Canadian Journal of Public Health
https://doi.org/10.17269/s41997-022-00697-7

SPECIAL ISSUE ON SOCIOCULTURAL AND BEHAVIOURAL FACTORS AFFECTING COMMUNITIES' RESPONSES TO PUBLIC HEALTH MEASURES: IMPLICATIONS FOR THE COVID-19 PANDEMIC AND BEYOND: QUALITATIVE RESEARCH

Public health communication during the COVID-19 pandemic: perspectives of communication specialists, healthcare professionals, and community members in Quebec, Canada

Ève Dubé[1,2] · Fabienne Labbé[1] · Benjamin Malo[2] · Catherine Pelletier[2]

Received: 29 April 2022 / Accepted: 6 September 2022
© The Author(s) under exclusive license to The Canadian Public Health Association 2022

Abstract

Objectives Communication during a pandemic is key in ensuring adoption of preventive behaviours and limiting disease transmission. The aim of the study was to explore how communication specialists working in health and governmental institutions and healthcare professionals have communicated about COVID-19, and how different groups of the public have perceived official communications on COVID-19.

Methods We conducted an exploratory qualitative study. Data were collected via individual semi-structured interviews and focus-group discussions. The Crisis and Emergency Risk Communication (CERC) model was used as a theoretical framework to guide data interpretation.

Results We interviewed 6 communication specialists and 5 healthcare professionals. Three focus groups were held with 23 participants (8 young adults, 9 Quebecers of Asian ethnicity, and 6 Quebecers who suffered harshly from economic consequences of the pandemic and measures). Although daily press conferences were rapidly implemented in Quebec, participants highlighted several communication challenges, including accuracy and credibility of information in a context of uncertainties and rapidly evolving knowledge. Participants also identified paternalism, stigmatization of some communities, and issues with promoting action and mobilization of some subpopulations as communication challenges.

Conclusion Our study showed that the six core CERC principles have not all been applied systematically in communication interventions in Quebec. Despite some limitations, messages about COVID-19 risk were clearly and consistently communicated and were generally well understood by most Quebecers.

Résumé

Objectifs La communication en temps de pandémie joue un rôle clé dans l'adoption des comportements préventifs et le contrôle de la transmission de la maladie. Cette étude visait à explorer comment les spécialistes de la communication travaillant dans les institutions gouvernementales et de santé et les professionnels de la santé ont communiqué sur la COVID-19 et comment les différents groupes du public ont perçu les communications officielles sur la COVID-19.

Méthode Les données de cette étude qualitative exploratoire ont été recueillies à l'aide d'entretiens individuels semi-structurés et de groupes de discussion. Le modèle de la communication des risques en situation de crise et d'urgence (CERC) a été utilisé comme cadre théorique pour guider l'interprétation des données.

Résultats Nous avons rencontré 6 experts en communication et 5 professionnels de la santé. Trois groupes de discussion ont eu lieu avec 23 participants (8 jeunes adultes, 9 Québécois d'origine asiatique et 6 Québécois ayant subi des conséquences

✉ Ève Dubé
eve.dube@inspq.qc.ca

[1] Institut national de santé publique du Québec, Québec, Québec, Canada

[2] Centre de recherche du CHU de Québec-Université Laval, Québec, Québec, Canada

Published online: 21 September 2022

financières importantes à cause de la pandémie et des mesures sanitaires). Bien que des conférences de presse quotidiennes aient été rapidement mises en place au Québec, les participants ont souligné plusieurs défis de communication, notamment en ce qui concerne l'exactitude et la crédibilité de l'information dans un contexte d'incertitudes et d'évolution rapide des connaissances. Les participants ont également identifié le paternalisme, la stigmatisation de certaines communautés et les problèmes de promotion de l'action et de mobilisation au sein de certaines sous-populations comme des défis de communication.

Conclusion Notre étude a démontré que les six principes fondamentaux du CERC n'ont pas tous été appliqués systématiquement dans les interventions de communication au Québec. Malgré certaines limites, les messages sur le risque lié à la COVID-19 ont été communiqués de manière claire et cohérente et ont été généralement bien compris par la plupart des Québécois.

Keywords COVID-19 · Public health · Risk and crisis communication · Qualitative research · Canada

Mots-clés COVID-19 · santé publique · communication des risques · recherche qualitative · Canada

Introduction

The COVID-19 pandemic has emphasized the importance of communication, as public adherence to preventive measures is essential to control the spread of the virus. Since the beginning of the pandemic, Quebec is the Canadian province with the highest number of cases and deaths due to COVID-19, despite implementation of stringent measures to limit its transmission (e.g. curfew, closure of schools, bars, and restaurants) (Institut national de santé publique du Québec, 2022a).

