



Examining the mental health impacts of the COVID-19 pandemic on international postsecondary students in Canada: A cross sectional analysis

Research Paper

Shirui Tan¹, Fatih Sekercioglu²

¹School of Occupational and Public Health, Toronto Metropolitan University, Toronto, Canada; ²Planetary Health Research Lab, School of Occupational and Public Health, Toronto Metropolitan University, Toronto, Canada

Corresponding author: S. Tan (shirui.tan@ryerson.ca)

ABSTRACT

Globally, the mental health challenges of university and college students are a considerable public health challenge that has been further exacerbated by the COVID-19 pandemic. Across Canada, international postsecondary students have reported experiencing increase financial stress, lack of social support, racist aggression, and travel restrictions. This cross-sectional study aimed to assess the mental health impacts of COVID-19 on international postsecondary students in Canada. Data from 177 international students attending universities and colleges in Canada was collected over a 2-month period. Results suggest 36.2% of all students reported a high level of perceived stress, with moderate to severe anxiety and depression symptoms reported by 64.4% of the sample. Stress ($p = 0.015$) along with anxiety and depression ($p = 0.019$) were significantly higher in female study participants. Coping strategies related to engaging in activities of daily living were identified. Strategies to support international students' mental health and well-being during the pandemic and beyond have been put forward.

KEYWORDS

COVID-19; Coping; International Students; Mental Health; Public Health

FUNDING SOURCE

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INTRODUCTION

The COVID-19 pandemic resulted in 579,092,623 confirmed cases and 6,407,556 deaths as of August 5, 2022 (World Health Organization, 2022). To date, extensive research has shown that COVID-19 has unprecedented undesirable mental health effects on the general population worldwide (Hwang et al., 2020; Salari et al., 2020; Sher, 2020; Vindegaard & Benros, 2020; Xiong et al., 2020). The systemic review of Xiong et al. (2020) demonstrated that the pandemic has significantly increased the levels of anxiety (6.33% to 50.9%), depression (14.6% to

48.3%), stress (8.1% to 81.9%), psychological distress (34.43% to 38%) and post-traumatic stress disorder (7% to 53.8%) in the general population across several countries. Besides, Sher (2020) reported that the suicide rate might increase due to the COVID-19 pandemic.

The mental health challenges of university and college students is a growing public health concern worldwide, which is further accentuated by this global pandemic. University and college students are



facing unforeseen campus closure or reopening, the alternation of learning mode, financial burden, social isolation, loss of internships, and so forth, and many of them are frustrated with academic disruption or unemployment after graduation (Haliwa et al., 2021; Lee et al., 2021; Li et al., 2020; Patsali et al., 2020; Wang et al., 2020). As Wu et al. (2021) elaborated, the recent prevalence of anxiety and depression among students was higher than normal. In addition, another study among US college students reported that 71% of 195 students indicated the amplification of stress and anxiety due to the pandemic (Son et al., 2020). Similarly, an increased rate of depressive and anxiety symptoms was observed among college students in China (Li et al., 2020), French (Essadek & Rabeyron, 2020), and Greece (Patsali et al., 2020).

International university students, as a unique subpopulation of students, are more susceptible to mental health challenges amid the pandemic since they are experiencing challenges such as being far away from family, travel restrictions, social exclusion, potential language barriers, cultural shock, and financial stress (e.g., excessive tuition fee) (Alam et al., 2021; King et al., 2020; Lai et al., 2020). For instance, Lai et al. (2020) elucidated that, compared to students who returned to their home countries, “stayers had significantly higher stress from COVID-19-related challenges such as personal health and lack of social support.” Alam et al. (2021) also reported that psychological outcomes and risk factors were more prevalent among international students in China during the pandemic. Nevertheless, compared to the studies on university students, there is very little published research on the impacts of COVID-19 on international students’ mental health.

In Canada, even though international students represented 18% of the total enrolments (388,782 students) in universities and colleges in the 2019/2020 academic year (Statistics Canada, 2021a), their mental health status in the COVID-19 pandemic has not been well-documented, as well as the effects of COVID-19-related challenges. Therefore, we aim to investigate the mental health impacts of COVID-19 on international postsecondary students in Canada and identify potential COVID-19-related challenges and coping strategies. Our findings will be meaningful for postsecondary institutions, government sectors, and public health professionals. Universities and colleges

might use our study findings to establish initiatives and resources to support international students coping with the pandemic.

