A qualitative exploration of the mental wellbeing and coping strategies of Canadian adolescents during the COVID-19 pandemic

Abstract

Background: Qualitative research is lacking on the mental wellbeing of adolescents during the COVID-19 pandemic. The aim of this study was to explore the feelings and emotions adolescents experienced around the COVID-19 pandemic and the coping strategies they identified and employed to manage those emotions.

Methods: Qualitative data were gathered from two open-ended e-survey questions: 1) what feelings and emotions have you experienced around the pandemic; and 2) what coping strategies have you used during the pandemic? Participants were 851 Canadian adolescents, aged 13-19 years. A summative content analysis was taken to inductively analyze 1228 open-ended responses.

Results: Within the two broader categories under analysis (feelings and emotions associated with the pandemic; coping strategies used during the pandemic), five major themes were identified: (1) socio-spatial and temporal disconnections; (2) emotional toll of the pandemic; (3) positives amidst the pandemic; (4) connecting online and outdoors; and (5) leisure and health-promoting activities.

Interpretations: This novel, youth-informed study reveals significant ways in which the pandemic has affected adolescents' mental and emotional wellbeing. The negative emotions experienced, such as disconnection, loneliness, loss, distress, and missing in-person support and connection, represent the range of harms contributing to mental distress. Although the emotional toll is evident, participants adopted various positive coping strategies to mitigate their distress, including physical activity, safe peer interactions, and hobbies. The results have important implications for public health policy and practice during pandemic times, emphasizing the importance of accessible mental health resources for those experiencing psychological distress.

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Introduction

On March 11, 2020 and in response to the global COVID-19 pandemic, Canada implemented various public health interventions, including physical distancing measures, stay-at-home orders, and quarantines to reduce the spread of the virus. While some elements varied by province, most Canadians were in some form of "lockdown" between March and September 2020. Although adolescents are not faced with the same physical health risks as older adults, the substantial societal changes and disruption to adolescents' daily routines are likely to make them vulnerable to impacts on their wellbeing and development (1,2,3). School closures, home isolation, cancelled social gatherings and events, loss of important milestones (e.g., graduation, school social events), uncertainty about the future, as well as significant disruptions to peer interactions and experiences may critically affect the emotional, behavioural, moral, and identity development of adolescents (3,4,5,6,7). Thus, the complex stressors endured could be associated with adverse mental health outcomes (3).

Research investigating pandemic effects on youth aged 14 to 28 in Ontario, Canada found an increase in mental health concerns (i.e., depression, anxiety, self-harm) during the early stages of COVID-19 (8). A survey among youth Indian citizens reported moderate-to-severe stress, anxiety, and depression symptoms during the pandemic (9). Research examining Nigerian parents' perceptions of the psychosocial effect of pandemic restrictions on children, revealed that those with limited internet access expressed unhappiness, stress, and anxiety (10). Stay-at-home orders in China resulted in higher rates of anxiety and depressive symptoms among children (11), a decrease in social support from peers, and a higher prevalence of mental health problems (12). While research has demonstrated a decline in self-reported mental health among adolescents during the pandemic (2,8,9,10,11,12), to our knowledge no research has qualitatively examined mental wellbeing outcomes of the pandemic. By examining adolescents' feelings and emotions through open-ended questions, which allow respondents to express themselves in their own words, we may gain a deeper understanding of their experiences during this challenging time. We sought to explore the feelings and emotions adolescents experienced around the COVID-19 pandemic and the coping strategies they identified and employed to manage those emotions.

Method

Working with the Human Environments Analysis Laboratory Youth Advisory Council (HEALYAC), a youth-informed cross-sectional online survey (e-survey) called QuaranTEENing was developed to gain an understanding of the impacts of COVID-19 restrictions (e.g., physical distancing, stay-at-home orders) on adolescents' mental and emotional wellbeing (see Appendix A for Checklist for Reporting Results of Internet E-Surveys [CHERRIES; 13]). Participants were recruited through various HEALYAC social media networks and youth-serving organizations in Canada. Recruitment material contained a weblink directing potential participants to the e-survey in Qualtrics software, which began with a Letter of Information outlining study details and eligibility (i.e., being between the ages of 13-19 years and living in Canada). Consent was implied if adolescents completed the survey. Data were collected from June -

September 2020 (in Canada, schools closed in March 2020). The e-survey took approximately 20 minutes to complete and was offered in English and French. Upon completion, participants were entered into a draw for a $250 gift card.