Risk and crisis communication are key components of emergency preparedness tools of public health agencies (Glik, 2007). Sandman, who developed the formula 'Risk = Hazard + Outrage', noted that crisis risk communication occurs when the hazard is significant as is the public outrage or emotional response about it (Sandman & Lanard, 2004). The COVID-19 pandemic definitively meets these conditions. In this particular context, public health messaging played a critical role, not only in alleviating anxieties due to a novel virus, but also in ensuring public understanding and adoption of preventive measures (Glik, 2007). However, modifying health behaviours is complex, especially during a pandemic (Nan et al., 2021). Several studies of communication during public health emergencies have underlined the challenges of risk and crisis communication: scientific uncertainties, rumours and misinformation, lack of trust in authorities, and ethical issues (e.g. inequalities, stigma, and blame) (Capurro et al., 2021; Guttman & Lev, 2021; Jin et al., 2019; MacKay et al., 2022). This pandemic was also unprecedented in terms of information (true, false, and even misleading) on the virus and on public health measures that circulated in traditional and social media, i.e. the 'infodemic' that came with COVID-19. This infodemic was associated with decreased public trust in authorities, highlighting the importance of evidence-informed communication strategies (Islam et al., 2020). In addition, as shown by the findings of a recent Canadian study, communications that are tailored to the needs and values of the intended audience are key to maintain and improve trust in a crisis, especially among equity-seeking groups (MacKay et al., 2022).

The Crisis and Emergency Risk Communication (CERC) model was created by the Centers for Disease Control and Prevention (CDC) to face such communication challenges (Reynolds & Seeger, 2005). CERC brings together different principles from risk and crisis communication in a unifying framework derived from theory, research, and practice (Veil et al., 2008). CERC divides public health crises into five stages and proposes six communication principles (Table 1). According to this model, individuals who are adequately informed can better understand an emergency and, ultimately, show greater adherence to public health measures (Veil et al., 2008). This model has been frequently used to analyze public health communication strategies during epidemics (Neville Miller et al., 2021). CERC was also recently used to analyze health authorities' communications during the COVID-19 pandemic (Malik et al., 2021; Reyes Bernard et al., 2021; Sauer et al., 2021; Yang et al., 2021), to assess the perception of hospital staff on the management of the pandemic (Ow Yong et al., 2020), and to evaluate an intervention to improve communication on COVID-19 with immigrants and refugees (Wieland et al., 2022).

To our knowledge, no study has examined communication in Quebec during the COVID-19 pandemic from the perspective of both the sender and the receiver. The aim of this qualitative study was to explore how communication specialists working in health and governmental institutions and healthcare professionals have communicated about COVID-19 and how different groups of Quebecers have perceived official communication on COVID-19.

Methods

This exploratory qualitative study was conducted in Quebec, Canada. Focus-group discussion was chosen as the preferred data collection approach as it provides a context in which participants' views are challenged and shaped collectively. However, due to time constraints and concerns with regard to confidentiality, data were

Table 1 Principles of the Crisis and Emergency Risk Communication model applied to infectious disease outbreaks (Adapted from CDC, 2014; Sauer et al., 2021)

Principles	Description	Examples of strategies
Be first	The first source of information is often the most trusted source Communicating information quickly is crucial.	Share information that is available, identify information voids, stay ahead of rumours.
Be right	Accuracy is critical to credibility.	Communication must include what is known, what is not known, and what is being done to fill the gaps. Fact checks with scientific experts to avoid misleading messages. Public health messages must be consistent with the situation in the healthcare system.
Be credible	Honesty is key to build trust.	Transparency is essential to build public trust in information and recommendations. Recognize that some questions may not be answered (acknowledge the uncertainties). Work with scientific experts to find answers.
Express empathy	People must know that their leaders care.	The emergence of a new infectious disease can cause fear and anxiety. Be empathetic and acknowledge the challenges that some individuals or groups may be experiencing. Take inequities into account when communicating and making recommendations.
Show respect	Lack of respect undermines trust.	Respectful communication is important, especially with equity-seeking groups. Listen to issues and ideas brought by local communities. Acknowledge different cultural beliefs and practices. Collaborate with local actors to ensure that communities are reached and cooperation is fostered.
Promote action	Provide a call to action.	To reduce anxiety and foster a sense of control, it is important to concretely engage and mobilize the population. Use simple, easy-to-remember messages on recommended behaviours. Use different ways to promote messages to reach communities that may have limited access to information.

collected via individual interviews for communication specialists and healthcare professionals.

