

Evidence synthesis

A comparative systematic scan of COVID-19 health literacy information sources for Canadian university students

Sana Mahmood, BSc (1); John Vincent Lobendino Flores, BA (2); Erica Di Ruggiero, PhD (3); Paola Ardiles, MBA (2); Hussein Elhagehassan, BA (2); Simran Purewal (2)

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Abstract

Introduction: With the rapid spread of online coronavirus-related health information, it is important to ensure that this information is reliable and effectively communicated. This study observes the dissemination of COVID-19 health literacy information by Canadian postsecondary institutions aimed at university students as compared to provincial and federal government COVID-19 guidelines.

Methods: We conducted a systematic scan of web pages from Canadian provincial and federal governments and from selected Canadian universities to identify how health information is presented to university students. We used our previously implemented health literacy survey with Canadian postsecondary students as a sampling frame to determine which academic institutions to include. We then used specific search terms to identify relevant web pages using Google and integrated search functions on government websites, and compared the information available on pandemic measures categorized by university response strategies, sources of expertise and branding approaches.

Results: Our scan of Canadian government and university web pages found that universities similarly created one main page for COVID-19 updates and information and linked to public sector agencies as a main resource, and mainly differed in their provincial and local sources for obtaining information. They also differed in their strategies for communicating and displaying this information to their respective students.

Conclusion: The universities in our sample outlined similar policies for their students, aligning with Canadian government public health recommendations and their respective provincial or regional health authorities. Maintaining the accuracy of these information sources is important to ensure student health literacy and counter misinformation about COVID-19.

Keywords: COVID-19, health literacy, public health, online information, Canada, postsecondary students, university

Introduction

COVID-19 was declared a global pandemic on 11 March 2020 by the World Health Organization.¹ The first known case occurred in Wuhan, China, in December 2019, and the first case in Canada was

detected on 25 January 2020.¹ The pandemic also gave rise to a COVID-19 “infodemic,” or “information epidemic,” which is an overwhelming amount of information spread rapidly through communication technologies.² This surplus of information includes both credible information and

Highlights

- This paper identifies measures taken by postsecondary institutions to enhance student COVID-19 health literacy in Canada.
- Advice from Canadian universities is compared to Canadian provincial and federal government public health guidelines.

misinformation.² In relation to COVID-19, this ranges from information on viral distribution and preventive measures published by reliable public health authorities, to unsubstantiated “remedies,” to claims by unauthorized sources of the virus being a hoax.³

Previous research has revealed that conspiracy allegations can directly impact preventive behaviours; this has arisen not only in the context of COVID-19, but for past major disease outbreaks including HIV and the Zika virus.³ The distribution of, access to and uptake of credible information thus play important roles in mitigating pandemic spread and contributing to the success of public health measures. Credible health resources may aid individuals in developing the skills to identify pandemic-related misinformation and are key to ensuring health literacy.

Health literacy is the “degree to which people are able to access, understand, appraise and communicate information to engage with the demands of different

Author references:

1. Faculty of Arts and Science, University of Toronto, Toronto, Ontario, Canada
2. Faculty of Health Sciences, Simon Fraser University, Burnaby, British Columbia, Canada
3. Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario, Canada

Correspondence: Sana Mahmood, Faculty of Arts and Science, University of Toronto, 100 St. George St., Toronto, ON M5S 3G3; Tel: 647-704-6523; Email: sana.s.mahmood@gmail.com

health contexts to promote and maintain health across the life-course.^{7,4,p.ii} In addition to accessing information, health literacy is also necessary for applying the acquired information to making health-related decisions.⁴ Conversely, low levels of health literacy may signify difficulty in understanding health conditions and related information, thereby affecting an individual's health-related decision-making processes.⁴ With the ongoing pandemic, it is necessary to enhance literacy to promote better understanding of the public health information available, and to thereby encourage compliance with public health protocols.

From 1 July to 30 September 2020, we conducted a cross-sectional survey of COVID-19-related health literacy in Canadian postsecondary students, which served as context for the present study.⁵ The survey was conducted by researchers at the University of Toronto and Simon Fraser University, in partnership with the international COVID-19 Health Literacy Consortium (a global network for research on health literacy and digital health literacy), and obtained data on the health literacy of young adults in over 50 countries.⁶ The survey revealed that Canadian young adults frequently accessed sources of health information about the coronavirus through websites of public sector bodies such as the Public Health Agency of Canada (PHAC), as well as other health portals. The use of these reputable sources was reported to be beneficial by students, since it might enhance their health literacy through reliable and accurate information distribution.⁵

Ideally, curtailing coronavirus misinformation in students should also be a priority for academic institutions. In pursuing mitigation strategies for COVID-19, postsecondary institutions in Canada shifted early in the pandemic to remote learning methods, with the cessation of many in-person activities, in accordance with physical distancing measures and national and provincial pandemic restrictions.⁷ This sudden transition into remote learning created new challenges for students in adapting to the online learning environment, particularly due to the lack of previous online learning opportunities.^{7,8} Because of this new online learning environment, postsecondary students who require constant access to the Internet may also experience increased exposure to both reliable and unreliable online

claims, which in turn may affect their understanding of current health information. Academic institutions can collectively help to reverse the confusion and misinformation stemming from these unauthorized sources and improve student health literacy by mirroring official government public health information, thereby also providing consistency in the information presented by each institution. As postsecondary students may communicate health information to others, it is important to ensure that this population group is also able to effectively access, comprehend and evaluate the credibility of online information sources.⁵

There is limited research regarding the health literacy of postsecondary students, particularly those in Canada, and few studies focus on the sources from which students are receiving health information.⁵ This study aims to address this knowledge gap within the context of the COVID-19 pandemic in Canada. In this paper, we report on a systematic scan of publicly available sources of health information from both federal and provincial government websites and postsecondary institutions. Our scans aimed to examine (1) what information on pandemic measures was disseminated to universities and students by the federal and provincial governments and by Canadian universities; (2) how these sources compare with each other; and (3) whether this access to health information had an impact on the health literacy levels self-reported by postsecondary students.

