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Depression and anxiety symptoms in young adults before and during the COVID-19 pandemic: evidence from a Canadian population-based cohort

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Abstract

Background: Concerns have been raised that the COVID-19 pandemic could increase risk for adverse mental health outcomes, especially in young adults, a vulnerable age group. We investigated changes in depression and anxiety symptoms (overall and severe) from before to during the pandemic, as well as whether these changes are linked to COVID-19-related stressors and pre-existing vulnerabilities in young adults followed in the context of a population-based cohort.

Method: Participants (n = 1039) from the Quebec Longitudinal Study of Child Development reported on their depression (Centre for Epidemiological Studies Depression Scale, short form) and anxiety (General Anxiety Disorder-7 Scale) symptoms and completed a COVID-19 questionnaire during the first wave of the COVID-19 pandemic in the summer of 2020 (age 22 years). Assessments at age 20 (2018) were used to estimate pre-pandemic depression and anxiety symptom severity.

Results: While mean levels of depression and anxiety symptoms did not change from before to during the first wave of the COVID-19 pandemic (e.g., the mean of depressive symptoms was 9.30 in 2018 and 9.59 in 2020), we observed a slight increase in rates of severe depression (scores ≥ 21) from before (6.1%) to during (8.2%) the pandemic. Most COVID-19-related variables (e.g., loss of education/occupation, frequent news-seeking) – except living alone – and most pre-existing vulnerabilities (e.g., low SES, low social support) were not associated with changes in depression or anxiety symptoms. However, results varied as a function of pre-pandemic levels of depression and anxiety: depression and anxiety symptoms increased among adults with the lowest levels of symptoms before the pandemic, while they decreased among those with the highest levels of symptoms, possibly reflecting a regression to the mean.

Conclusions: Depression and anxiety symptoms in young adults from Québec in Summer 2020 were mostly comparable to symptoms reported in 2018. Most COVID-19-related stressors and pre-existing vulnerabilities were not associated with changes in symptoms, except living alone and pre-existing symptoms of depression and anxiety. However, the increased rate of severe depression warrants further investigation.

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Keywords: COVID-19, Mental health, Depression, Anxiety, Young adults

Background

There is concern that the coronavirus disease 2019 (COVID-19) pandemic has negatively impacted depressive and anxiety symptoms [1, 18, 33], especially among young adults aged 18–25 years [10, 20, 26, 36]. While young adulthood is generally a period of good physical health, mental health problems are common [19, 27]. To date, most studies that have documented putative mental health consequences of the COVID-19 pandemic have relied on cross-sectional investigations of convenience samples [21, 25, 34, 38], from which it is not possible to draw conclusions about whether and how mental health has changed from pre-pandemic levels. Only longitudinal studies with pre-pandemic assessments of depression and anxiety symptoms can allow one to quantify such changes according to a clear temporal sequence and account for such sources of bias as seasonality. The few longitudinal studies with pre-pandemic assessments of depression and anxiety symptoms in young adults have yielded inconsistent findings, with some showing deterioration [5, 42] and others reporting no symptom change during the COVID-19 pandemic.

To our knowledge, no population-based study in the Canadian province of Quebec has examined whether the mental health of young adults has changed from before to during the first wave of the pandemic and identified factors associated with these changes. Using a longitudinal population-based cohort of young adults from Quebec, where strict lockdown measures (e.g., stay-at-home orders; social distancing; school and business closures) were implemented at the beginning of the first wave of the COVID-19 pandemic, we aimed to: (1) examine whether and how depression and anxiety symptoms and the severity of these symptoms changed from the pre-pandemic (participant age: 20 years) to the intra-pandemic period during the summer of 2020 (participant age: 22 years); and (2) investigate whether these changes were linked to COVID-19-related stressors (e.g., loss of employment/education; COVID-19-related news-seeking) and/or pre-existing vulnerabilities (e.g., low SES; severe depression and anxiety).

Method

Participants

The Québec Longitudinal Study of Child Development (QLSCD) [28] is an ongoing population-based cohort that includes 2120 participants born in 1997/98 in the province of Quebec, Canada. From July to August 2020, participants completed an online survey at age 22 years

about their well-being during the COVID-19 pandemic. Of the 1593 individuals contacted, 1182 responded in 2020 (participation rate: 74%). Of those, 1039 had provided information on their mental health before the pandemic in the Spring of 2018, at age 20 years. The QLSCD, conducted by the Institut de la Statistique du Québec (ISQ) [9], was approved by ethical committees of the ISQ and the CHU Sainte-Justine Hospital Research Centre and written informed consent was obtained.

Measures

Depression and anxiety symptoms before (20 years) and during (22 years) the COVID-19 pandemic

Depressive symptoms were self-reported using the Centre for Epidemiological Studies-Depression Scale, short form, (CES-D) including 12 items; (e.g., “I felt depressed”) rated from 0=rarely/never to 3=most/all of the time [13, 35, 37]. Anxiety symptoms were self-reported using the Generalized Anxiety Disorder 7-item scale (GAD-7) including 7 items (e.g., “Feeling nervous, anxious or on edge”) rated from 0=not at all to 3=nearly every day [43]. Scores of 21 to 36 and of 15 to 21 are thought to indicate severe levels of depression and anxiety, respectively [37].