Semi-structured interviews

Semi-structured interviews were conducted with participants involved in COVID-19 communication, i.e. professionals in charge of developing health authorities' COVID-19 communication and healthcare professionals actively involved in public discussion on this topic. Communication specialists were identified and recruited through a search in websites of different health organizations in Quebec. A previous project by Gagnon et al. (2022) analyzing online discourse about COVID-19 allowed us to identify healthcare professionals actively engaged in traditional and social media. Both communication specialists and healthcare professionals were invited to participate via emails.

Interviews were conducted virtually between September and December 2021 using the Microsoft Teams collaborative platform. The interview guides included questions to assess participants' role and responsibilities around communication and the challenges faced; their opinions regarding the effectiveness of the communication about COVID-19; and how they perceived the public's response (adherence to preventive measures, vaccination). All interviews were recorded and transcribed.

Focus groups

Three focus groups were conducted with community members. We identified profiles of Quebecers who were disproportionately affected and even stigmatized at the beginning of the pandemic to participate. This was done intentionally, in order to assess perceptions of communication interventions, but also trust in communication messages from health and governmental authorities. Based on previous research, young adults (18–24 years old) and Quebecers of Asian ethnicity, who have been particularly stigmatized as 'spreaders' of COVID-19, as well as small business owners and people working in non-essential services, who have suffered from economic loss due to the measures, were considered disproportionately affected or stigmatized and were targeted for the data collection (Institut national de santé publique du Québec, 2022b; Labbé et al., 2022). A professional research firm was hired to conduct the focus-group discussions. Different means of recruitment were used, including advertisements on social media and email/phone recruitment. Individuals who were interested answered a questionnaire (online or by phone) to determine whether they

corresponded to the required profiles. A compensation of $75 was offered to participants.

Focus groups took place virtually in April 2021 on the research firm private virtual platform. The interview guide used during the focus groups included questions to explore participants' perceptions of COVID-19; the impacts of COVID-19 and stigmatizing discourses on them and their families; their opinions regarding preventive measures; their opinions on communication strategies about COVID-19; and their trusted sources of information about COVID-19. Focus groups were recorded and detailed notes were provided by the research firm.

Data analysis

A thematic content analysis was conducted using NVivo 12. Themes were deductively and inductively created, in line with the research objectives and the CERC framework. To ensure data consistency and standard application of codes, data codification was performed by one member of the research team with a background in qualitative methods (CP). Regular inter-validation of the coding process was done with a senior member of the research team with more than 10 years of professional experience doing qualitative research (FL). Analysis was first done separately for each group of participants and then combined to produce a coherent, multi-level interpretation. After initial inducting coding, themes were regrouped according to the CERC model for the final analysis.

Results

Interviews were conducted with 6 communication specialists and 5 healthcare professionals. Three focus groups were held with 23 participants (8 young adults, 9 Quebecers of Asian ethnicity, and 6 Quebecers who suffered from important economic consequences of the pandemic and measures, e.g. small business owners, workers in restaurants and bars).

Being a communicator during a pandemic

The role of communication specialists varied depending on whether they were employed by a provincial (i.e. Quebec government) or a regional institution (i.e. organizations that oversee health and social services in one of the 18 areas of the province). Communication specialists working at the provincial level were involved in the development, deployment, monitoring, and evaluation of province-wide communication campaigns while the role of those working at the regional level was to adapt province-wide messages to respond to local population needs (e.g. newcomers, First Nations and Inuit populations, minorities). All participants agreed that the pandemic disrupted their usual approach to public health communication—which implies needs' assessment, literature review, identifying target population, choosing message and channels, evaluating impact and reach—and forced them to adapt rapidly in the development of communication messages which were aimed at informing the public about COVID-19 and fostering adoption of preventive measures. Communication specialists noted that the pandemic had a positive impact on the recognition of the importance of their work.

> We really understood that we are not only, excuse me, 'doer' […]. No, we really have an advisory role. What is the objective to reach? We have tools, we will propose actions to reach this objective (Communication specialist).

Healthcare professionals saw their role as 'knowledge broker'. They were motivated by a desire to share their professional expertise and scientific knowledge and counter false or misleading information about the pandemic.