METHODS

Study Design and Participants

This study was an anonymous cross-sectional online survey that contained 34 close-ended question using Google Forms. The survey was distributed to students across Canada from November 1 to December 31, 2021, and the sample size of 200 participants was anticipated. Participants were eligible for the study if they were enrolled as an international student (i.e., holding a study permit) in any postsecondary institution in Canada, at least 18 years old, and in full-time status.

Participants who were not international postsecondary students in Canada, aged under 18 years old, and enrolled with a part-time status were excluded from the study. Part-time international students were excluded from the study because, in Canada, international students with full-time and part-time status are experiencing different challenges in terms of studying hours, working status, financial stress, and so forth. For instance, full-time students have a heavier course load, are paying higher tuition fees, and can legally work on- or off-campus in Canada (Government of Canada, 2019). It is also expected that more international university and college students will choose to be enrolled in the full-time status since they can work on- or off-campus in Canada. Students must maintain full-time status in Canada during each semester of their study to apply for a postsecondary work permit after graduation (Government of Canada, 2022).

Participants were selected using the exponential, non-discriminative snowball sampling strategy, where students were encouraged to forward the link to their friends and classmates. Recruitment notices and the survey link were posted on various social media platforms, including WhatsApp chat groups, international student groups on Facebook, WeChat groups, Instagram, Twitter, Kijiji, and Honeybee. Besides, the Twitter landing page was designed on Wix.com Ltd, a web development service. Before starting the survey, all participants were required to



respond to three eligibility questions (i.e., Are you an international student currently enrolled in a postsecondary institution in Canada? Are you a full-time student? Are you at least 18 years old?). In appreciation of participants' time, they had the option to enter the draw for one of fifteen \$20 coffee gift cards after completion.

Data Collection

Demographic Information Questionnaire

The first nine questions were established to collect the following demographic information of participants: sex, age (18-25 years old, or 25+ years old), geographical regions of origin, ethnicity (African, Asian, Caribbean, European, Oceania, Multiethnic, North America, Latin, Central and South America, or Other Origins), whether they are currently in Canada (yes or no), geographic regions of schools that they are attending in Canada (Western, Central, Atlantic or Northern), the field of study (medical or health-related, or other), level of study (undergraduate or postgraduate) and whether they are in the final year of study (yes, no, or not sure).

Pandemic-Related Perceived Stress Scale

The ten-item Pandemic-Related Perceived Stress Scale (PSS-10-C) is the modified version of the famous Perceived Stress Scale. The PSS-10-C is a reliable and valid measurement tool (Campo-Arias et al., 2020). In this study, PSS-10-C was utilized to evaluate the level of pandemic-related perceived stress over the past week. Example items include "I have felt as if something serious was going to happen unexpectedly with the epidemic." Responses were expressed on the five-point Likert scale: "0 = Never", "1 = Hardly ever", "2 = Occasionally", "3 = Almost always", and "4 = Always". Items 1, 2, 3, 6, 9, and 10 indicate negative feelings about the pandemic (0 to 4), whereas items 4, 5, 7, and 8 present positive feelings (4 to 0). Scores ranged from 0 to 40, with a cutting point of ≥ 25 relating to high perceived stress for COVID-19.

Patient Health Questionnaire

The Patient Health Questionnaire-4 (PHQ-4) consists of a two-item anxiety subscale and a two-item depression subscale and is a valid and reliable

ultra-brief measure of anxiety and depression symptoms in the population (Löwe et al., 2010). Respondents were asked to report how often they have been bothered by the feelings related to anxiety and depression in the past two weeks, using the four-point Likert scale ("0 = Not at all", "1 = Several days", "2 = More than half the days", and "3 = Nearly every day"). The four-item scale includes "feeling nervous, anxious or on edge," "not being able to stop or control worrying," "feeling down, depressed, or hopeless," and "little interest or pleasure in doing things." The total score ranges from 0 to 12, in which 0-2 indicates no psychological distress, 3-5 indicates mild psychological distress, 6-8 indicates moderate psychological distress, and 9-12 indicates severe psychological distress. On the anxiety and depression subscale (0 to 6), a score of 3 or greater suggests a positive screening need. One general assessment question (i.e., has COVID-19 affected your mental health?) was added at the end.