COVID-19-related stressors

All participants completed a questionnaire assessing their worries about the pandemic. Participants indicated their level of concern on a 4-point Likert scale (1=not at all to 4=extremely concerned) regarding: having a degree/certificate/diploma which will not be considered equivalent, compared to those who completed their degree prior to the pandemic; not having job prospects in the near future; and not having enough money to meet basic needs. The questionnaire also included items about their living status (alone vs. with others) and the level of disruption that the pandemic had on their life from mid-March to Summer 2020, including: loss of employment (“I lost my job”; “I closed my business”); loss of education (“All or some of my courses have been rescheduled to Fall 2020”; “I have dropped all my courses”; “My internship has been postponed or cancelled”); a positive COVID-19 test result (yes vs. no); COVID-19-related daily news-seeking on traditional or social media (<2 h vs. ≥2 h per day); and participants’ geographic region based on their postal code (Montreal vs. other regions, as Montreal was the hardest hit region in the Province of Québec in March–August 2020, as per the number of confirmed cases and COVID-19-related deaths) [7].

Pre-existing vulnerabilities

Pre-existing vulnerabilities increasing risk for poor mental health [12, 14, 24, 31, 41, 47] were assessed before the Québec government enforced lockdown measures as of mid-March 2020: not in education or employment at 22 years (just prior to the onset of the pandemic); having parents of low socioeconomic status (SES) (defined as scores ≤ 1 standard deviation (SD) on SES scale aggregating annual gross income, parental education level, and parental occupational prestige from ages 15 and 17 years) [46]; sexual orientation at 17 years (same sex/bisexual/asexual vs. opposite sex; if missing at 17 years, orientation at 15 years was used); low social support at 19 years (defined as score ≤ 1 SD on the 10-item Social Provision Scale) [4]; low life satisfaction at 19 years old (defined as a score of ≤ 5 on the following item: "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?") [44]; and a chronic learning disability diagnosis as reported by the mother at 15 or 17 years (no vs. yes).

Statistical analyses

All statistical analyses were conducted in IBM SPSS, version 26, using cohort weights to ensure representativeness of the sample. First, we described the COVID-19-related stressors and pre-existing vulnerabilities variables using counts and percentages. Second, we tested whether (a) a mean symptom score and (b) a severity category of depressive and anxiety symptoms changed from before to during the COVID-19 pandemic using paired t-tests. Third, we calculated change in depression and anxiety symptoms by subtracting the mean symptom score before the pandemic (20 years) to the mean score during the pandemic (22 years). We standardized the mean change score (change/SD of change) to ease interpretation; positive scores indicate an increase in depression and anxiety symptoms. Then, we examined crude associations between COVID-19-related stressors and pre-existing vulnerabilities variables and change in depression and anxiety symptoms, using t-tests and ANOVAs. The double-sided p-value for significance was set at 0.05. We used multiple imputation (MI) to generate 100 datasets to handle missing values on risk factors. Missing values ranged from 0.9% (loss of employment) to 17.9% (sexual minority); there was no missing data for COVID-19-related stressors.

Results

Descriptive statistics on COVID-19-related stressors and pre-existing vulnerabilities are shown in Table 1. Figure 1 depicts descriptive statistics for COVID-19-related

Table 1 Descriptive statistics of the COVID-19-related stressors and pre-existing vulnerabilities, weighted

	n	%
COVID-19-related stressors		
Sex		
Male	417	40.1
Female	622	59.9
Living status		
Alone	90	8.7
With others	949	91.3
Loss of employment		
No	790	76.0
Yes	249	24.0
Loss of education		
No	805	77.5
Yes	234	22.5
Positive COVID-19 test		
No	1030	99.0
Yes	9	1.0
Daily COVID-19-related news-seeking		
< 2 h	783	75.0
≥ 2 h	256	25.0
Living in Montreal		
No	831	80.0
Yes	208	20.0
Pre-existing vulnerabilities		
Not in education or employed (22 years, pre-pandemic)		
No	941	90.6
Yes	98	9.4
Low SES families (15, 17 years) ^a		
No	873	84.0
Yes	166	16.0
Sexual minority (15, 17 years)		
No	921	88.6
Yes (Gay, Lesbian, Asexual)	118	11.4
Low social support (19 years) ^a		
No	892	87.3
Yes	147	12.7
Low life satisfaction (19 years) ^b		
No	901	86.7
Yes	138	13.3
Learning disability diagnosis (15, 17 years)		
No	963	92.7
Yes	76	7.3
Pre-existing depression symptoms (20 years)		
No/low/moderate	975	93.8
Severe ^c	64	6.2
Pre-existing anxiety symptoms (20 years)		
No/low/moderate	990	95.3
Severe ^c	49	4.7

Table 1 (continued)

Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2020), Québec Government, Québec Statistic Institute

Maximum N available ranges from 869 to 1039

^a Defined as scores < 1 standard deviation of the sample mean

^b Defined as scores of 0 to 5 a scale of 0 to 10, where 0 means ‘very dissatisfied’ and 10 means ‘very satisfied’