Participants included 851 Canadian adolescents (605 female, 220 male, 14 trans or non-binary, 12 identified as unknown or other [e.g., demiboy, genderfluid, agender]), aged 13-19 (*M* = 15.6; *SD* = 1.7). This paper focuses on findings from two optional open-ended questions: 1) what feelings and emotions have you experienced around the pandemic; and 2) what coping strategies have you used during the pandemic? These questions were placed after Likert-scale questions asking about self-rated mental health, stress, and psychological distress, both before and during COVID-19 restriction measures.

Ethics Approval

Study approval was obtained from BLINDED university's non-medical research ethics board.

Data Analysis

A summative content analysis was taken to inductively analyze 1228 open-ended responses (489 responses to the first question on feelings and emotions and 739 responses to the second that addressed coping strategies). This approach is commonly used for open-ended surveys with high response rates (14,15) and involves comparing content and counting keywords, followed by interpretation of the context. Two researchers worked independently to group similar responses into themes, where sub-themes were constructed from repeating ideas (16). The researchers removed any responses that were deemed irrelevant to the data (e.g., "N/A," "none"), leaving 449 responses for the first question and 715 for the second. After the two researchers came to a consensus on the themes and sub-themes, a third researcher provided a check on the plausibility of themes, sub-themes, and the consistency of analysis, adding to the rigorous approach (17). Any discrepancies were discussed as a group, where themes and sub-themes were refined until agreement was reached. Keywords were then extracted and quantified using frequency counts (14), which were verified using NVivo 12 Pro. Quantifying responses allow for inferences to be made about the magnitude of an issue considered important to participants (17). Within the two broader categories under analysis (feelings and emotions associated with the pandemic; coping strategies used during the pandemic), five major themes and 22 sub-themes were identified. Participants' own words and phrases are brought into our presentation of results where possible to foreground their voices in reporting themes.

Results

Feelings and emotions associated with the pandemic

Analysis of this category generated three themes: (1) socio-spatial and temporal disconnections; (2) emotional toll of the pandemic; and (3) positives amidst the pandemic.

Socio-spatial and temporal disconnections. This theme reflects five sub-themes that reveal a range of disconnections adolescents experienced across time, place, and social relationships. Participants called attention to the *challenges navigating stay-at-home measures* (Box 1A); namely, online school while isolated at home. Learning online was perceived to be more difficult due to isolation, missing friends, decreased motivation, increased workload, and tensions at home. Next, *missing in-person interaction, support, and connection* (Box 1B) contributed to the despair participants experienced. Participants were craving in-person interaction, realizing the need to "see friends regularly" for "mental and emotional health". Feeling like "the support [they] used to rely on" was pulled out from underneath them and how they "would love to hug friends and family" uncovered the importance of support and connection for this demographic. Third, as momentous life events were derailed, participants feared how *missing milestones and opportunities* (Box 1C) (e.g., high school graduation, exciting beginnings of post-secondary education, sport) would affect them now and in the future. Further, an overwhelming sense of *disconnection, loneliness, and isolation* (Box 1D) was common for many participants (*N* = 95), as participants noted feeling "extremely alone, shut off" and "disconnected from the world". Lastly, many participants (*N* = 80) felt *uneasy and distressed about the future* (Box 1E) due to the unknown consequences of the pandemic and uncertainty of "how life is going to end up", causing many adolescents to feel "very anxious and nervous". Participants linked the various disconnections to their mental and emotional wellbeing, placing emphasis on the urgency for peer interaction, connection, support, and experience.

Box 1: Socio-spatial and temporal disconnections (*N* = 449)

A. Challenges navigating stay-at-home measures (N = 19)

- The way school is sucks it's more stressful and I feel I could just give up on work easily.
- I miss my friends and feel sad not to have a social life. It's been hard at home to stay and do learning online and a bit isolating.
- Physical distancing is hard because I am home again with my parents. It's tough being back here. It wasn't the perfect household.
- Being stuck with the same people is really hard and there tends to be a lot of tension.