COVID-19-Related Challenges

In this section, participants were requested to indicate the level of fear, worry, and stress that they experienced related to eight COVID-19 challenges under one of the three categories: Intrapersonal factors (risk of being infected, academic program and future plans, and financial stress), Interpersonal factors (risk of loved ones being infected, and lack of social support), and Environmental factors (changes of learning mode, travelling restrictions and delays to application process of legal documents, and social exclusion/racist aggression). Each item scored from 1 to 4, where 1 means no fear, worry and stress related to the challenges, 2 indicates a mild level of fear, worry and stress, 3 means a moderate level of fear, worry and stress, and 4 means a severe level of fear, worry and stress. One general assessment question (i.e., Do you feel you are able to cope with the stress of the current situation adequately?) was attached at the end.

Coping Strategies

The survey included a list of coping strategies at the end, and participants were asked to select the coping strategy or strategies they used to deal with their negative feelings related to COVID-19 over the past month. The items were: studying, working,



sleeping, doing relaxation activities (e.g., meditations, sports, exercise, music), eating or cooking, playing video/mobile games, watching entertaining programs, online shopping, seeking support from family or friends, positive thinking, spiritual support, or other.

Data Analysis

Statistical analysis was performed by using IBM Statistical Package for the Social Sciences (SPSS V.26.0).

Reliability and validity tests were assessed using Cronbach's Alpha, and Kaiser-Meyer-Olkin (KMO) and Bartlett's Test, respectively. Frequency tables were used to record the demographic characteristics of participants and the frequencies and mean values of perceived stress, anxiety, and depression symptoms.

Bivariate correlations were used to analyze the relationship between the severity of perceived stress, anxiety, and depression symptoms and whether COVID-19 has affected students' mental health. Mann-Whitney U-test and Kruskal-Wallis-test were applied to compare the severity of each symptom (i.e., normal perceived stress vs. high perceived stress, and none to mild anxiety and depression symptoms vs. moderate to severe anxiety and depression symptoms) between two or more demographic groups.

The association of severity of perceived stress, anxiety and depression symptoms, COVID-19-related challenges, and the utilization of coping strategies were also examined by bivariate correlations. P-value < 0.05 was considered a significant level.

Ethics Consideration

Toronto Metropolitan University Research Ethics Board approval was granted (REB 2021-413). All participants were requested to respond to the informed consent (i.e., Do you agree to participate in the study? Yes/No) before entering the survey. The informed consent indicated the purpose of the study, potential benefits and risks, participants' right to skip questions and withdraw their consent at any point, and the confidentiality of the survey.

RESULTS

Sample Characteristics

Data were collected between November 1, 2021, to December 31, 2021, from 218 responses, of which 177 valid responses were included in our study. All participants were international postsecondary students in Canada who were in full-time status and 18 years old or older, including 74 males (41.8%), 101 females (57.1%), and two unknowns (1.1%). Of the 177 students, 81.9% were 18-25 years old ($n = 145$), 59.4% were from Asia ($n = 105$), 61.6% ($n = 109$) were of Asian origin, 90.4% were currently in Canada at the time of the survey ($n = 160$), 68.4% ($n = 121$) were attending post-secondary institutions in Central Canada (i.e. Ontario and Quebec), 41.8% ($n = 74$) were studying medical or health-related programs, 84.2% ($n = 149$) were in the undergraduate studies, and 41.8% ($n = 74$) were in the final year of study ([Table 1](#)).

For the two general questions, 67.8% of the participants ($n = 120$) responded that COVID-19 had affected their mental health, and 119 participants (67.2%) felt that they were able to cope with the stress of the current situation adequately. A Cronbach's alpha of 0.868, suggest good internal consistency, and the KMO value of 0.890 ($p = 0.00$) is acceptable.

Mental Health Assessment

Based on PSS-10-C and PHQ-4 results, 36.2% of the participants reported a high level of perceived stress, moderate to severe anxiety, and depression symptoms accounted for 64.4%. A positive correlation between severity of perceived stress ($r = 0.242$, $p < 0.01$), anxiety and depression symptoms ($r = 0.265$, $p < 0.01$), and the response of mental health impacts of COVID-19 on students was reported ([Table 2](#)). Students who responded that COVID-19 had affected their mental health had higher perceived stress, anxiety, and depression symptoms. In addition, the levels of perceived stress, anxiety, and depression symptoms were significantly positively associated ($r = 0.516$, $p < 0.01$).