^c Severe symptoms were defined by Centre for Epidemiological Studies-Depression scale scores ≥ 21 and Generalized Anxiety Disorder 7-item scale scores ≥ 15

concerns. The vast majority of young adults reported that they were “not at all concerned” about (a) having a compromised diploma; (b) loss of job prospects or (c) having enough money to meet basic needs, whereas 10.2, 21.4

and 14.0% reported that they were ‘very or extremely concerned’, respectively. As shown in Table 2, there was no difference in the means of depression and anxiety symptoms from before to during the pandemic, as reported by participants in July–August 2020. However, while the prevalence of severe anxiety did not increase significantly, that of severe depression did, with 6.2% of participants reporting severe depressive symptoms before the pandemic compared to 8.1% during the pandemic (increase of 1.9%; $p = 0.041$).

Figure 2 and Additional file 1: Table S1 depict standardized change in depression and anxiety from before the pandemic (20 years) to during the pandemic (22 years) as a function of COVID-related stressors. Symptoms of depression and anxiety did not vary according to COVID-19-related stressors, except for participants living alone

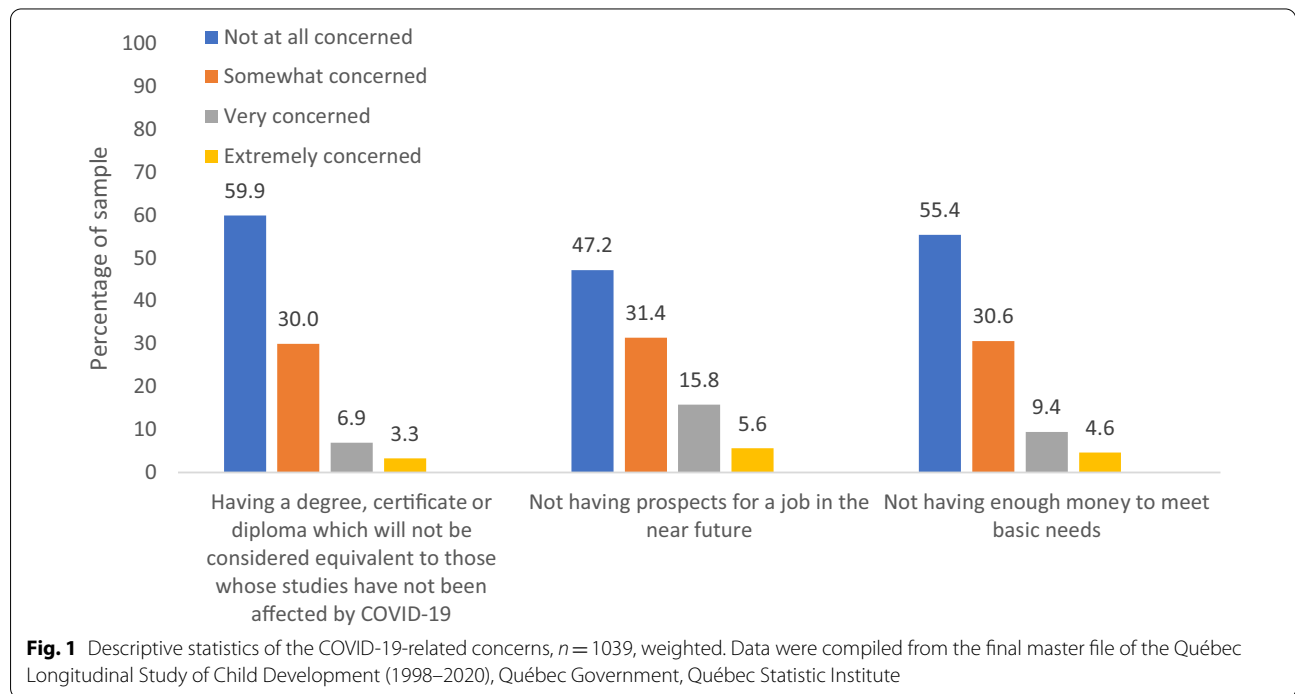
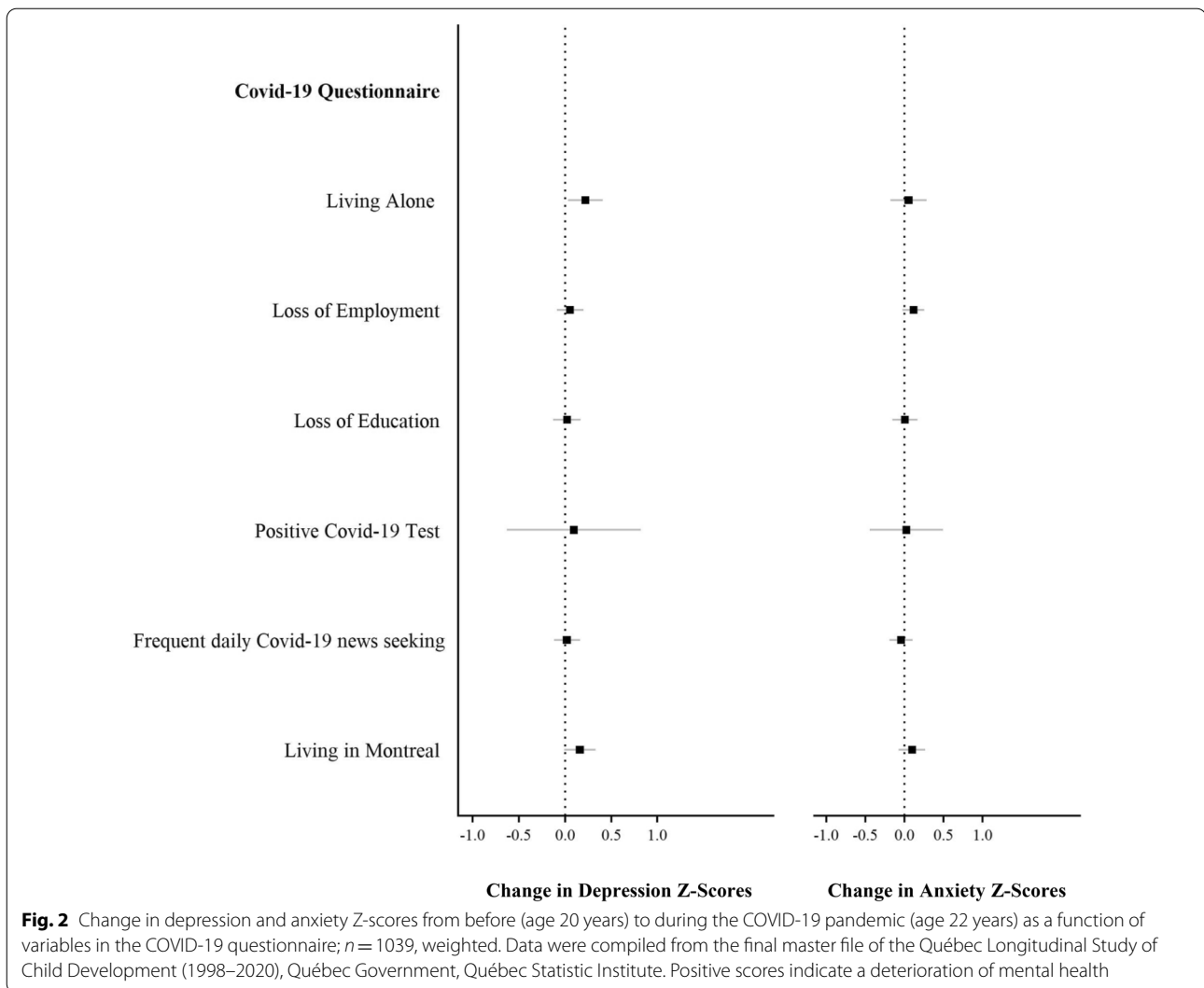