> At some point, I thought 'no one is talking about the real things, no one is supporting science' [...]. I am well placed to do it, and it would be up to me to do it (Healthcare professional).

Communication challenges in times of pandemic

Be first

CERC states that the first source of information used by the public during a crisis often becomes the preferred source. For health authorities, it was crucial to be the first to provide information to the public to prevent further use of other, sometimes unverified, sources of information. The government of Quebec has rapidly established daily press conferences, bringing together the 'health trio' (the Prime Minister, the minister of health, and the provincial health officer) to inform the public about the state of the pandemic in Quebec and the recommended measures. Although considered proactive, some issues were identified by participants regarding this communication approach.

> Quebec would make an announcement and then the reporters would immediately turn to us to see what we thought. We didn't know. We listened to the press conference at the same time as they did, and then we learned things at the same time as they did (Communication specialist).

Social media were identified as important sources of misinformation by communication specialists. In this context,

they had to adapt their communication strategies to be more active on these platforms. This required a lot of effort (without necessarily more resources). The goal was to be the first to provide the information, without providing too many details (i.e. providing key messages), so the population could easily access information. In addition, social media interventions needed to be done in parallel and aligned with more traditional communication interventions (e.g. mass media campaigns).

In all focus groups with community members, traditional media were mentioned as the main source of information on COVID-19 (print and online newspapers, television channels, radio), followed by information provided by people in their social networks (family, friends, colleagues). Several participants from all groups also watched the daily press conferences. Finally, about half of the participants, especially young adults, reported getting information through social media. Most of them mentioned the amount of false information online and noted relying on what they considered ‘reliable’ sources (e.g. Government of Quebec or Prime Minister’s Facebook pages).

Be right and be credible

These principles reflect the importance of communicating accurate information and of recognizing knowledge gaps with honesty. Over the course of the pandemic, the rapid evolution of scientific knowledge has led to frequent changes in recommendations. This has created specific challenges for our participants.

> Not everything we say is static. [...] the situation is so unstable that it looks like we are lying… but we are not, it’s just that it is the truth for here and now (Communication specialist).
> [It’s] a lot of pressure, not to know everything about everything, but almost [...] sometimes in one day you have several interviews, there is a new issue, you must read scientific papers about it, understand what’s underneath it. This takes a lot of time, combined with everything else (Healthcare professional).

Some healthcare professionals also mentioned the challenges they faced when invited to comment in traditional media on particular recommendations by health authorities for which evidence-based data were scarce (e.g. the effectiveness of the curfew, the number of people allowed in private gatherings). They noted trying to balance scientific nuances while still showing support to the official messages and recommendations in order not to lose the population’s trust.

> I didn’t think it was useful to criticize our government head on in a time of crisis. I think we could ask questions, but I wanted to be careful, because we were in such a vulnerable moment, in a fragile moment, that I didn’t think it was helpful (Healthcare professional).
> I think science is full of nuance while, in general, media interventions and social media are not... it’s possible to bring nuance, but it’s not easy (Healthcare professional).

Other healthcare professionals were more critical and noted that the government failed to explain honestly why some public health measures were implemented or removed and that the benefits of the measures were not sufficiently explained. Healthcare professionals and communication specialists noted that the authorities’ desire to reassure the public sometimes led to a discourse that was disconnected from the reality (e.g. no recommendations about masks early in the pandemic due to stock out). Despite some criticism, most agreed that the authorities did their best under the circumstances.

> Looking back today, I think it’s hard to say that Quebec did a bad job […]. Now, between what is happening now and where we were at the beginning, there is a world of difference. […] I think the information was changing so fast at the beginning of the crisis that there was no communication strategy that could have been more effective (Communication specialist).

During focus groups with community members, participants discussed the perceptions of the messages conveyed by authorities throughout the pandemic. Although daily press conferences and traditional media were frequently consulted during the first wave, most participants expressed some level of fatigue due to the amount of information available with regard to the pandemic.

> At first, I used to go to the government website to get information. But now I’ve stopped. I found it completely anxiety-provoking. I keep up to date through my friends (Focus Group Economic loss).

Many felt that the conferences were too long and the information, too complicated. Among community member participants who inform themselves through social media, some said they used social media to explore a variety of perspectives on the pandemic and to see ‘both sides of the story’ as they felt that authorities were not always fully transparent regarding COVID-19.