B. Missing in-person interaction, support, and connection (N = 68)

- I wish I could just hug my friends and hang out with them like no problem. I feel as though I've taken physical touch for granted.
- I never realized how much I needed to see my friends regularly for my mental and emotional health and I've missed physical closeness more then I'd originally imagined I would.
- It was very hard since my usual coping mechanisms weren't there. ie. teachers, friends, other adults, etc. I don't often share my feelings with my parents so this was hard.
- It has been near to impossible to be away from my friends who are my support system.

C. Missing milestones and opportunities (N = 33)

- As a 2020 graduate, I was sad that I won't be able to experience important milestones such as graduation, prom, and the last day of school with my friends.
- I am very upset about losing grad 12 grad/prom, feeling a sense of loss of everything I don't get to experience.
- I feel sad as I miss my friends and teachers. I also feel sad because of missed opportunities, and plans I had been looking forward to. I feel sad when I read the news, and think about being unable to say goodbye to some people from school who are not returning next year. I am worried about how my grade twelve year and university will go, and that I will have to miss more opportunities.
- Physical distancing has definitely ruined our year. I feel I missed out on making so many memories with my family and friends and I fear that I will never get this time back.

D. Disconnection, isolation, loneliness (N = 95)

- I've been feeling disconnected and isolated from people my age and without friends.
- I feel less connected to others and lonelier, online communication isn't as easy or enjoyable as in person.
- I feel very isolated and I feel as if there is no light at the end of the tunnel. Sometimes it just feels as if I'm going through the motion of life but not actually living it.
- Physical distancing also made me feel more isolated and disconnected from the rest of the world. Felt like I was alone.

E. Uneasy and distressed about the future (*N* = 80)

- The fact that everything is unclear about the future, even more than normally, gives me quite a lot of anxiety and since some exams from uni are replanned I felt quite stressed too and if something unexpected happens, it can really throw me off in some kind of panic-cry.
- I am scared of everything going back to normal and me being left behind, unprepared for yet another change.
- Thinking about the future also makes me feel very anxious and nervous, where before I was excited. When I think of my future, I feel more of a sense of dread and a lot of worry and a lot of hopelessness, as I'm realizing that the experiences I had imagined for myself are now not going to happen due to corona.
- Everything feels uncertain, but I am at a point in my life where I have to make many decisions very quickly about things that will affect my future for decades to come. I am not equipped to do so.

Emotional toll of the pandemic. This theme reveals the damaging emotional toll of the pandemic in participants' lives. For one, adolescents articulated their *concern for safety* (Box 2A), including being uncomfortable with physical touch, fear of public spaces, worry for others' wellbeing, and feeling "extremely anxious [to] leave the house". Second, *broken down and at a loss* (Box 2B) was the most common sentiment among participants (*N* = 126), who reported a "loss of independence", happiness, and motivation. "Feel[ing] trapped and [not] excited to wake up", with thoughts of worthlessness and hopelessness was also evident. Third, participants experienced a *cycle of emotions* (Box 2C), where "emotions switch[ed] faster" than usual where they could be "having fun one second then angry the next". Finally, and although a low frequency (*N* = 4), it is important to emphasize that some participants disclosed a struggle with *suicidal thoughts* (Box 2D), attributing these thoughts to isolation and loneliness. Through these sub-themes, it is evident that participants were extremely vulnerable to the harmful effects of the pandemic, calling attention to the mental and emotional distress endured.

Box 2: Emotional toll of the pandemic (*N* = 449)

A. Knowledge and concern for safety (N = 14)

- I honestly don't know when I'll be able to hug one of my friends without feeling uncomfortable or that i have to take a shower immediately.
- I get really awkward, stressed, and scared when people get too close to me when I'm out in public. I always have to remind my parents to not get too close to neighbours and such when they're talking, and I've become a complete germophobe when touching anything, even the groceries in my own fridge. All these kind of feelings are definitely due to covid-19 and are not something I can see going away easily even after the pandemic is over.
- I do feel extremely anxious if I leave the house to a public area even if I maintain my distance and wear masks and am obsessive over potential symptoms.
- I feel afraid of folks who do not safely distance, as it feels like a breach of my (as well as their) personal safety.