Table 2 Descriptive statistics for depression and anxiety symptoms before (20 years) and during (22 years) the COVID-19 pandemic, $n = 1039$, weighted

	Before COVID-19 pandemic (20y)	During COVID-19 pandemic (22y)	P Value for differences before vs. during the pandemic
Depressive symptoms, mean (SD)	9.30 (6.42)	9.59 (6.79)	.153
Severe depression symptoms, N (%) ^a	64 (6.2%)	80 (8.1%)	.041
Anxiety symptoms, mean (SD)	4.73 (4.61)	4.45 (4.70)	.060
Severe anxiety symptoms, N (%) ^a	51 (4.9%)	49 (4.7%)	.807

Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2020), Québec Government, Québec Statistic Institute

^a Severe symptoms were defined by Centre for Epidemiological Studies-Depression scale scores ≥ 21 and Generalized Anxiety Disorder 7-item scale scores ≥ 15

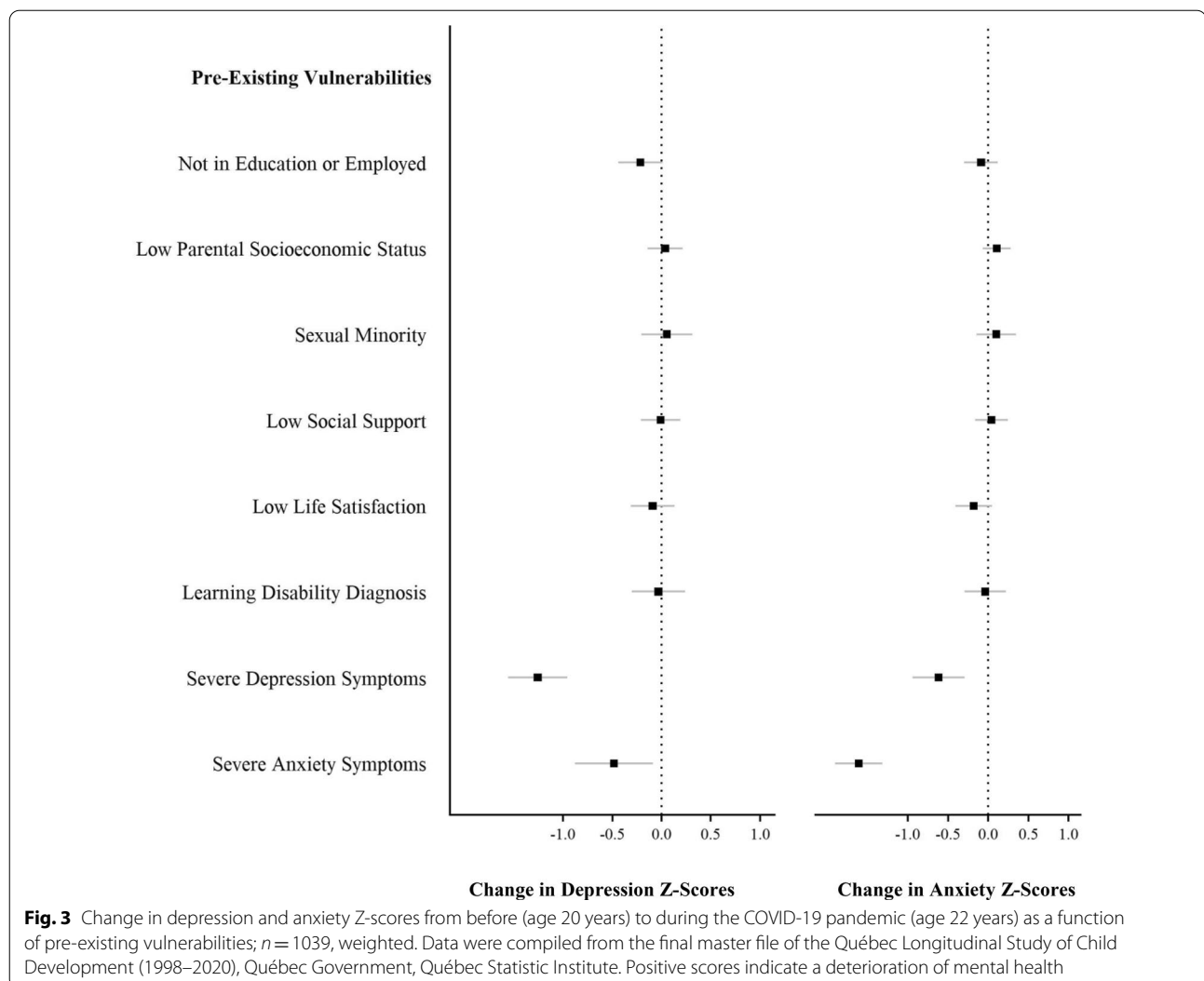


who reported a slight increase in depressive symptoms (0.22, SD). Figure 3 and Additional file 1: Table S1 depict standardized changes in depression and anxiety symptoms as a function of pre-existing vulnerabilities. Participants with pre-existing severe symptoms of depression and anxiety experienced a significant decrease in depressive and anxiety symptoms from before to during the pandemic. That is, individuals with severe depression at age 20 years experienced a decrease in depressive symptoms from 20 to 22 years (1.26 SD), while those with severe anxiety experienced a decrease in anxiety symptoms of 1.61 SD. In sensitivity analyses, we divided participants into quintiles according to their depressive and anxiety levels at 20 years: (1) very low (0–20%); (2) low (21–40%); (3) average (41–60%); (4) high (61–80%); and (5) very high (81–100%) and explored changes in symptom levels from before to during COVID-19 using ANOVAs. As depicted in Fig. 4 and Additional file 2: Table S2,

there was a significant increase in depression and anxiety symptoms among young adults with the lowest levels of symptoms at baseline. To illustrate, participants with very low levels of depressive symptoms at age 20 years experienced a significant increase in symptoms from age 20 to 22 years (0.49 SD, $p < 0.001$), while those with very low levels of anxiety experienced an increase in symptoms of 0.38 SD ($p < 0.001$). As previously reported, young adults with the highest levels of depression and anxiety symptoms at baseline experienced a decrease in symptoms from before to during COVID-19.

Discussion

Using a population-based cohort of young adults with data collected 2 years before the pandemic and 4 months after the onset of the first wave of the pandemic (Summer 2020) in the province of Quebec, this study examined changes in symptoms of depression



and anxiety and investigated whether these changes are linked to pandemic-related stressors and/or pre-existing vulnerabilities. On average, young adults did not report change in depression and anxiety levels across the full spectrum of symptom severity. However, the prevalence of severe depressive symptoms increased by 1.9% during the initial months of the pandemic, while there was no change in severe anxiety symptoms. Most COVID-19-related stressors (with the exception of living alone) and variables pertaining to pre-existing vulnerabilities (e.g., low SES, low social support) were not associated with changes in symptoms of depression and anxiety. Contrary to expectations [5, 42], we did not observe a generalized worsening of depressive and anxiety symptoms during the pandemic among participants with severe pre-pandemic depression and anxiety. However, supplemental analyses investigating changes in depression and anxiety symptoms

according to different levels of pre-existing symptoms (very low; low; average; high; very high) revealed that young adults with low levels of symptoms before the pandemic experienced a deterioration in mental health during the pandemic. Conversely, those with high levels of pre-existing symptoms at age 20 years experienced an improvement at age 22 years.