Methods

To identify the health information available to university students, we conducted systematic scans of publicly available information drawn from government and university web platforms. We defined this systematic scanning process as the identification of and data extraction from relevant web pages guided by the application of specific search and inclusion/exclusion criteria listed in the sections that follow. The time frame for scanning government platforms was July to October 2020, and the time frame for scanning university platforms was November 2020 to January 2021.

Scans of publicly available information drawn from government platforms

In deciding which government agencies and types of information to use in our

scan, we created criteria for inclusion and exclusion as follows. Included were official Canadian federal government and Ontario and British Columbia provincial government web pages, publicly available (i.e. not in private domains, and accessible to the general public) online information about COVID-19, and information that would affect postsecondary students and institutions (i.e. through closures of facilities and travel restrictions). Excluded were municipal government web pages and private databases.

We chose not to include municipal and city-level data, because, due to the pandemic, we could not assume that students were physically based in the city where their institution was located. We relied only on publicly available information for accessibility reasons, as these sources are likely more readily available to all students compared to private web pages blocked to individuals not part of a specific organization, or requiring subscription. Finally, because the international survey that we referenced as a sampling frame was focussed on postsecondary institutions, we limited the information sources we observed to those relevant to the postsecondary setting.

After determining these inclusion/exclusion criteria, we selected three relevant public sector agencies to search, based on the study location: the official sites of the governments of Canada, Ontario and British Columbia. We then performed a search using the websites' integrated search functions with the search terms "COVID-19" plus one of the following: "policy", "measures", "public health" or "postsecondary". This resulted in the inclusion of eight government web pages, including the Government of Canada's federal legislations⁹⁻¹¹ and guidance for postsecondary institutions,¹² PHAC's individual and community-based measures to mitigate the spread of COVID-19 in Canada,¹³ the province of Ontario's pandemic restrictions and framework for reopening the province^{14,15} and the province of British Columbia's pandemic restrictions and BC restart plan.¹⁶

The time frame for scanning government web pages was from July to October 2020; therefore, the results are limited to the most recent available at that time. We scanned the web pages by extracting and summarizing information about the

pandemic public health measures (which we defined as a range of regulations, policies and guidance) put in effect by federal and provincial governments that would affect academic institutions and students, as well as guidelines for how to enact and follow these measures.

Scans of publicly available information drawn from university platforms

To compare postsecondary institution information sources to those from government public health authorities, we created a framework for deciding which institutions' web pages to scan. We used the results of our earlier COVID-19 health literacy cross-sectional study as a sampling frame from which to choose a subset of academic institutions to include in our scan. In total, the survey received 2679 responses from students enrolled across 88 Canadian postsecondary institutions (Figure 1).⁵ We specifically limited the institutions searched to those from which at least 20 students enrolled at the academic institution had responded (while institutions themselves were not recruited to participate in the survey, students from different institutions were able to voluntarily respond). This cut-off value narrowed our scans to observing the pandemic-related information published by 27 Canadian universities aimed at their students, and consequently resulted in the

exclusion of any Canadian colleges due to a lower response rate from college students.

Next, we determined keywords to identify relevant web pages from this subset of universities. The search terms were: [institution name], "COVID-19" and "student", which were input into the Google search engine. The time frame for scanning universities was between November 2020 and January 2021. We then developed a guideline for the kinds of common information to extract and observe from each university, namely the institution's response strategies, frequently asked questions (FAQ), sources of expertise, and branding approaches (Table 1). These selected items were also used to provide a side-by-side comparison of the universities' responses to the pandemic directives by federal and provincial governments, through the listing of provincial and local sources of expertise and any additional public sector agencies or public health bodies on their web pages.

To better understand how the mirroring of official resources by academic institutions may have a role in enhancing student health literacy, we also presented students' average estimated health literacy from the top four and bottom two universities in our 27-university subsample. The health literacy data was obtained from our

earlier COVID-19 health literacy survey study; these estimates were generated in that study by reviewing the responses to health literacy-related questions (Table 2).⁵

We further grouped the 27 universities included in the scan by region: three universities in the West Coast (British Columbia), eight universities from the Prairie Provinces (Alberta, Saskatchewan and Manitoba), 14 universities in Central Canada (Ontario and Quebec), and two universities from the Atlantic Provinces (Nova Scotia) (Table 1).

Results

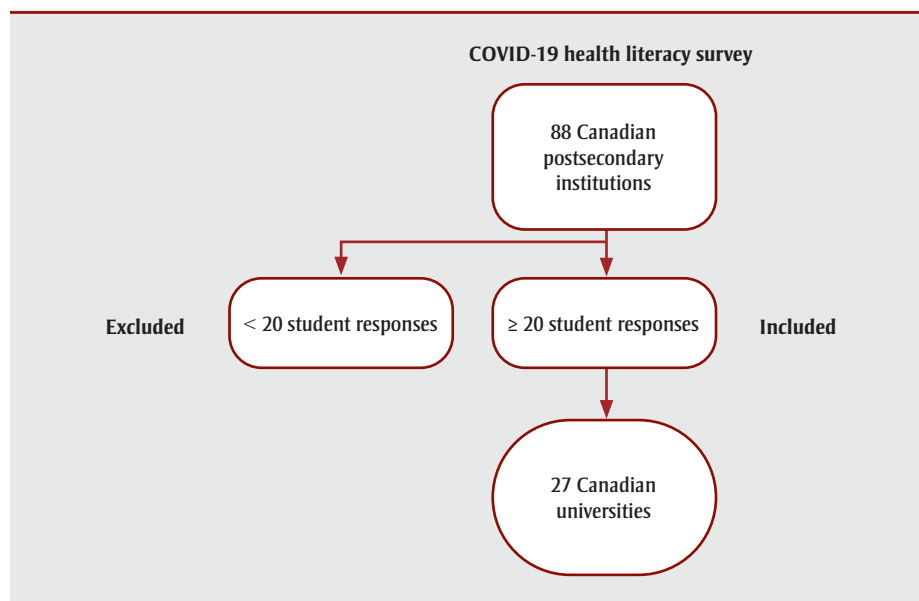
First, we present our review of four web pages from the federal government and three web pages from the provincial governments of Ontario and British Columbia for information available to the postsecondary student population. Next, we highlight the results from our scan of 27 Canadian universities for the types of web pages used to provide health information about COVID-19 to students.