Compared to male students, female international students were associated with higher perceived



stress ($p = 0.015$) and significantly more moderate to severe symptoms of anxiety and depression ($p = 0.019$). Moreover, students currently in Canada reported more moderate to severe anxiety and depression symptoms ($p = 0.009$) than those not in Canada. However, these two groups had no significant difference in perceived stress. As well, compared to students who were not in the final year of study, students in the final year were significantly associated with higher perceived stress ($p = 0.033$). There was no significant difference in anxiety and depression symptoms between the two populations.

COVID19-Related Challenges Assessment

The three challenges students most frequently reported related to their mental health (score of 4) specifically travelling restrictions and/or delays in the application process of legal documents ($n = 62$), financial stress ($n = 59$), and fear and worry about the academic program and future ($n = 53$).

A significant positive correlation between financial stress and the severity of anxiety and depression symptoms ($r = 0.583$, $p < 0.01$) was noted. In addition to financial stress, international students experiencing a lack of support were significantly associated with more severe anxiety and depression symptoms ($r = 0.512$, $p < 0.01$). Social exclusion and/or racist aggression was also significantly associated with the severity of perceived stress ($r = 0.509$, $p < 0.01$) ([Table 3](#)).

Coping Strategies Assessment

The top five commonly used coping strategies included sleeping ($n = 102$), watching entertaining programs ($n = 98$), doing relaxation activities ($n = 97$), eating or cooking ($n = 93$), and playing video/mobile games ($n = 91$). The assessment of the use of coping strategies, perceived stress and anxiety and depression symptoms among students is summarized in [Table 4](#).

Moreover, students who used sleeping, eating, or cooking, and playing video/mobile games to cope with the pandemic were associated with lower perceived stress, anxiety, and depression symptoms ($p < 0.01$ for all). In addition, a positive correlation between working and severity of symptoms of anxiety

and depression was observed among international university and college students ($r = 0.164$, $p < 0.05$).

DISCUSSION

To the best of our knowledge, our research is the first study to assess the mental health impacts of the COVID-19 pandemic on international postsecondary students in Canada and identify potential COVID-19-related challenges and coping strategies. Our study revealed a higher prevalence of stress, anxiety, and depression symptoms among international students in Canada amidst the pandemic. Based on PSS-10-C and PHQ-4, 36.2% and 64.4% of the students reported a high level of perceived stress and moderate to severe anxiety and depression, respectively.

The results are consistent with similar studies carried out in other countries during the COVID-19 pandemic. A survey of 1,000 international students at Carleton University concluded that 55% and 50% of the respondents were at risk of depression and anxiety disorder, respectively (Varughese & Schwartz, 2022). The study by Alam et al. (2021) demonstrated the high prevalence of stress (58.5%), anxiety (76.6%), and depression (73.4%) among international students in China, while 47.1%, 39.6%, and 49% of the international students in South Korea universities reported sleep problems, anxiety, and depression (Kim & Kim, 2021).

International university and college students have already been exposed to numerous challenges pre-COVID-19. Some of the pre-existing challenges include language and cultural barriers, racism and social exclusion, difficulties in obtaining study permits and visas, lack of social support, and financial stress, which can all contribute to poor mental health outcomes (Lai et al., 2020; King et al., 2020; Kim & Kim, 2021). It is also worth noting that the severity of perceived stress, anxiety and depression symptoms among students may be underestimated in this study, as the survey was collected before the widespread of omicron, which could potentially have worsened the mental health crises globally.

Mental Health Assessments

The COVID-19 pandemic has negatively impacted the mental health of international postsecondary



students in Canada. Participants (67.2%) who responded that COVID-19 had affected their mental health had higher levels of stress, anxiety, and depression symptoms. In addition, there was a significant association between perceived stress level and severity of anxiety and depression symptoms. This finding corresponds with mental health study findings of international students studying in the UK and USA, where perceived stress, anxiety and depression, and insomnia symptoms were significantly correlated (Lai et al., 2020).