B. Broken down and at a loss (N = 126)

- I am no longer feeling determined. I usually put effort into everything I do, but now I feel as if there is no point.
- It makes me sad and hopeless because my friends were what made me happy, and now I cant even see them.
- I feel trapped and don't feel very excited to wake up every morning. I'm tired of being at home. I feel drained all the time.
- Feelings of uselessness and procrastination have increased significantly since the start of confinement.

C. Cycle of emotions (N = 40)

- I remain in this cycle, break down more than I did before and I just didn't think that I would feel this way when this all started.
- I find that now in quarantine that my emotions switch faster. I could be having fun one second then angry the next.
- I've noticed the negative feelings I have felt are not constant. They will all show up at one point, overwhelming me. Then life continues, and I move on for a little bit of time. Then the cycle continues.
- Some days I feel fine, other days I feel very sad, almost sick inside and I don't know why.

D. Suicidal thoughts (N = 4)

- Felt somewhat suicidal because I couldnt see my friends and wasnt getting along with my mom and everything was building up.
- Suicidal every now and then.
- I have experienced suicidal thoughts.

Positives amidst the pandemic. Despite the overwhelming negative mental impacts, participants did find positives amidst the pandemic. Participants (*N* = 82) expressed *feeling more at ease with less stress and pressur*e (Box 3A) from daily demands and that it was a "relief to be able to relax from schoolwork and extracurricular related stress". A small sample of participants mentioned that more time at home and access to online platforms enabled them to feel *more connected to friends and loved ones* (Box 3B). Further, reduced demands allowed for *self-reflection, growth, and care* (Box 3C) in terms of time to focus on themselves and to organize their thoughts, adding to perceptions of improved mental wellbeing. In the face of adversity, many adolescents revealed that the pandemic relieved them from the stress of day-to-day demands, while allowing more connection with friends and family, and time to focus on themselves.

Box 3: Positives amidst the pandemic (*N* = 449)

A. Feeling more at ease with less stress and pressure (N = 82)

- After schools closed I could tell my mental health and even physical health started vastly improving. I have time to do things I love, I get a good amount of sleep each night, I eat properly now and I'm not stressed.
- Feeling significantly less stressed and pressured as prior to quarantine my schedule was jam packed and I rarely had a free minute.
- I am generally feeling a lot less stressed since school has been closed. School work was the biggest cause of stress in my life, and with the workload reduced and our marks not able to go down, I now have time to pace myself, learn, and I now have time to relax.
- I feel amazing and so at ease. School is so hard to maintain physically and mentally it is incredibly draining trying to keep up with people at look your best and seem happy all the time. I am an introvert at heart and this quarantine has made my mental health much better and has honestly turned my life for the better. I am so happy that I don't have to put up with faking being cheery all the time at school and I can take the time to do things I love like read which I haven't have time for awhile because all my school work.

B. More connected to friends and loved ones (N = 11)

- I was not overly social before COVID but since then I'd say I've gotten closer with some friends.
- I grew somehow even closer to my girlfriend, who supported me in such difficult time.
- I feel like I have been able to reconnect with family members.
- I feel a lot more connected to my friends.

C. Self-reflection, growth, and care (N = 20)

- With less distractions, and more free time I was finally able to focus on my relationships and my mental health. Not having to go to school also gave me the chance to realize how some friends' impact was not the best for me.
- The gap in time that this has caused has allowed me to organize how i feel and what i think about my point of view in my life for the better.
- Being in quarantine has given me much more time with my thoughts and emotions. i am beginning to understand myself and try to actually figure out how to open up.
- After physical distancing I allowed myself to take some time and focus to on myself. That helped me grow out of my depressive state and frequent panic attacks.

Coping Strategies Used During the Pandemic

In addition to the emotions and feelings identified, participants noted adopting various coping strategies to help them through these uncertain times, resulting in two themes: (1) connecting online and outdoors; and (2) leisure and health-promoting activities.