Federal government: guidance for postsecondary institutions and students

Web pages presented by the Canadian federal government included those on pandemic measures that would affect the general population and thereby students, as well as postsecondary institution-specific information on how to enforce these measures for students on campus. In response to the COVID-19 pandemic, the federal government enacted measures to prevent people with COVID-19 coming in from outside of Canada, including border closures and limiting of nonessential travel, along with mandatory 14-day isolation periods upon entry into the country.⁹⁻¹¹

These mandates were followed by guidance for academic institutions during the pandemic, developed by PHAC and Canadian public health experts, directed at postsecondary institution administrators. This guidance outlined a risk-based approach for campus planning and operations to administrators and course providers, taking into consideration factors such as the amount of on-campus COVID-19 transmission and domestic and international travel requirements. It also addressed collaboration with local public health authorities in the event of an outbreak, and included recommendations for the timing of school closures and openings.¹²

FIGURE 1
Inclusion and exclusion of postsecondary institutions in systematic scan of postsecondary student health literacy^a during the COVID-19 pandemic, Canada, 2020 to 2021



^a The COVID-19 health literacy survey was administered to students in Canadian postsecondary institutions from July to September 2020.⁵

TABLE 1
Scans of 27 Canadian universities' health information provided to students during the COVID-19 pandemic, November 2020 to January 2021

Item	Description	Universities that used these items on their web pages
Response strategies		
Campus closures and restrictions	Institution-initiated, campus-related changes in response to the pandemic, including the implementation of physical distancing practices, closures or restrictions on campus facilities and services, and shifts to remote learning	Simon Fraser University, ^{17,20,21} University of British Columbia, ¹⁸ University of Victoria, ¹⁹ Brandon University, ²² University of Calgary, ²³ University of Alberta, ²⁴ University of Lethbridge, ²⁵ Mount Royal University, ²⁶ University of Winnipeg, ²⁷ University of Saskatchewan, ²⁸ University of Manitoba, ²⁹ University of Waterloo, ³⁰ University of Toronto, ^{31,32} University of Ottawa, ³³ York University, ³⁴ Lakehead University, ³⁵ Western University, ³⁶ McMaster University, ³⁷ Queen's University, ³⁸ University of Guelph, ³⁹ Brock University, ⁴⁰ Laurentian University, ⁴¹ Ryerson University, ⁴² Concordia University, ⁴³ McGill University, ⁴⁴ Acadia University, ⁴⁵ Dalhousie University ⁴⁶
COVID-19 updates and information pages	Web pages published by individual universities citing COVID-19-related information and providing students with updates to the new academic term and remote learning strategies, public health measures in place on campus and additional health tips and resources	Simon Fraser University, ^{17,20,21} University of Lethbridge, ²⁵ University of Toronto, ^{31,32} University of Ottawa, ³³ York University, ³⁴ Acadia University ⁴⁵
COVID-19 FAQ	Community-specific FAQ organized based on inquiries from students as well as faculty and staff	University of Calgary, ²³ University of Manitoba, ²⁹ Queen's University, ³⁸ University of Guelph, ³⁹ McGill University, ⁴⁴ Acadia University ⁴⁵
COVID-19 roadmaps	Detailed plans and steps for returning to campus, in line with government and public health authorities' advice	Simon Fraser University, ^{17,20,21} University of Lethbridge, ²⁵ University of Toronto, ^{31,32} University of Ottawa, ³³ York University, ³⁴ Acadia University ⁴⁵
Campus case trackers	Information on locations and buildings on campus at which there was a confirmed positive case	University of Calgary, ²³ University of Manitoba, ²⁹ Queen's University, ³⁸ University of Guelph, ³⁹ McGill University, ⁴⁴ Acadia University ⁴⁵
Screening tools and self-assessment forms	Tools initiated for assessing oneself regarding signs or symptoms that may require self-isolation	Simon Fraser University, ^{17,20,21} University of Lethbridge, ²⁵ University of Toronto, ^{31,32} University of Guelph, ³⁹ Brock University, ⁴⁰ Laurentian University, ⁴¹ Ryerson University, ⁴² McGill University ⁴⁴
Instructional videos	Videos entailing detailed instructions for safety protocols enacted on campus and how to effectively follow them	University of Saskatchewan, ²⁸ University of Toronto, ^{31,32} Western University, ³⁶
Training courses	E-courses on adhering to safety protocols following public health guidance	University of Alberta, ²⁴ University of Guelph, ³⁹ McGill University ⁴⁴
Chat features	Live chat functions were available for queries about the pandemic	Laurentian University ⁴¹
Sources of expertise:		
federal public health authorities		
Government of Canada, PHAC		Simon Fraser University, ^{17,20,21} University of British Columbia, ¹⁸ University of Victoria, ¹⁹ Brandon University, ²² University of Calgary, ²³ University of Alberta, ²⁴ University of Lethbridge, ²⁵ Mount Royal University, ²⁶ University of Winnipeg, ²⁷ University of Saskatchewan, ²⁸ University of Manitoba, ²⁹ University of Waterloo, ³⁰ University of Toronto, ^{31,32} University of Ottawa, ³³ York University, ³⁴ Lakehead University, ³⁵ Western University, ³⁶ McMaster University, ³⁷ Queen's University, ³⁸ University of Guelph, ³⁹ Brock University, ⁴⁰ Laurentian University, ⁴¹ Ryerson University, ⁴² Concordia University, ⁴³ McGill University, ⁴⁴ Acadia University, ⁴⁵ Dalhousie University ⁴⁶
Provincial public health authorities		
Government of British Columbia, British Columbia Centre for Disease Control		Simon Fraser University, ^{17,20,21} University of British Columbia, ¹⁸ University of Victoria ¹⁹
Government of Alberta		University of Calgary, ²³ University of Alberta, ²⁴ University of Lethbridge, ²⁵ Mount Royal University ²⁶
Government of Saskatchewan		University of Saskatchewan ²⁸
Government of Manitoba		Brandon University, ²² University of Winnipeg, ²⁷ University of Manitoba ²⁹

Continued on the following page

TABLE 1 (continued)
Scans of 27 Canadian universities' health information provided to students during the COVID-19 pandemic, November 2020 to January 2021