In this study, international female students were more likely to have higher perceived stress levels and more moderate to severe symptoms of anxiety and depression, which is consistent with the study by Statistics Canada (2020). Moreover, Chen & Lucock (2020) elaborated that female university students in the UK were subject to higher levels of anxiety and depression than males, and one reason could be that "women fulfill the multiple roles in society that render them at greater risk of experiencing mental disorders" (Mokhtari et al., 2013, p84). However, Alam et al. (2021) observed that male international students studying in China were associated with more depressive, anxiety and fear symptoms during the pandemic, which may be attributed to that most participants in the study were males (84.6%). There was a higher possibility of a male student taking risky behaviours. This suggests an urgent need to address the mental health challenges of both male and female international students in Canada, such as providing self-help strategies, risky behaviour management courses, and support groups.

Furthermore, our study demonstrated that international students staying in Canada were associated with more moderate to severe symptoms of anxiety and depression than students who were not in Canada at the time of the survey. This finding is consistent with another study where international students who stayed in the UK and USA were more likely to experience higher levels of perceived stress, anxiety, and depression symptoms than returnees (Lai et al., 2020). Finally, compared to students who were not in the final year of undergraduate or postgraduate study, final-year students reported higher perceived stress amid the pandemic, like findings of Keane et al. (2021) on the mental health of final-year nursing students where students found

challenging to manage the transition to work or continuing education. Consequently, our study suggests that it is imperative to support international students' mental health, particularly for students who are staying in Canada and/or in their final year of study.

COVID19-Related Challenges Assessment

All examined COVID19-related challenges were significantly associated with higher levels of perceived stress and anxiety and depression symptoms among international students in Canada (Table 3). Of which, travel restrictions and/or delays in the application process of legal documents, financial stress, and fear and worry about the academic program and future were the top three most frequently reported challenges by students to have severe levels of fear and worry. Mainly, students facing financial stress and lack of social support (e.g., being far away from family and friends) were more likely to have moderate to severe anxiety and depression symptoms, while students experiencing social exclusion and/or racist aggression were at a greater risk of having a high level of perceived stress.

During the pandemic, travelling restrictions and processing time delays have caused tremendous stress and frustration to students. All international students must hold a valid study or work permit and visitor visa to stay in Canada legally; however, the processing times for all essential documents soared to multiple times the normal ten days to 10 weeks during the pandemic "due to the shortage of staff and resources, outdated immigration infrastructure and technology, and a lack of political action" (Pratyush, 2021). In addition to processing time delays, the Canadian government occasionally placed flight bans against some countries in 2020 and 2021 due to COVID-19 outbreaks. For example, the Canadian government suspended all flights from Beijing and Shanghai to Canada on January 30, 2020 (CBC News, 2020) and banned Indian flights on April 22, 2021 (Bhattacharyya & Chanda, 2021). As such, international students were hindered from entering, studying, or working in Canada and felt the lack of provision for their academic programs and future, which in turn exacerbated the mental health challenges. As international students represented 17.8% of postsecondary enrolments in Canada in the



2019/2020 academic year (Statistics Canada, 2021a), it is suggested that the Canadian government should mobilize their staff and resources more effectively as well as invest in updating and supporting the immigrant service, so that international students can study and work in Canada as planned.

Furthermore, financial stress was another outstanding COVID-19-related challenge that was significantly associated with the severity of anxiety and depression symptoms of international students. According to Statistics Canada (2021b), domestic students pay an average of \$6,693 and \$7,472 for their undergraduate and graduate studies in the 2021/2022 academic year. In contrast, the corresponding tuition fees for international students range between \$20,120 and \$33,623. While international students face excessive tuition fees and high living expenses, their job opportunities are limited in Canada (Firang & Mensah, 2022), particularly during the COVID-19 pandemic.

The finding reveals the need for Canadian postsecondary institutions to support international students with more financial aid, scholarships, and on-campus part-time job opportunities. On the one hand, international students will be able to offset their financial stress and maintain good mental health; on the other hand, Canada will continue to be an ideal destination to attract and retain international students in the future. In addition, the present study found a significant correlation between lack of social support and severity of anxiety and depression symptoms, social exclusion and/or racist aggression, and perceived stress levels. The results of this study correspond with Lai et al. (2020), which concluded a lack of social support as a significant predictor of mental health among international students. In terms of social exclusion and/or racist aggression, it is noted that the COVID-19 pandemic has intensified anti-Asian crises in North America, such as the racist term "China virus" and the tragic murder of eight people in Atlanta, Georgia, including six Asian descendants. Such a societal illness would inevitably cause psychological damage to international students, and the Canadian government and postsecondary institutions need to take immediate actions against it, including developing policies at schools and at the national level to protect students.