Connecting online and outdoors. Given restrictions on physical interaction, participants noted shifting social interactions online or outdoors. The most frequently reported (*N* = 228) way of connecting with others was through *online* (Box 4A) platforms, including video calls, texting, playing videogames together, and social media. Participants mentioned connecting online as "a way to stay connected and help relieve the stress of the situation". With stay-at-home orders, participants mentioned that they were spending more time *connecting with their famili*es (Box 4B) "than before [as a way] to cope with physical distancing". This was done by engaging in more activities together, such as playing games, going for walks, or just hanging out. A small sample mentioned using *visits with friends/family outdoors* (Box 4C) as another way to connect and socialize, while following physical distancing guidelines. Although means of connecting with others changed, the importance of connecting with others to cope with the pandemic was evident.

Box 4: Connecting online and outdoors (*N* = 715)

A. Online (N = 228)
- [I] have also been video calling family members to stay connected and help relive the stress of the situation. Communicating and trying to stay focused helps relieve stress and anxiety.
- FaceTime and text messaging had helped a lot since I can't see anyone due to physical distancing.
- I've been trying to keep in contact with my friends through platforms such as Facetime and Snapchat.
- I have been connecting with my friends and family outside my home virtually.

B. Connecting with family (N = 70)
- I've been hanging out with my family more often. We've been having fires in our backyard and trying to stay postings.
- My family has helped me cope with physical distancing because I'm very close with them and since now they are all home, I get to spend much more time with them.
- Spending more time with my family. Playing more games as a family (e.g. board games) that we wouldn't have time for without covid-19.
- Spending time with my family are the times I most cherish during this time.

C. Visits with friends and/or family outdoors (N = 23)
- Sometimes close friends will come by my house and we will sit physical distanced and talk for a while
- My neighbours also come to my backyard where we often have campfires at a safe distance.
- Hanging out with my friends in the outdoors
- …spend some time in the backyard with my neighbours when the weather is nice.

Leisure and health-promoting activities. This theme demonstrates the various leisure and health-promoting activities that participants engaged in to cope with the pandemic. *Physical activity* (Box 5A) was frequently reported (*N* = 186) as an important coping mechanism and a way to "feel better". This included incorporating exercise into daily routines, going for walks with family members, or working on sport specific skills. Next, a few adolescents mentioned the importance of *being outside* (Box 5B) as often as possible "for fresh air". Participants also noted how finding activities and new hobbies to keep them busy and distracted from current events was critical, including *videogaming* (Box 5C)*, cooking and baking* (Box 5D)*, arts* (i.e., crafts, music, and dance) (Box 5E), *reading* (Box 5F)*, and watching TV/movies* (Box 5G). The leisure activities noted in this theme provided a positive way for participants to cope with the events happening around them.

Box 5: Leisure and health-promoting activities (*N* = 715)

A. Physical activity (N = 186)
- I have been working out and doing a lot of yoga.
- I started to take the time to do home workouts everyday to cope with anxiety and improve my physical heath.
- I also try my best to workout and go for walks to move negative energy and to feel accomplished.

...practicing my shot, working on baseball skills with my dad and brother.

B. Being outside (N = 24)
- I've been going to the beach, which helps me feel relaxed and at ease.
- Keeping myself busy by going outside and getting fresh air instead of staying inside all day.
- ...spending a lot of time outside in the forest or beach.
- ...going in my backyard for fresh air.

C. Videogames (N = 76)
- I have been playing playing my PlayStation 4 with my friends so I don't get lonely.
- Playing video games with my friends.
- Playing video games to take my mind off the covid19.
- I spend a lot of time playing multi-player video games.

D. Cooking/baking (N = 30)
- I have been baking a lot.
- …My mom and I cook together as well.
- Cooking, healthy eating.
- I also started learning butterfly knife tricks as a new hobby.

E. Arts (N = 72)
- I've been listening to music more often than not as I find it cheers me up.
- I have been doing lots of crafts like making shirts and bracelets.
- I have been writing and doing things that I like do that help me feel relaxed and calm.
- I draw a lot, read, listen to music, play a little piano, write a random story.

F. Reading (N = 37)
- I've started reading a few finance books.
- I have been reading more, journaling.
- I also like to read web comics.
- Reading stories and books.