Item	Description	Universities that used these items on their web pages
Government of Ontario, Public Health Ontario		University of British Columbia, ¹⁸ University of Victoria, ¹⁹ University of Waterloo, ³⁰ University of Toronto, ^{31,32} University of Ottawa, ³³ York University, ³⁴ Western University, ³⁶ McMaster University, ³⁷ Brock University, ⁴⁰ Laurentian University, ⁴¹ Ryerson University ⁴²
Quebec Public Health		Queen's University, ³⁸ Concordia University ⁴³
Government of Nova Scotia		Acadia University, ⁴⁵ Dalhousie University ⁴⁶
Local public health authorities		
Toronto Public Health		University of Toronto, ^{31,32} York University, ³⁴ Ryerson University ⁴²
Region of Waterloo Public Health		University of Waterloo ³⁰
Thunder Bay District Health Unit		Lakehead University ³⁵
Simcoe Muskoka District Health Unit		Lakehead University ³⁵
Middlesex-London Health Unit		Western University ³⁶
KFL&A Public Health		Queen's University ³⁸
Wellington-Dufferin-Guelph Public Health		University of Guelph ³⁹
Niagara Region Public Health		Brock University ⁴⁰
Prairie Mountain Health		Brandon University ²²
Branding approaches		
Hashtags	Branding approaches included the use of hashtags for individual universities with the goal of fostering connection while still physically apart, and staying informed (included #Utogether, #YU Better Together, #TakeCareWesternU Toolkit)	University of Toronto, ^{31,32} York University, ³⁴ Western University ³⁶

Abbreviations: FAQ, frequently asked questions; KFL&A, Kingston, Frontenac, Lennox and Addington; PHAC, Public Health Agency of Canada.

Note: While the web pages in Table 1 remained relatively constant during the scanning time frame, the links in the References list may lead to pages that have changed or been updated since this study was conducted.

Federal advice also referred postsecondary institutions to previously issued general guidance for personal preventive measures and community-based measures in mitigating COVID-19 spread in Canada detailing the risk of transmission, which is

particularly high in indoor environments with a high density of people, thereby reinforcing the need for campus closures.¹³ Federal guidance further stated that relevant information should be shared by academic institutions with their students.¹²

Provincial government: measures in effect in Ontario and British Columbia

Provincial government web pages also presented safety measures, including those being implemented in classroom settings. We limited the scope of our

TABLE 2
Digital health literacy and satisfaction with COVID-19 information from survey of postsecondary students, by university, Canada, 2020

School	DHLLI-COVID (N = 1749)		Satisfaction with COVID information (N = 1889)	
	Range of possible scores: 15–60		Range: 1–5 (1 = very dissatisfied; 5 = very satisfied)	
	Mean	Median	Mean	Median
Simon Fraser University	47.1	47.0 (43.0–51.0)	3.6	4.0 (3–4)
University of Waterloo	46.5	47.0 (43.0–50.0)	3.7	4.0 (3–4)
University of British Columbia	48.1	48.0 (44.0–52.0)	3.6	4.0 (3–4)
University of Toronto	47.6	48.0 (43.0–52.0)	3.6	4.0 (3–4)
Ryerson University	45.6	44.5 (41.0–49.5)	3.6	4.0 (3–4)
University of Manitoba	46.4	46.0 (42.0–49.0)	3.8	4.0 (3–4)

Abbreviations: DHLLI, digital health literacy instrument; IQR, interquartile range.

Note: Data are from the top four and bottom two institutions in a 27-university subsample, ranked by health literacy determined in an earlier health literacy study among postsecondary students.⁵

review of provincial measures to Ontario and British Columbia, mainly due to the geographic location of the institutions of the research team.⁵

Ontario was first declared to be in a state of emergency in March of 2020, when schools and other public establishments were shut down.¹⁴ The provincial government provided guidance as to when these establishments would be permitted to resume operations, and at what capacity, with restrictions listed in Ontario's Roadmap to Reopen.^{14,15}

Similarly, the province of British Columbia enacted measures that followed the province's restart plan: this was founded on principles for moving forward during COVID-19 by staying informed and prepared, and by following public health advice.¹⁶ During the first phase of this restart plan, a public health state of emergency was declared for the province, limiting operations to essential services; this also resulted in reduced in-classroom learning.¹⁶

Additional public health messaging issued in both provinces reiterated and encouraged the practice of good hygiene and safety measures through mask-wearing and physical distancing.^{15,16}

Scans of universities from the West Coast

The three universities from the Canadian West Coast region—Simon Fraser University, the University of British Columbia and the University of Victoria—referenced recommendations and policies from the BC Centre for Disease Control, the provincial government of British Columbia and PHAC for planning their university operations and pandemic measures for students, staff and faculty members.¹⁷⁻¹⁹ Each institution had published similar web pages in terms of the content and resources dedicated to COVID-19 information, and each had included pages for students' FAQ. They also provided links to additional resources, including British Columbia government COVID-19 self-assessment tools and mandatory isolation policies, as well as links for student health and well-being that allowed students to both give and receive support during COVID-19 outbreaks.¹⁷⁻²¹

Scans of universities from the Prairie Provinces

The eight universities in the Prairie Provinces region were Brandon University,

the University of Calgary, the University of Alberta, the University of Lethbridge, Mount Royal University, the University of Winnipeg, the University of Saskatchewan and the University of Manitoba.²²⁻²⁹ These institutions cited similar recommendations made by PHAC, as well as recommendations set by their respective regional health authorities and provincial bodies (e.g. ministries of health).²²⁻²⁹ The COVID-19 web pages published by these institutions included information on campus operations and updates, FAQ and self-assessment and prevention tools. As with the other universities, students are required to complete health declaration forms prior to accessing campus facilities.²²⁻²⁹

Scans of universities from Central Canada

The 14 universities from Central Canada were the University of Waterloo, the University of Toronto, the University of Ottawa, York University, Lakehead University, Western University, McMaster University, Queen's University, the University of Guelph, Brock University, Laurentian University, Ryerson University, Concordia University and McGill University.³⁰⁻⁴⁴ These institutions also referenced guidelines provided by PHAC, and additionally adhered to the recommendations from their respective regional health authorities or public health units (in the case of Ontario-based academic institutions) for campus operations, international travel policies and COVID-19 measures.³⁰⁻⁴⁴ These institutions created web pages for FAQ regarding COVID-19, newly implemented campus protocols and self-assessment tools. Additional resources provided by these institutions were mental health portals designed to help students adapt to the challenges introduced by the pandemic.³⁰⁻⁴⁴