Our findings showing no increase in depression and anxiety symptoms from before to during the pandemic are comparable to a prior longitudinal study [42] using a sample of 768 young adults living in Switzerland. This study found that internalizing symptoms (assessed using depressive, anxiety, and suicidal ideation and self-injury items from the Social Behavior Questionnaire) did not significantly increase from before (20 years) to during the pandemic in April 2020 (22 years). In contrast, a study of 624 undergraduate students (mean age: 19.6 years) in Baoding, China, found that symptoms of depression

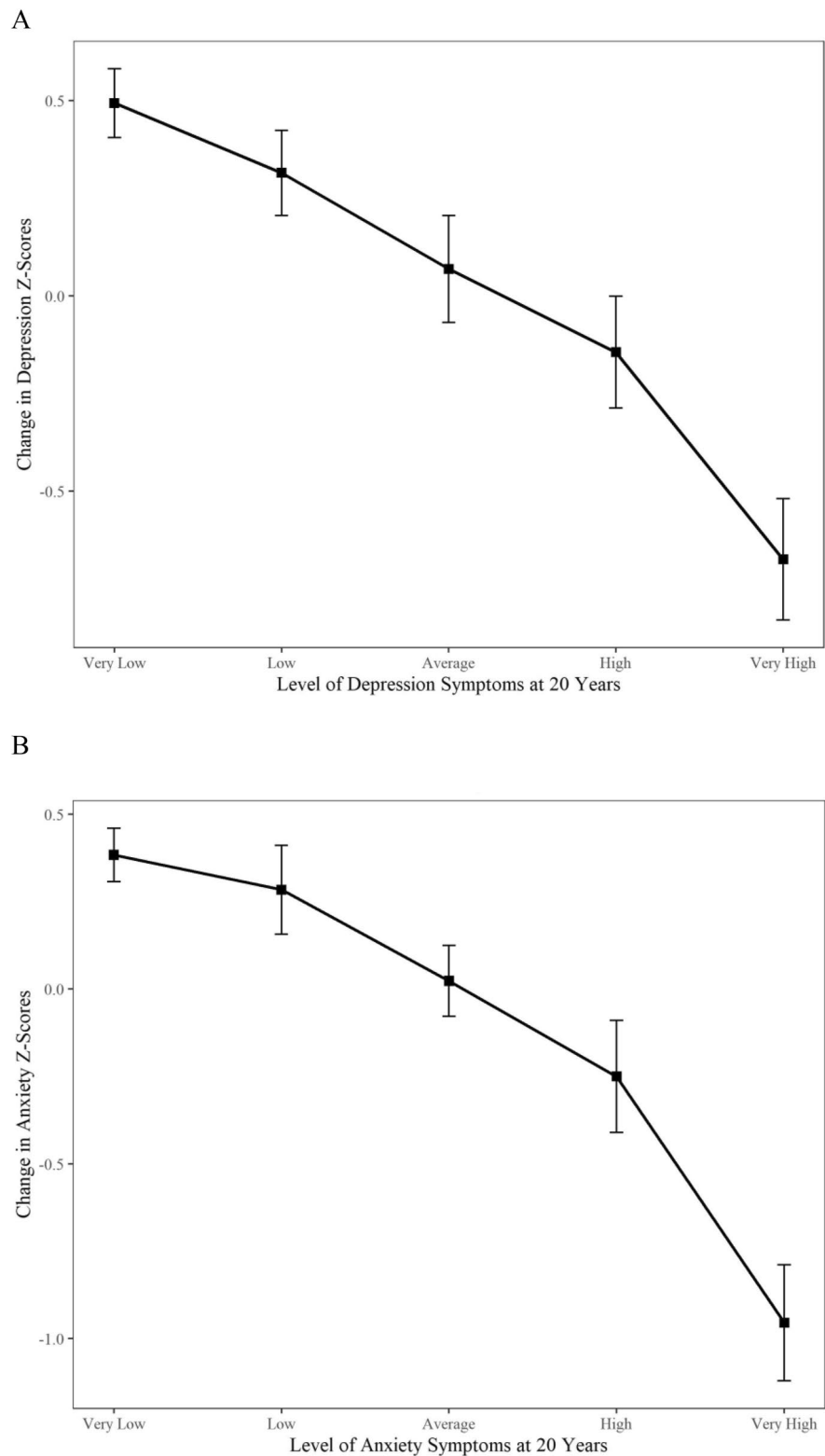


Fig. 4 Change in **A** depression and **B** anxiety Z-scores from before (age 20 years) to during the COVID-19 pandemic (age 22 years) as a function of categories of levels of pre-existing symptoms; $n = 1039$, weighted. Data were compiled from the final master file of the Québec Longitudinal Study of Child Development (1998–2020), Québec Government, Québec Statistic Institute. Positive scores indicate a deterioration of mental health

and anxiety (as measured by the PHQ-4) significantly increased from before (December 2019) to during the pandemic (February 2020) [22].