G. TV/ movie watching (N = 24)
- Watching Netflix and playing online games.
- Watching videos of my favourite artist.
- Mainly distracting myself by watching movies, T.V. show
- …going in my backyard for fresh air.

Discussion

To better understand adolescents' experiences during the COVID-19 pandemic, this study explored the feelings and emotions adolescents experienced and the coping strategies employed to manage those emotions. The fact that so many adolescents were willing to share their lived experiences through two *optional* open-ended e-survey questions, evidences the magnitude of the impact of the pandemic on adolescents' wellbeing. The negative feelings and emotions disclosed reflect subjective responses common during traumatic event exposure (3,18), with the most prevalent sentiments around disconnection, isolation, loneliness, feeling broken down and at a loss, and experiencing distress about the future. When adolescents are exposed to trauma due to multiple stressors endured (e.g., significant life disruption, threat to personal safety and health, loss of support systems and experiences), they become more vulnerable to adverse mental health outcomes (3,12,19). Thus, consistent with previous research, results indicate that the negative emotions experienced by participants can be linked to a decline in mental wellbeing.

A strong current in disconnections adolescents experienced during this time was that "friends are my support system", pointing to the need for interventions that leverage adolescent friend and peer networks during pandemic times. In this study, and still relevant to many segments of Canada, adolescents were e-learning while isolated at home due to school closures and stay-at-home measures. Although the side effects of e-learning have not been addressed (20), school is an important environment that supports adolescents' ability to cope with daily stressors (21) and can act as a gateway for access to mental health resources (22). Participants' objective (i.e., social networks) and subjective support (i.e., emotional experience, satisfaction) diminished when public health interventions were implemented (12,23). Low social support is associated with higher incidence of depression and anxiety among adolescents (12,24,25) and social support can mediate the association between a stressor and psychological distress (26). Therefore, losing this anchor in life not only contributed to adolescents' mental distress but restricted their access to peer support and mental health services at a very critical time (27,28).

Though faced with substantial societal disruption, participants recognized positives amidst the pandemic, with the most common sentiment around experiencing less stress and pressure from reduced physical, mental, and social demands. Some adolescents also identified improved self-reflection and self-care, as the pandemic allowed time for personal investment. To our knowledge, research has yet to focus on the positive associations between the pandemic and adolescents' wellbeing, prompting the need for future research.

While much research points to the harmful and destructive coping mechanisms that adolescents may engage in during challenging life experiences (e.g., substance use; [18,29]), our results demonstrate that many adolescents were actively adopting positive and healthful coping strategies (e.g., reading, arts, baking). The most prominent strategy mentioned was physical activity. Physical activity has mental health benefits for young people (30) and is a promising mental health promotion strategy (31). Additionally, many participants utilized safe peer interactions by connecting with friends and loved ones, both virtually and in person (while maintaining physical distance) as a coping strategy. Maintaining social relations and friendships can be associated with better mental health outcomes among adolescents (20) and brings attention to social interactions as an important coping strategy for this demographic (28). Although adolescents faced a variety of negative emotions and feelings, our results show that some seem to be gravitating towards using positive coping strategies to help them through these uncertain times.

Limitations

This study reports on the responses to two open-ended e-survey questions and thus was unable to capture the depth and nuance that more intensive qualitative methods, such as interviews or focus groups would provide. Our findings identify key areas of impact on adolescents' mental wellbeing and further qualitative research should be undertaken to explore these in greater detail.

Conclusion

This novel, youth-informed study identified significant ways that the pandemic has affected adolescents' mental and emotional wellbeing. While results show numerous harms, there is also hope in the form of positive coping mechanisms. The results have important implications for public health policy and practice during pandemic times. Support for adolescents should include facilitating safe peer interactions, support, connection, and experience and provide accessible mental health resources for those experiencing psychological distress.