Scans of universities from the Atlantic Provinces

The two universities from the Atlantic Provinces were Acadia University and Dalhousie University.^{45,46} These two institutions followed and referenced notices from the Government of Nova Scotia, and created pages for campus updates on the pandemic and future university reopening plans, as well as student health and safety resources and FAQ.^{45,46}

Survey results

Using the data from the earlier COVID-19 health literacy survey for the top four

(Simon Fraser University, the University of Waterloo, the University of British Columbia and the University of Toronto) and bottom two (Ryerson University and the University of Manitoba) institutions of our 27-university sample, we determined the average response for six questions (Table 2). Five questions (numbered 14 to 18 on the survey) related to digital health literacy, and one (question 23) gauged satisfaction with online COVID-19 information (Table 3).⁵ The averages of the responses to each of the six questions were compared across the given institutions, and no significant difference was observed for either digital health literacy or for satisfaction with COVID-19. Findings from the scans of institutions' web pages showed that they similarly followed government guidelines and had similar coronavirus-related resources available for their students.

Discussion

The COVID-19 pandemic has been a primary focus of research due to its widespread impacts; however, a relatively small portion of this research has focussed on pandemic-related health literacy, specifically among postsecondary students. Due to the shift to remote, online learning across many Canadian academic institutions, postsecondary students would be expected to have increased exposure to both credible and less reliable online claims about COVID-19.

It is crucial for reliable sources such as public health bodies and postsecondary institutions to continue to distribute accurate health information to counter misinformation. There is a correlation between professional encouragement and preventive behaviour in university students. One Canadian study found students were 76 times more likely to willingly receive COVID-19 vaccines once available if they had been encouraged by medical professionals as opposed to other students that had not received advice from their doctor or pharmacist, or if they had unaddressed concerns about the safety and efficacy of the COVID-19 vaccines.⁴⁷ This study further substantiated the importance of regularly communicating accurate COVID-19 health information, as health communication can correlate with the uptake of coronavirus vaccines among the university student population.⁴⁷

TABLE 3
COVID-19 health literacy survey^a questions 14 to 18 and 23

Q14. When you search the Internet for information on the coronavirus or related topics, how easy or difficult is it for you to... (on a scale from very easy, easy, difficult, very difficult):

- ... make a choice with all the information you find?
- ... use the proper words or search query to find the information you are looking for?
- ... find the exact information you are looking for?

Q15. When typing a message (e.g. on a forum, or on social media such as Facebook or Twitter) about the coronavirus or related topics, how easy or difficult is it for you to... (on a scale from very easy, easy, difficult, very difficult):

- ... clearly formulate your question or health-related worry?
- ... express your opinion, thoughts or feelings in writing?
- ... write your message as such, for people to understand exactly what you mean?

Q16. When you search the Internet for information on the coronavirus or related topics, how easy or difficult is it for you to... (on a scale from very easy, easy, difficult, very difficult):

- ... decide whether the information is reliable or not?
- ... decide whether the information is written with commercial interests (e.g. by people trying to sell a product)?
- ... check different websites to see whether they provide the same information?

Q17. When you search the Internet for information on the coronavirus or related topics, how easy or difficult is it for you to... (on a scale from very easy, easy, difficult, very difficult):

- ... decide if the information you found is applicable to you?
- ... apply the information you found in your daily life?
- ... use the information you found to make decisions about your health (e.g. on protective measures, hygiene regulations, transmission routes, risks and their prevention)?

Q18. When you post a message about the coronavirus or related topics on a public forum or social media, how often... (on a scale from never, once, several times, often):

- ... do you find it difficult to judge who can read along?
- ... do you (intentionally or unintentionally) share your own private information (e.g. name or address)?
- ... do you (intentionally or unintentionally) share someone else's private information?

Q23. How satisfied are you with the information you find on the Internet about coronavirus (on a scale from very dissatisfied, dissatisfied, partly satisfied, satisfied, very satisfied)?

^a The COVID-19 health literacy survey was administered to students in Canadian postsecondary institutions from July to September 2020.⁵

For this reason, we examined the kinds of resources made available to postsecondary students searching for coronavirus-related information. This included publicly available information from government bodies and web pages of postsecondary institutions, since students may rely on them as a resource for disease-related information and campus restrictions and protocols.

In scanning the information published by federal and provincial governments in Canada, we noted that both had taken measures to ensure the health and safety of the general population in terms of

reducing viral transmissions. The changes that would directly affect postsecondary students and institutions were the closures of academic institutions. The provinces of Ontario and British Columbia both created frameworks for reopening each province after a reduction in case counts, which listed already implemented restrictions and plans for the future, and drew attention to the importance of communicating up-to-date information.^{15,16}

The federal government created a web page for guidance and recommendations directed specifically toward postsecondary institutions regarding changes across campus

that should be made in response to the pandemic and recommended to these institutions that they share relevant information with their students, but did not have information specifically addressing students.¹² This may be because education is a provincial jurisdictional responsibility. While this web page provided recommendations for campus-related changes, further guidance should be provided by government to institutions on how to monitor and enforce the changes.

A majority of the students who participated in the COVID-19 health literacy survey reported high levels of health literacy,

with 52.6% finding it “easy” and 30.4% finding it “very easy” to use online health information to make health-related decisions (Table 3, Figure 2).⁵ This level of ease could be attributed to the accessibility and availability of health information from public bodies. These sources are also relayed by postsecondary institutions; the survey showed that a high proportion of students use official government sources to obtain health information about the pandemic. In scanning information published by postsecondary institutions, we found these scans showed alignment with the frequently used sources by students in accessing COVID-19 information, as they mirrored the information and directives available on the websites of government

bodies, including safety and distancing protocols, recommended closures of buildings on campus and links directing users to additional resources published by these official bodies.