Although on average we did not observe changes across the full spectrum of symptom severity, the prevalence of severe depression slightly increased by 1.9% from before to during the pandemic. However, the prevalence of severe anxiety did not change, suggesting that mental health consequences of the pandemic might differ depending on the type of symptom. This is in line with a recent systematic review and meta-analysis of 65 longitudinal cohort studies by Robinson and colleagues that found that compared to symptoms of anxiety, increases in depressive symptoms tended to be larger and remained elevated beyond the first months of the pandemic [40].

None of the COVID-19-related stressors were associated with a change in depression and anxiety symptoms, except for those living alone who experienced a slight increase in depressive symptoms. These findings are in line with results from a large prospective panel study weighted to population proportions ($n=36,520$) and conducted over the first 20 weeks of lockdown in the UK that identified living alone as a risk factor for higher symptoms of depression and anxiety during the pandemic. While most pre-existing vulnerabilities were not associated with change in depression and anxiety symptoms, we found that participants with pre-existing severe manifestations of depression and anxiety at age 20 years experienced a significant decrease in depressive and anxiety symptoms between 2018 and the summer of 2020. Pre-existing mental health vulnerabilities have been identified in several cross-sectional studies as a risk factor for mental health deterioration during the pandemic [15, 29, 39, 45, 48], yet evidence from longitudinal studies is relatively scarce and contradictory, to date [40]. To illustrate, in a longitudinal study conducted on three psychiatry case-control cohorts in the Netherlands ($N=1517$, mean age: 56.1 years), the COVID-19 pandemic did not seem to exacerbate the severity of pre-existing symptoms among those with severe pre-pandemic mental health problems [30], which researchers suggested might be explained by stay-at-home orders allowing for the implementation of more structured and consistent daily routines [30, 32]. In contrast, a cohort study on young adults in Switzerland identified pre-pandemic emotional distress as the largest risk factor for increased emotional distress during the pandemic [42].

In our study, symptoms of youth with severe pre-existing symptoms did not deteriorate but rather improved, possibly reflecting a natural improvement of mental illness over time, an effect of seasonality (2018 data were collected in the spring, while 2020 data were collected in the summer), or a reduction in social stressors during

periods of confinement. Conversely, young adults with low levels of depression and anxiety symptoms experienced a significantly greater deterioration in mental health from before to during the pandemic. These results correspond with findings from a longitudinal study by Hamza and colleagues conducted with students at a Canadian university ($N=773$), in which participants with pre-existing mental health problems showed decreasing depressive and anxiety symptoms from before (May 2019) to during (May 2020) the pandemic, whereas their peers without pre-existing mental health problems showed increasing depressive and anxiety symptoms during the pandemic [17]. Importantly, such findings might reflect the negative impact of increased social isolation (due to widespread closures and social distancing regulations) on young adults without pre-existing mental health problems. However, we cannot rule out the possibility that these findings merely reflect a regression to the mean, a statistical phenomenon that makes values that are extreme at the first point of measurement more likely to be closer to the distribution mean at subsequent points of measurement. This phenomenon may explain why we observed decreased symptoms at age 22 years among those with the highest symptom levels at age 20, as well as increased symptoms at age 22 years among those with the lowest levels of pre-existing symptoms at age 20.

Altogether, these conflicting findings about the mental health consequences of the pandemic may be attributed to several different factors. Firstly, changes in depression and anxiety symptoms might vary according to the type and severity of government lockdown measures in place when symptoms were assessed [2]. Indeed, the systematic review of longitudinal studies by Robinson and colleagues mentioned above found that while there was an overall increase in mental health symptoms from before to during pandemic, this increase was most pronounced during the early stages of the pandemic (March–April 2020) before decreasing back toward pre-pandemic levels over the following months (May–July 2020). Data for the current study was collected in July–August 2020, during which time Quebecers were newly permitted to gather in private (up to 10 people from 3 different households) and public settings (up to 50 people in movie theaters, reception halls, and places of worship, among other locations) after months of strict lockdown [23]. Participants' newfound ability to socialize after months of isolation may have offset the impact of pandemic-related stress experienced during the strict lockdown period. Indeed, a German study examining the effects of different kinds and levels of restrictive public health measures during the pandemic (e.g., quarantine/lockdown/stay-at-home orders) on symptoms of anxiety and depression found that stricter restrictions, greater reduction of social

contact, and greater perceived changes in daily life were associated with poorer mental health [2].

Secondly, depression and anxiety symptoms may vary in accordance with government socioeconomic policies, which differ across countries. Soon after the onset of the pandemic, the Canadian government introduced relatively generous payments for workers and post-secondary students whose income earning abilities were negatively impacted (e.g., reduction in hours; job loss) by the COVID-19 pandemic [3, 16]. These government measures may have had a protective effect against depression and anxiety. For example, a survey study using data collected by the US Census Bureau from April to July 2020 found that the prevalence of depressive and anxiety symptoms varied across states by what the investigators called “household income shock” [8] (i.e., the experience of job loss and/or partial income loss), which was buffered by state-level differing socioeconomic policies (e.g., access to Medicaid, unemployment insurance, and suspended utility shut-offs) [8]. Despite the potentially buffering effects of the Canadian government’s economic response plan against symptoms of depression and anxiety, it is worth noting that future professional opportunities were still among the primary COVID-related concerns shared by young adults, with 21.4% of our participants stating that they were very or extremely concerned by future job prospects (see Fig. 1).