Coping Strategies Assessment

The most used coping strategies among students were sleeping, watching entertaining programs, doing relaxation activities, eating, or cooking, and playing video/mobile games. Students who utilized sleeping, eating, or cooking, and video and mobile gaming to cope with COVID-19 were associated with lower levels of perceived stress, anxiety, and depression. A meta-analysis of randomized control trials on 8,608 participants observed that improved sleep quality could reduce stress, anxiety, and depression (Scott et al., 2021), and the reverse may also be true where people experiencing underlying health conditions often encounter sleeping problems.

As sleeping and mental health outcomes are intertwined, students are encouraged to have sufficient sleep and maintain regular sleep schedules. International students who used eating or cooking to cope with COVID-19 was less likely to have high levels of perceived stress, anxiety, and depression in our study, which corresponds with Utter et al. (2016) study on 8,500 adolescents in New Zealand. However, it is inconsistent with Lai et al. (2020) study in which a significant positive correlation between eating or cooking and severity of symptoms of anxiety and depression was found among international students in the United Kingdom and the United States. The possible explanation may be that, although cooking could promote self-esteem and creativity to improve anxiety and depression symptoms, cooking too much and eating disorders are associated with psychological distress (Farmer & Cotter, 2021).

Moreover, video, and mobile gaming were negatively correlated to stress, anxiety, and depression among international students in our study; however, it is also alarming that problematic video gaming could lead to adverse mental health outcomes (von der Heiden et al., 2019). We suggest that Canadian universities and colleges should advise students on developing regular sleep patterns. The institutions should also guide the development of healthy cooking, eating, and gaming habits, as excessive practice of any of these activities could harm emotional well-being.

LIMITATIONS



There are several limitations in our study. Firstly, it was based on a small sample size of 177 participants due to time constraints, which may reduce the power of the study and lead to higher variability. Secondly, even though the exponential, non-discriminative snowball sampling strategy helped locate international students cost-effectively, it was subject to non-random selection procedures that may not guarantee representative of the study population.

Another limitation was that 68.4% of the included participants were attending schools in Central Canada (i.e., Ontario and Quebec), and 61.6% were of Asian origins; hence, the results may not be applicable to international students living in other regions in Canada or coming from other cultures. In addition, since no comparative test was performed on the mental health status of domestic and international students in Canada, it is not necessarily concluded that international students had worse symptoms of stress, anxiety, and depression during the pandemic. While no study on the mental health status of Canadian international students amid the COVID-19 pandemic has been documented, it is challenging to compare the study sample to a larger population which could further affect the robustness of the study.

Future studies are suggested to examine international students' mental health with a more diverse cultural background and living in provinces and territories across Canada. Researchers could also conduct a comparison study on the mental health assessments of domestic and international students attending post-secondary institutions in Canada.

IMPLICATIONS

Our study findings have implications for Canadian postsecondary institutions, governments, public health agencies. As mental health crises of both male and female international students have been amplified amid the pandemic, postsecondary institutions should provide more scholarship and on-campus job opportunities for international students to overcome financial burdens, create a more socially inclusive community for students to live and grow, encourage students to use self-help coping strategies, and assist students, particularly final-year

international students, in transitioning from school to further education or work.

In addition to universities and colleges, the Canadian government should support mental health services at schools, ensure a fair labour market for both domestic and international students, formulate policies and punitive measures to respond to social exclusion at the national level, and invest in immigrant services to streamline study and work inquiries.

Lastly, as the COVID-19 pandemic situation is rapid-changing and has profound impacts which go beyond individual mental health to the societal structure, public health professionals are encouraged to continue to monitor the mental health status of international students during and post COVID-19, examine various COVID19-related challenges and coping strategies, as well as delve into the structural determinants of mental health among international students in Canada.

CONCLUSION

Our study implies the high prevalence of stress, anxiety and depression among international university and college students in Canada, particularly female students, students who are in Canada, and final-year students. Besides, all COVID19-related challenges are significantly related to perceived stress, anxiety and depression while sleeping, eating, or cooking, and video and mobile gaming could be beneficial for international students to cope with the pandemic. Canadian postsecondary institutions, governments, and public health authorities should take immediate actions to support international students' mental health during the pandemic and beyond.