In particular, we found that all of these institutions similarly sourced the Government of Canada and related public health authorities such as PHAC for COVID-19 information. The major contrasts that we noticed regarding sources of expertise across these web pages mainly consisted of the institutions’ references to provincial and municipal bodies, which is to be expected since many of the institutions are located in different regions across Canada.

In terms of the universities’ response strategies and branding approaches, we noted that universities mainly differed in the methods used for providing information, but maintained the same goal of educating their students on the pandemic and ensuring safety. All of the observed universities had created main pages for COVID-19 information with links navigating to additional resources, including updates, the universities’ responses and FAQ. The universities’ strategies for providing information began branching when it came to other resources available to students. For example, some universities provided self-screening tools to determine whether one might be at risk or health-compromised and should self-isolate, while other universities instead opted for online campus case trackers to alert their students to locations where there were confirmed cases of COVID-19 and suggesting students isolate if they had been at these locations during the time of exposure.

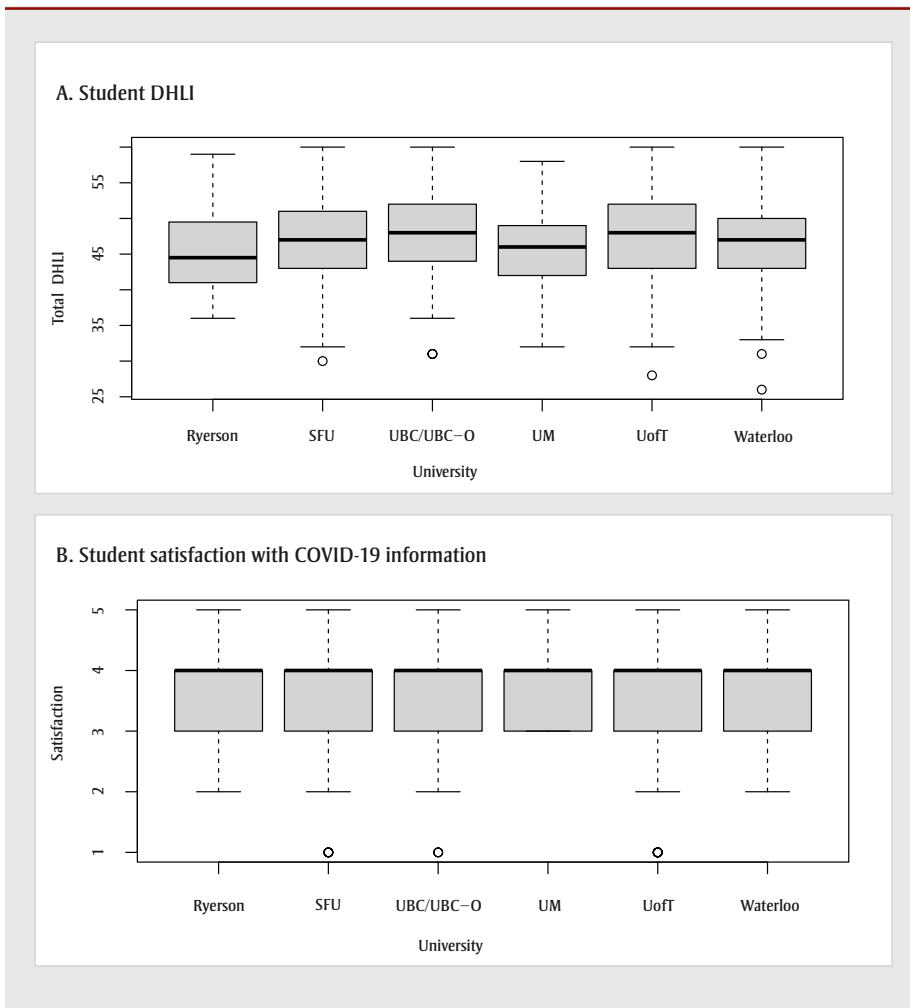
Other differences included the universities’ use of instructional videos versus training courses to inform their students of current public health guidelines and how to effectively follow these protocols on campus, and the use of different social media hashtags to tailor information to their own students and maintain a sense of connection while apart during the pandemic.

Strengths and limitations

This study provides insight into the kinds of publicly accessible sources of COVID-19 health information made available to postsecondary students by government and academic institutions. As the scans were conducted between September 2020 and January 2021, it provides contextual information on the Canadian public health policy environment during the COVID-19 pandemic. Furthermore, by comparing our findings with our earlier health literacy survey results, we found evidence of some congruence between the behaviours of postsecondary institutions and those of the students, in that they both referred back to government policies for university responses and COVID-19 information.

However, some limitations should be noted. These include the lack of consistently available information during the pandemic, as responses from federal and provincial governments and regional health authorities were still unstable due

FIGURE 2
Postsecondary student digital health literacy and satisfaction with institution’s COVID-19 information, COVID-19 health literacy survey, by university, July to September 2020



Abbreviations: DHLI, digital health literacy instrument; SFU, St. Francis Xavier University; UBC/UBC-O, University of British Columbia/University of British Columbia-Okanagan; UM, University of Manitoba; UofT, University of Toronto.

Notes: Data are from a cross-sectional survey of Canadian university students’ COVID-19 health literacy.⁵ Only the top four and bottom two schools of a 27-school subsample (ranking for digital health literacy) are shown here. Error bars indicate confidence intervals.

to the rapid release of new COVID-19-related information. The provincial web page scans are further limited, as we only observed information from the provinces of Ontario and British Columbia.

In addition, our scans of postsecondary institutions and the measurements of health literacy may have been subject to sampling bias, as a majority of the respondents to the health literacy survey were students in the health field, which may have resulted in an overestimation of health literacy levels among postsecondary students. Similarly, a sampling bias may have also stemmed from the exclusion of colleges within our scanning frame, as there were not enough responses from colleges to meet our sampling threshold. The use of Google (a commercial database) as the sole search engine for our study may have led to selection bias through the indexing of web pages. The visual presentation of information, such as the positioning and/or use of infographics by different university web pages, was not explored in this study, although how information is presented and the ease of navigation through a web page can also impact health literacy.

Despite these limitations, this study provides novel insights into the online health resources available to university students, and into students' health literacy levels.