Lastly, the normal process of psychological adaptation following distressing events might also come into play in explaining the inconsistent findings on the impact of the pandemic on the mental health of young adults [6, 34]. Consistent with findings from a meta-analysis indicating that mental health deteriorated at the onset of the pandemic before returning to baseline levels by mid-2020 [40], a prospective longitudinal study in the UK examining anxiety and depression over the first 20 weeks of lockdown (March 23–August 9, 2020) found that there was a significant decrease in depressive and anxiety symptoms throughout both the strict lockdown period and the period during which lockdown measures were eased [11]. Moreover, the same study found that younger adults showed faster improvements in depression and anxiety symptoms compared to older adults [11]. This suggests that while some studies find young adults to be at greater risk for mental health problems during the pandemic, they may be better able to psychologically adapt to challenging circumstances relative to older adults, or that factors contributing to persistent internalizing symptoms may have been alleviated by the confinement measures (e.g., lack of commute; additional rest time; accommodations for final exams). However, given that most studies

on the mental health impact of the COVID-19 pandemic on young adults were conducted during the first wave of the pandemic in 2020, the mental health impact of the subsequent waves is still unclear.

Methodological considerations

This study has a number of strengths, including its longitudinal design; the use of standardized measures of depression and anxiety; and data collected before and during the pandemic from the same participants. We acknowledge the following limitations. As in all longitudinal surveys, attrition occurred over the years and the most vulnerable individuals were underrepresented. Although all analyses were weighted, such differential attrition could potentially result in underestimation of the rates of anxiety and depression and consequently of the mental impact of COVID-19. Mental health outcomes were measured by self-report questionnaires, which do not provide clinical diagnoses. While we were able to use longitudinal data with mental health assessments before and during the COVID-19 pandemic, it is difficult to differentiate between mental health changes attributable to the pandemic versus developmental changes that are typical for this age group or changes due to seasonal effects, since pre-pandemic measures were obtained in the spring, while intra-pandemic measures were collected during the summer.

Conclusion

In this sample of young adults from the Canadian province of Québec, we found that depressive and anxiety symptoms did not significantly change during the first wave of the COVID-19 pandemic, although the prevalence of severe depression did slightly increase, especially among those who were living alone during the lockdown. Moreover, while the majority of the young adults showed a pattern of symptoms consistent with adaptation to the pandemic, levels of depressive and anxiety symptoms increased among those with the lowest levels of symptoms before the pandemic. Future studies should track the mental health of young adults throughout the subsequent waves of the COVID-19 pandemic to better understand whether this observation reflects a regression to the mean or a need to improve access to mental health services for youth who are newly struggling with symptoms of depression and anxiety.

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12991-021-00362-2>.

Additional file 1: Table S1. Change in depression and anxiety symptoms from before to during the COVID-19 pandemic. **Table S2.** Change in depression and anxiety symptoms from before the pandemic to during the pandemic according to different levels of symptoms severity before the pandemic.

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Authors' contributions

Each author has sufficiently contributed to the manuscript to justify authorship and responsibility for the content. KW-M, M-CG, and MO conceived and designed the study. MB, RT, M-CG, and SC acquired the data. M-CG analyzed the data and all of the authors interpreted the data. KW-M, M-CG, and MO wrote the initial drafts, and SL, J-PG, IO-M, NC, FP, MB, RT, M-HP, NC-R, and SC revised the paper for important intellectual content. All of the authors read and gave their final approval of the version to be published and agreed to be accountable for all aspects of the work.

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Availability of data and materials

The data that support the findings of this study are available from the Quebec Longitudinal Study on Child Development (QLSCD) but restrictions apply to the availability of these data. Data access QLSCD data are accessible to researchers on the premises of the Centre d'accès aux données de recherche de l'Institut statistique du Québec (CADRISQ) located in Montreal and Quebec City. To access the data, researchers affiliated with an institution in Quebec must create a profile and fill out an access request including, among other things, the purpose and aim of the research project, a summary of the analysis plan, the contact information of any researchers associated with the project, and the location where they want to use the data. Once received, the access request is analyzed by the Research Data Access Point team, which makes the necessary follow-up to obtain the required authorizations and communicates the results to the researchers. Researchers receive the necessary support for the submission of their access request and the implementation of their projects. More information can be found on the Research Data Access Point website (<https://www.stat.gouv.qc.ca/research/#/accueil>). Numerous international collaborations have been established since the start of the study.

Declarations

Ethics approval and consent to participate

The Quebec Longitudinal Study on Child Development (QLSCD), conducted by the Institut de la Statistique du Québec (ISQ), was approved by ethical committees of the ISQ and the CHU Sainte-Justine Hospital Research Centre and written informed consent was obtained.

Consent for publication

Not applicable.

Competing interests

None declared.

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