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Table 1. Demographic characteristics (n = 177)

Variables	Categories	Frequency (%)
<i>Sex</i>	Male	74 (41.8%)
	Female	101 (57.1)
	Prefer not to answer	2 (1.1%)
<i>Age</i>	18-25 years old	145 (81.9%)
	25+ years old	31 (17.5%)
	Unknown	1 (0.6%)
<i>Geographical Regions, World</i>	Africa	5 (2.8%)
	Asia	105 (59.4%)
	Europe	3 (1.7%)
	The Americas	30 (16.9%)
	Unknown	34 (19.2%)
<i>Ethnicity</i>	African origins	6 (3.4%)
	Asian origins	109 (61.6%)
	Caribbean origins	5 (2.8%)
	European origins	19 (10.7%)
	Latin, Central and South American origins	13 (7.3%)
	Oceania origins	4 (2.3%)
	Multiethnic	1 (0.6%)
	North American origins	13 (7.3%)
<i>Currently in Canada</i>	Other	7 (4.0%)
	Yes	160 (90.4%)



	No	17 (9.6%)
<i>Geographic Regions of School, Canada</i>	Western (BC, AB, SK, MB)	35 (19.8%)
	Central (ON, QC)	121 (68.4%)
	Atlantic (NB, PEI, NS, NFL)	10 (5.6%)
	Northern (YK, NWT, NVT)	11 (6.2%)
<i>Field of Study</i>	Medical or health related	74 (41.8%)
	Other	103 (58.2%)
<i>Level of Study</i>	Undergraduate	149 (84.2%)
	Postgraduate	28 (15.8%)
<i>Final Year of Study</i>	Yes	74 (41.8%)
	No	100 (56.5%)
	Not sure	3 (1.7%)
<i>Has COVID-19 affected your Mental health</i>	Yes	120 (67.8%)
	No	57 (32.2%)
<i>Do you feel you are able to Adequately cope with the stress of the current situation</i>	Yes	119 (67.2%)
	No	58 (32.8%)



Table 2. Association between severity of symptoms and impact on mental health

	V1	V2	V3
V1	1		
V2	0.516**	1	
V3	0.242**	0.265**	1

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

V1: severity of perceived stress

V2: severity of anxiety and depression symptoms

V3: has COVID-19 affected your mental health



Table 3. Association between indicators of fear and worry and severity of perceived stress, anxiety and depression symptoms

Indicators of Fear and Worry		Severity of Perceived Stress	Severity of Anxiety and Depression Symptoms
Risk of being infected	r	0.407**	0.417**
Fear and worry about your academic program and future plans	r	0.413**	0.480**
Financial stress	r	0.497**	0.583**
Risk of loved ones being infected	r	0.378**	0.482**
Lack of social support	r	0.473**	0.512**
Changes of learning mode	r	0.388**	0.238**
Travelling restrictions and/or delays to application process of legal documents	r	0.351**	0.255**
Social exclusion and/or racist aggression	r	0.509**	0.481**
<p>** . Correlation is significant at the 0.01 level (2-tailed)</p> <p>* . Correlation is significant at the 0.05 level (2-tailed)</p>			



Table 4: Association between coping strategies and severity of perceived stress; anxiety and depression symptoms

Coping Strategies		Severity of Perceived Stress	Severity of Anxiety and Depression Symptoms	Has COVID-19 affected your mental health
Studying	r	0.053	0.020	0.004
Working	r	0.074	0.164*	-0.014
Sleeping	r	-0.330**	-0.355**	-0.004
Doing relaxation activities	r	-0.002	-0.095	0.079
Eating or cooking	r	-0.321**	-0.351**	-0.062
Playing video/mobile games	r	-0.351**	-0.333**	-0.225**
Watching entertaining programs	r	-0.081	-0.057	0.030
Online shopping	r	-0.038	-0.068	-0.052
Seeking support from family/friends	r	0.028	-0.086	0.031
Positive thinking	r	0.076	-0.022	0.003
Spiritual support	r	0.074	-0.063	0.061
Other – shower	r	-0.022	-0.059	0.103
Other – therapy	r	0.020	0.032	0.116
Other – sports	r	0.031	0.025	0.074
**Correlation is significant at the 0.01 level (2-tailed).				
*Correlation is significant at the 0.05 level (2-tailed).				