Conclusion

Overall, we examined 27 universities in this study and found that these institutions followed the same guidelines from the federal government, including from agencies such as PHAC, as well as their respective provincial government and local health authorities, for campus operations, COVID-19 measures and enhancement of health literacy among their students. Greater health literacy levels in this student population would encourage adherence to the current pandemic public health measures such as physical distancing, mask-wearing and vaccination, which directly relate to minimizing the spread of COVID-19. The Canadian government and Canadian postsecondary institutions should continue to provide easily accessible and verified up-to-date information to their students to assist in curbing the spread of COVID-19 and reducing health care burdens.

This study helped to identify the online information-seeking behaviours of university students, and how information published by the government and by universities promotes access to credible online health resources. Future research is needed to address the limitations mentioned above, and to include local public health information.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

Authors' contributions and statement

EDR and PA completed the study conceptualization. SM, JF, HE and SP performed the data collection and analysis, and EDR and PA reviewed the interpretation of results. SM, JF, EDR and PA wrote the manuscript draft. EDR and PA reviewed and edited the manuscript. All authors approved the final version of the manuscript before submission.

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References

1. World Health Organization (WHO). Rolling updates on coronavirus disease (COVID-19) [Internet]. Geneva (CH): WHO; 2020 [cited 2021 Nov 9]. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/events-as-they-happen>
2. Okan O, Bollweg TM, Berens E-M, Hurrelmann K, Bauer U, Schaeffer D. Coronavirus-related health literacy: a cross-sectional study in adults during the COVID-19 infodemic in Germany. *Int J Environ Res Public Health*. 2020; 17(15):5503. <https://doi.org/10.3390/ijerph17155503>
3. Imhoff R, Lamberty P. A bioweapon or a hoax? The link between distinct conspiracy beliefs about the coronavirus disease (COVID-19) outbreak and pandemic behavior. *Soc Psychol Pers Sci*. 2020;1948550620934692. <https://doi.org/10.1177/1948550620934692>

4. Kwan B, Frankish J, Rootman I. The development and validation of measures of "health literacy" in different populations. Vancouver (BC): University of British Columbia Institute of Health Promotion Research & University of Victoria Centre for Community Health Promotion Research; 2012. 204 p. Available from: <http://blogs.ubc.ca/frankish/files/2010/12/HLit-final-report-2006-11-24.pdf>
5. Purewal S, Ardiles P, Di Ruggiero E, et al. A cross-sectional study to assess health literacy levels among Canadian post-secondary students during the COVID-19 pandemic. *Int J Health Promot Educ*. 2022. <https://doi.org/10.1080/14635240.2022.205954>
6. COVID-HL Network. Health literacy in times of COVID-19 [Internet]. Fulda (Germany): COVID-HL Network; 2020 [cited 2021 Nov 15]. Available from: <https://covid-hl.eu/>
7. Day T, Chang I-C, Chung CL, Doolittle WE, Housel J, McDaniel PN. The immediate impact of COVID-19 on postsecondary teaching and learning. *Prof Geographer*. 2020;73(1):1-13. <https://doi.org/10.1080/00330124.2020.1823864>
8. Jenei K, Cassidy-Matthews C, Virk P, Lulie B, Closson K. Challenges and opportunities for graduate students in public health during the COVID-19 pandemic. *Can J Public Health*. 2020; 111(3):408-9. <https://doi.org/10.17269/2Fs41997-020-00349-8>
9. Government of Canada. Orders in Council. Minimizing the risk of exposure to COVID-19 in Canada order (prohibition of entry into Canada from the United States). P.C. 2020-0469. 2020 Jun 19. Available from: <https://orders-in-council.canada.ca/attachment.php?attach=39438&lang=en>
10. Government of Canada. Orders in Council. Minimizing the risk of exposure to COVID-19 in Canada order (prohibition of entry into Canada from any country other than the United States). P.C. 2020-0523. 2020 Jun 29. Available from: <https://orders-in-council.canada.ca/attachment.php?attach=39483&lang=en>