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Appendix A

Checklist for Reporting Results of Internet E-Surveys (CHERRIES)

Item Category	Checklist Item	Explanation	Reporting Results
Design	Describe survey design	Describe target population, sample frame. Is the sample a convenience sample? (In "open" surveys this is most likely.)	Convenience sample
Institutional Review Board approval and informed consent process	IRB approval	Mention whether the study has been approved by an IRB.	Approval was sought from the affiliated universities ethics committees.
	Informed consent	Describe the informed consent process. Where were the participants told the length of time of the survey, which data were stored and where and for how long, who the investigator was, and the purpose of the study?	On the recruitment material, a web link was provided to direct potential participants to the e-survey. At the start of the survey, participants were provided with a Letter of Information outlining study details (e.g., purpose, length of time to complete, how and where data is stored and for how long, rights of the participant, incentives, investigator information) and consent was implied if teens agreed to participate.
	Data protection	If any personal information was collected or stored, describe what mechanisms were used to protect unauthorized access.	The survey platform (Qualtrics) uses encryption processes with restricted access authorization to protect all data collected. Only the research team can access the password-protected platform.
Development and pre-testing	Development and testing	State how the survey was developed, including whether the usability and technical functionality of the electronic questionnaire had been tested before fielding the questionnaire.	The survey was developed by researchers from various disciplines (i.e., health geography, health science, epidemiology and biostatistics). Prior to fielding the e-survey, it was piloted for usability and technical

			functionality by the research team and affiliated Youth Advisory Council (HEALYAC) members.
Recruitment process and description of the sample having access to the questionnaire	Open survey versus closed survey	An “open survey” is a survey open for each visitor of a site, while a closed survey is only open to a sample which the investigator knows (password-protected survey).	Open survey
	Contact mode	Indicate whether or not the initial contact with the potential participants was made on the Internet. (Investigators may also send out questionnaires by mail and allow for Web-based data entry.)	Internet (i.e., social media)
	Advertising the survey	How/where was the survey announced or advertised? Some examples are offline media (newspapers), or online (mailing lists – If yes, which ones?) or banner ads (Where were these banner ads posted and what did they look like?). It is important to know the wording of the announcement as it will heavily influence who chooses to participate. Ideally the survey announcement should be published as an appendix.	The affiliated Youth Advisory Council (HEALYAC) members promoted the e-survey through their social media platforms and social networks. Recruitment materials were also sent to various Youth Advisory Councils across Canada to share across their social networks.
Survey administration	Web/E-mail	State the type of e-survey (e.g., one posted on a Web site, or one sent out through e-mail). If it is an e-mail survey, were the responses entered manually into a database, or was there an	Web site

	automatic method for capturing responses?	
Context	Describe the Web site (for mailing list/newsgroup) in which the survey was posted. What is the Web site about, who is visiting it, what are visitors normally looking for? Discuss to what degree the content of the Web site could pre-select the sample or influence the results. For example, a survey about vaccination on a anti-immunization Web site will have different results from a Web survey conducted on a government Web site	A Web site was created that directed participants to the Letter of Information detailing the study.
Mandatory/ voluntary	Was it a mandatory survey to be filled in by every visitor who wanted to enter the Web site, or was it a voluntary survey?	Voluntary
Incentives	Were any incentives offered (e.g., monetary, prizes, or non-monetary incentives such as an offer to provide the survey results)?	After every 800 completed surveys, there was a draw for a $250 gift card.
Time/Date	In what timeframe were the data collected?	Data were collected between June 2020 - September 2020.
Randomization of items or questionnaires	To prevent biases items can be randomized or alternated.	To avoid conceptual complexity, randomization was not used as order was important for referencing time before and after social distancing measures.
Adaptive questioning	Use adaptive questioning (certain items, or only conditionally displayed based on responses to other items) to reduce number and complexity of the questions.	To reduce the number and complexity of questions, various skip patterns were put in place, directing participants to questions based on their previous responses.

