for further inquiry to better understand this phenomenon (Ayers et al., 2021; Barr, 2015).
patients with post-COVID or “long haul” syndrome (i.e., symptoms extending beyond three weeks following first onset) may experience long-lasting psychological and neurobiological impacts. These reportedly include depression, anxiety, posttraumatic symptoms and PTSD, insomnia, and inflammatory brain damage; all of which are associated with increased suicide risk (Sher, 2020). Future research is needed to better understand the role of COVID-19 exposure and infection status on experiences of suicidal thinking.

4.1. Implications

Suicidal ideation is a concerning form of distress and those who are impacted are often hidden and go unrecognized (Jobs & Joiner, 2019). While suicidal ideation in Canada remains relatively low from that compared to a global perspective (Dubé et al., 2021), one hypothesis suggests this to be a result of the restrictions and limitations placed on accessibility to firearms (Leenaars, Moksony, Lester, & Wenkstern, 2003), as it is theorized that the ability to access lethal means increases the likelihood of shifting ideation to action (Klonsky, May, & Saffer, 2016). However, this investigation demonstrates that the proportion of Canadians experiencing suicidal thoughts or feelings has increased considerably during the COVID-19 pandemic, especially among groups impacted by issues of equity. Indeed, it was estimated in 2016 that 2.5% of the Canadian population experienced suicidal thoughts or feelings during the previous year (Public Health Agency of Canada (PHAC), 2016). In the present study, this proportion grew substantially, with 6.2% of survey respondents (averaged across rounds) identifying suicidal thoughts or feelings within the previous two weeks. Further, our analysis shows that the prevalence of COVID-19 related suicidal ideation is even higher for marginalized subpopulations.

As countries move toward pandemic recovery, understanding the increased prevalence of COVID-19 related suicidal ideation is crucial to planning appropriate long-term resources, supports, and policies to equitably support their populations’ well-being, including those who have been affected by post-COVID syndrome. Current responses being implemented in different nations include expanding the use of tele-mental health services (Czeisler et al., 2020; Gilmour, 2020), creating alternative treatment settings (private outdoor spaces, distribution of phones for access to tele-mental health services), addressing financial barriers through income and other government supports, and campaigns to raise awareness about available resources and how to access them (Mental Health Commission of Statistics Canada, 2020). Additionally, some locales have implemented a national suicide prevention number, such as 9-8-8 in Canada, though it will not be fully functioning until March 2023 (Basky, 2021). In the meantime, and for the long-term, there is a “need for socio-politically informed interventions at both the individual and population levels” that recognize “that suicide is sometimes (if not often) a response to policies, systems, and structures that produce vulnerabilities in the form of intergenerational trauma, racism, gender violence, toxic masculinities, social marginalization, and inequities” (White & Morris, 2019, p. 11). Thus, tailored and safe mental health care is critically needed for groups – such as those who are non-cisgender, LGBTQ2S+, Indigenous, youth, or live with a mental health condition – who face these harmful conditions (Ferlatte et al., 2020; Wexler & Gone, 2012). Additionally, services that are responsive to the emerging needs of those who are living with post-COVID syndrome should be prioritized to help mitigate the effects on experiences of suicidality and to support these individuals in their recovery.

While there is an immediate need for increased access to mental health care, there is a further collective responsibility toward addressing the underlying structural contributors to suicidal ideation. This includes responding to issues of financial inequity, including through “emergency health care, mental health care, wage subsidies, supplemental income, and work retraining” (Barr et al., 2012; Reeves et al., 2014 in Mental Health Commission of Statistics Canada, 2020, p. 5). Moreover, social welfare policy interventions (e.g., government income support
subsidiaries) should be considered alongside financial investments in employment opportunities and expanded mental health and substance use services. Building awareness in primary and community care contexts about risk factors for suicidal ideation, especially for populations living with health and social inequities will be important for mitigating the impacts through appropriate screening and bridging to meaningful supports (Mental Health Commission of Statistics Canada, 2020). Ongoing monitoring and evaluation, including longitudinal studies that track change in suicidal ideation over time, within individuals, is necessary to best support the inequitable mental health impacts of the COVID-19 pandemic.

4.2. Strengths and limitations

Sampling across sociodemographic stratifications with adjustment for response propensity was used to obtain a sample that is representative of the adult population in Canada by age, gender, province, and income (Statistics Canada, 2020). However, other population characteristics may not be representative, which may limit the generalizability of results to particular population sub-groups. For example, those experiencing technological barriers, including access to the internet, are not reflected in the sample. Furthermore, the survey was only conducted in Canada’s two official languages, English and French, potentially missing those who are not proficient in reading these languages. Sampling methods including oversampling and community partner engagement were designed to maximize representativeness, but it is possible that not all populations were reached including individuals who are unhoused or vulnerably housed, and those with limited internet access. Another notable limitation is the cross-sectional study design, which does not support causal conclusions on the directionality of associations observed.

Additionally, while the purpose of this study was to examine associations between COVID-19 related suicidal ideation within the past two weeks and sociodemographic characteristics and stressors, we did not measure or control for pre-existing or ongoing suicidal ideation. Due to the sensitive nature of the topic, some participants may have been uncomfortable reporting certain experiences, such as suicidal thoughts or increased substance use. This may have affected our prevalence estimates. Moreover, as we were interested in capturing self-reported mental health experiences, we did not include clinical screening tools. Future research would benefit from the addition of standardized measures to identify clinically significant suicidality. We also excluded 66 participants (1.0%) from the analysis who indicated “Prefer not to say” to the suicidal ideation item. As noted in the Results (and documented in the associated Supplementary Table 2), we found that compared to those who answered this question, participants who selected “Prefer not to say” were more likely to be in the cisgender male or non-cisgender categories and to have a household income less than $25k. Although this finding does suggest that excluding participants who reply, “Prefer not to say” may bias our results, the results of sensitivity analyses with respondents who answered “Prefer not to say” all coded as “Yes” and then coded as “No” yielded the same pattern of results as the analyses with these respondents removed (see Supplementary Tables 3a, 3b, 4a and 4b). With the enduring nature and potential worsening of mental health impacts of the COVID-19 pandemic, ongoing monitoring is needed to continue to inform resource allocation and responsive service delivery while moving forward.

5. Conclusion

While research has identified stagnation or decline in suicide related deaths over the course of the pandemic, our research indicates that COVID-19 related suicidal ideation has significantly increased at the population-level in Canada, with higher prevalence noted for those within specific subpopulations – including those who are younger, single, are Indigenous, LGBT2Q+, not cisgender, or who have a pre-existing mental health condition. Likewise, a large proportion of respondents reported stressors related to finances, relationships, COVID-19 exposure, and increased substance use, which were associated with suicidal thoughts. Appropriate planning, resources, and policies are needed to protect and promote well-being and to mitigate suicidality through the pandemic recovery.

Author’s contributions

EJ and CM led the conceptualization of the study, including study design and data collection. CM, JP, CR, and KT led the analysis and interpretation of this manuscript. CM wrote the first draft, while JP, CR, KT, AS, TS, and EJ further contributed to the data interpretation and subsequent drafts this manuscript.

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Ethics approval

Ethical approval for this study was obtained from the University of British Columbia Behavioural Research Ethics Board (H20-01273).

Consent to participate

In advance of commencing the survey, participants provided consent online. Participants were provided with information about accessing mental health supports and received a small honorarium from Maru/Matchbox.

Declaration of competing interest

CR reports receiving personal fees from the University of British Columbia during the conduct of this study. All other authors declare that they have no conflict of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ssmph.2021.100988.

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