11. Government of Canada. Orders in Council. Minimizing the risk of exposure to COVID-19 in Canada order (mandatory isolation), No. 3. P.C. 2020-0524. 2020 Jun 29. Available from: <https://orders-in-council.canada.ca/attachment.php?attach=39482&lang=en>
12. Government of Canada. Guidance for post-secondary institutions during the COVID-19 pandemic [Internet]. Ottawa (ON): Government of Canada; 2020 [modified 2021 Aug 20; cited 2021 Nov 9]. Available from: <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/guidance-documents/covid-19-guidance-post-secondary-institutions-during-pandemic.html>
13. Public Health Agency of Canada (PHAC). Individual and community-based measures to mitigate the spread of COVID-19 in Canada [Internet]. Ottawa (ON): Government of Canada; 2020 [cited 2021 Nov 9]. Available from: <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection/health-professionals/public-health-measures-mitigate-covid-19.html>
14. Government of Ontario. Report on Ontario's provincial emergency from March 17, 2020 to July 24, 2020 [Internet]. Toronto (ON): Government of Ontario; 2020 [cited 2021 Nov 9]. Available from: <https://www.ontario.ca/document/report-ontarios-provincial-emergency-march-17-2020-july-24-2020>
15. Ontario. A framework for reopening our province [Internet]. Toronto (ON): Government of Ontario; 2020 [cited 2021 Mar 6]. <https://www.ontario.ca/page/framework-reopening-our-province>
16. Province of British Columbia. BC's restart plan [Internet]. 2020 [cited 2021 Nov 10]. Available from: <https://www2.gov.bc.ca/gov/content/covid-19/info/bc-restart-plan>
17. Simon Fraser University. Coronavirus (COVID-19) and SFU's response [Internet]. Burnaby (BC): Simon Fraser University; 2020 [cited 2021 Nov 9]. Available from: <https://www.sfu.ca/sfunews/covid-19.html>
18. The University of British Columbia. Coronavirus (COVID-19) and UBC's response [Internet]. 2020 [cited 2021 Nov 9]. Available from: <https://covid19.ubc.ca/information-for-students/>
19. University of Victoria. UVic response to COVID-19 (coronavirus) [Internet]. Victoria (BC): University of Victoria; 2020 [cited 2021 Nov 9]. Available from: <https://www.uvic.ca/students/covid-19/index.php>
20. Simon Fraser University. COVID-19 FAQ - New Undergraduates - Simon Fraser University [Internet]. Burnaby (BC); 2020 [cited 2021 Nov 9]. Available from: <https://www.sfu.ca/students/newundergrads/covid-19-faq.html>
21. Thrive Health. BC COVID-19 self-assessment tool. BC Centre for Disease Control [Internet]. Vancouver (BC): Thrive Health; 2021; [cited 2021 Nov 9]. Available from: <https://www.thrive.health/bc-self-assessment-tool>
22. Brandon University. Students—coronavirus response [Internet]. Brandon (MB): Brandon University; 2020 [cited 2021 Nov 9]. Available from: <https://www.brandonu.ca/coronavirus/students/>
23. University of Calgary. Information for students [Internet]. Calgary (AB): University of Calgary; 2020 [cited 2021 Nov 9]. Available from: <https://www.ucalgary.ca/risk/emergency-management/covid-19-response/info-for-students>
24. University of Alberta. Updates for students [Internet]. Edmonton (AB): University of Alberta; 2020 [cited 2021 Nov 9]. Available from: <https://www.ualberta.ca/covid-19/students/updates/index.html>
25. University of Lethbridge. COVID-19 information [Internet]. Lethbridge (AB): University of Lethbridge. 2020; [cited 2021 Nov 9]. Available from: <https://www.uleth.ca/covid-19>
26. Mount Royal University. COVID-19 updates and resources: students [Internet]. Calgary (AB): Mount Royal University; 2020 [cited 2021 Nov 9]. Available from: <https://www.mtroyal.ca/COVID19/students.htm>
27. University of Winnipeg. COVID-19 updates & FAQ [Internet]. Winnipeg (MB): University of Winnipeg; 2020 [cited 2021 Nov 9]. Available from: <https://www.uwinnipeg.ca/covid-19/>
28. University of Saskatchewan. Students [Internet]. Saskatoon (SK): University of Saskatchewan; 2020 [cited 2021 Nov 9]. Available from: <https://covid19.usask.ca/students.php>
29. University of Manitoba. COVID-19 resources for students [Internet]. Winnipeg (MB): University of Manitoba; 2020 [cited 2021 Nov 9]. Available from: <https://umanitoba.ca/coronavirus/resources-students>
30. University of Waterloo. University of Waterloo information on COVID-19 [Internet]. Waterloo (ON): University of Waterloo; 2020 [cited 2021 Nov 9]. Available from: <https://uwaterloo.ca/coronavirus/>
31. University of Toronto. COVID-19 information for University of Toronto students [Internet]. Toronto (ON): University of Toronto; 2020 [cited 2021 Nov 9]. Available from: <https://www.vicereprovoststudents.utoronto.ca/covid-19/>
32. University of Toronto. Your guide to the 2020-21 school year at U of T: UCheck [Internet]. Toronto (ON): University of Toronto; 2020 [cited 2021 Nov 9]. Available from: <https://www.utoronto.ca/utogether2020/ucheck>
33. University of Ottawa. Coronavirus (COVID-19) [Internet]. Ottawa (ON): University of Ottawa; 2020 [cited 2021 Nov 9]. Available from: <https://www.uottawa.ca/coronavirus/en>
34. York University. YU better together [Internet]. Toronto (ON): York University; 2020 [cited 2021 Nov 9]. Available from: <https://yubettertogether.info.yorku.ca/>
35. Lakehead University. For students [Internet]. Thunder Bay (ON): Lakehead University; 2020 [cited 2021 Nov 9]. Available from: <https://www.lakeheadu.ca/about/covid-19/students>

-
36. Western University. COVID-19 information for the campus community [Internet]. London (ON): Western University; 2020 [cited 2021 Nov 9]. Available from: <https://www.uwo.ca/coronavirus/students.html>
 37. McMaster University. News & resources - COVID-19 (coronavirus) [Internet]. Hamilton (ON): McMaster University; 2020 [cited 2021 Nov 9]. Available from: <https://covid19.mcmaster.ca/>
 38. Queen's University. COVID-19 information [Internet]. Kingston (ON): Queen's University; 2020 [cited 2021 Nov 9]. Available from: <https://www.queensu.ca/covidinfo/students>
 39. University of Guelph. COVID-19 info for students [Internet]. Guelph (ON): University of Guelph; 2020 [cited 2021 Nov 9]. Available from: <https://www.uoguelph.ca/covid19/covid-info-for-students>
 40. Brock University. Coronavirus (COVID-19) updates [Internet]. Brock University. 2020. <https://brocku.ca/coronavirus/updates/>
 41. Laurentian University. Students [Internet]. Sudbury (ON): Laurentian University; 2020 [cited 2021 Nov 9]. Available from: <https://laurentian.ca/COVID-19/students>
 42. Ryerson University. Ryerson COVID-19 information and updates [Internet]. Toronto (ON): Ryerson University; 2020 [cited 2021 Nov 9]. Available from: <https://www.ryerson.ca/covid-19/students/>
 43. Concordia University. Students [Internet]. Montréal (QC): Concordia University; 2020 [cited 2021 Nov 9]. Available from: <https://www.concordia.ca/coronavirus/students.html>
 44. McGill University. Essential information for students [Internet]. Montréal (QC): McGill University; 2020 [cited 2021 Nov 9]. Available from: <https://www.mcgill.ca/coronavirus/students>
 45. Acadia University. COVID-19 updates [Internet]. Wolfville (NS): Acadia University; 2020 [cited 2021 Nov 9]. Available from: <https://www2.acadiau.ca/covid-19/newsroom.html>
 46. Dalhousie University. COVID-19 information and updates [Internet]. Halifax (NS): Dalhousie University; 2020 [cited 2021 Nov 9]. Available from: <https://www.dal.ca/covid-19-information-and-updates/students.html>
 47. Mant M, Aslemund A, Prine A, Jaagumägi Holland A. University students' perspectives, planned uptake, and hesitancy regarding the COVID-19 vaccine: a multi-methods study. PLoS ONE. 2021;16(8):e0255447. <https://doi.org/10.1371/journal.pone.0255447>