	Number of Items	What was the number of questionnaire items per page? The number of items is an important factor for the completion rate.	The number of questionnaire items per page ranged from one to seven.
	Number of screens (pages)	Over how many pages was the questionnaire distributed? The number of items is an important factor for the completion rate.	The questionnaire was 39 pages in length with six of those pages designated to the Letter of Information, eligibility, consent, incentive, and participation in future research.
	Completeness check	It is technically possible to do consistency or completeness checks before the questionnaire is submitted. Was this done, and if "yes", how (usually JAVAScript)? An alternative is to check for completeness after the questionnaire has been submitted (and highlight mandatory items). If this has been done, it should be reported. All items should provide a non-response option such as "not applicable" or "rather not say", and selection of one response option should be enforced.	Not applicable
	Review step	State whether respondents were able to review and change their answers (e.g., through a Back button or a Review step which displays a summary of the responses and asks the respondents if they are correct).	Participants were able to use the Back button to change their answers. A Review step was not utilized.
Response Rates	Unique site visitor	If you provide view rates or participation rates, you need to define how you determined a unique visitor. There are different techniques available, based on IP addresses or cookies or both.	Not determined

View rate (Ratio of unique survey visitors/unique site visitors)	Requires counting unique visitors to the first page of the survey, divided by the number of unique site visitors (not page views!). It is not unusual to have view rates of less than 0.1 % if the survey is voluntary.	Not determined
Participation rate (Ratio of unique visitors who agreed to participate/unique first survey page visitors)	Count the unique number of people who filled in the first survey page (or agreed to participate, for example by checking a checkbox), divided by visitors who visit the first page of the survey (or the informed consents page, if present). This can also be called "recruitment" rate.	Not determined
Completion rate (Ratio of users who finished the survey/users who agreed to participate)	The number of people submitting the last questionnaire page, divided by the number of people who agreed to participate (or submitted the first survey page). This is only relevant if there is a separate "informed consent" page or if the survey goes over several pages. This is a measure for attrition. Note that "completion" can involve leaving questionnaire items blank. This is not a measure for how completely questionnaires were filled in. (If you need a measure for this, use the word "completeness rate".)	851 (see 28,31, & 32)/1179 eligible participants who completed the first survey page (consent page) after duplicate [IP address AND age] removed as well as out of Canada participants (72%).

Preventing multiple entries from the same individual	Cookies used	Indicate whether cookies were used to assign a unique user identifier to each client computer. If so, mention the page on which the cookie was set and read, and how long the cookie was valid. Were duplicate entries avoided by preventing users access to the survey twice; or were duplicate database entries having the same user ID eliminated before analysis? In the latter case, which entries were kept for analysis (e.g., the first entry or the most recent)?	None used
	IP check	Indicate whether the IP address of the client computer was used to identify potential duplicate entries from the same user. If so, mention the period of time for which no two entries from the same IP address were allowed (e.g., 24 hours). Were duplicate entries avoided by preventing users with the same IP address access to the survey twice; or were duplicate database entries having the same IP address within a given period of time eliminated before analysis? If the latter, which entries were kept for analysis (e.g., the first entry or the most recent)?	IP addresses were checked for duplicates after survey entries were removed based on incompleteness or atypical timestamp (see 31 and 32). Because individuals in the same household could complete the survey on the same device, a variable of IP address and age was created. Where age AND IP address were identical the entry with the highest Progress (proportion of the questionnaire viewed) value was kept for analysis, or if these were equal the first entry was kept.
	Log file analysis	Indicate whether other techniques to analyze the log file for identification of multiple entries were used. If so, please describe.	None used

	Registration	In “closed” (non-open) surveys, users need to login first and it is easier to prevent duplicate entries from the same user. Describe how this was done. For example, was the survey never displayed a second time once the user had filled it in, or was the username stored together with the survey results and later eliminated? If the latter, which entries were kept for analysis (e.g., the first entry or the most recent)?	Not applicable
Analysis	Handling of incomplete questionnaires	Were only completed questionnaires analyzed? Were questionnaires which terminated early (where, for example, users did not go through all questionnaire pages) also analyzed?	Survey which were only viewed to questions regarding demographics/living situation but did not progress through the questionnaire to any questions regarding health outcomes/behaviours (Progress <42%).
	Questionnaires submitted with an atypical timestamp	Some investigators may measure the time people needed to fill in a questionnaire and exclude questionnaires that were submitted too soon. Specify the timeframe that was used as a cut-off point, and describe how this point was determined.	Surveys which were competed in 3 minutes or less (180 seconds) were not included in analysis (Duration =<180).
	Statistical correction	Indicate whether any methods such as weighting of items or propensity scores have been used to adjust for the non-representative sample; if so, please describe the methods.	None used