Express empathy and show respect

According to CERC, communicators need to acknowledge that the emergence of a novel virus creates anxiety and fear in the public and that some groups or communities can be disproportionally affected by the virus or the containment

measures. Beliefs about health and perceived importance of preventive behaviours vary across socio-cultural contexts. Communication thus needs to be adapted to socio-cultural specificities. Working in collaboration with local actors, who are aware of the issues and needs of their communities, is necessary to develop tailored communication strategies. However, all interviewed communication specialists noted that it was really difficult to establish such collaboration as communication interventions were based on a 'top-down approach'.

> It was a big challenge because there was not so much latitude to develop tools in the region without have it authorized by the national, there was a lot of control of what was done and communicated in the context of the pandemic, for all kinds of good and not so good reasons (Communication specialist).

Participants noted that the use of daily press conferences as one of the main channels to communicate with the public was a key issue for cultural communities. Although some collaborations with community-based organizations were established, this was often limited to translation of official documents.

> There are some cultural minorities who have their own communication channels. I don't know how much there has been… At least I haven't heard of any really targeted intervention for those groups (Healthcare professional).

One participant working as a communication specialist noted that the communication strategies were poorly adapted to the realities and contexts of young adults, especially at the beginning of the pandemic. According to this participant, health authorities' messages were stigmatizing, as young adults were often blamed for not complying with social and physical distancing recommendations and thus for transmitting the virus. The importance of social activities for young people, but also their working and living conditions that could hinder compliance with such measures, were not recognized in public messages.

In the focus-group discussion with participants of Asian ethnicity, many revealed the discrimination that they and their loved ones had experienced, especially at the beginning of the pandemic when China was identified as the origin of the virus. Some of these participants reported having been subjected to racist comments or gestures in public. Many considered that media reports and some official messages conveyed by the government contributed to the stigmatization of Asians.

> The media could have left out pictures of Asians when they published their pandemic stories. About 9 out of 10 articles had pictures of Asians (Focus group, people of Asian ethnicity).
>
> If there was something to do, it would be not to convey indirect messages. I perceive that way too often Asians are targeted, especially China. For example: buy local, Quebecois, Canadian. It is implied that we should not buy from China. There are a lot of hidden messages that stigmatize (Focus group, people of Asian ethnicity).

In focus group with young adults, the majority reported having felt blamed, especially at the beginning of the pandemic. They felt that they were 'easy prey' and often portrayed as being non-compliant with the recommended measures (e.g. bans on private gatherings). Some noted that the tone and the messages used by authorities were stigmatizing. Many mentioned that, although they were not personally feeling at risk of COVID-19, they were worried about their loved ones and did not want to put them at risk. Some mentioned that they were not feeling concerned by the messages and that testimonials or stories that focused on the impact of COVID-19 on family and friends would have been more effective for their age group.

Promote action

CERC highlights the importance of communicating clearly about the preventive behaviours that people should adopt to protect themselves and their loved ones during a public health emergency. Participants named several successes during the pandemic such as the strong adherence to public health measures and the high COVID-19 vaccine uptake rates. However, both communication specialists and healthcare professionals felt that the government's paternalistic approach may have hindered behavioural change as the public did not always have a clear understanding of the rationale behind transmission and measures.

> I think it was nice to have a reassuring appointment at 1:00 [the government's daily press conferences] [...] But I'm more interested in empowering [people] than reassuring them (Communication specialist).
>
> We think people won't understand a complex message, and we don't make the effort to try to explain. Instead, we make shortcuts and simplify and at the end, it doesn't make sense to the public (Healthcare professional).

The lack of clear scientific explanations behind the implementation of some measures (e.g. curfew, mask-wearing outdoors) was also noted during focus groups with communities. Participants noted that the lack of understanding of the justification behind such measures was demobilizing for them.

> We've lost along the way the side of why we're doing this [the curfew]. I find that there is a lack of medical and technical explanation to understand the changes. Every time there are changes, I would like to understand (Focus Group, people who suffer economic loss because of the pandemic).

Discussion

Using CERC as a framework, we highlighted several public health communication challenges during the COVID-19 pandemic in Quebec. Although daily press conferences certainly correspond to the CERC 'be first' principle, this pace of communication was challenging for communication specialists who sometimes learned about new directives during press conferences, at the same time as the population, and needed to rapidly adjust their work. It also led to an information overload for some individuals (World Health Organization, 2022). Interestingly, many participants from the public mentioned asking friends and relatives for information on the pandemic. The role of social networks in influencing individuals' perceptions of health issues and their adoption of preventive behaviours is increasingly recognized (Bavel et al., 2020; Brunson, 2013), but frequently neglected in communication strategies (Asch & Rosin, 2016; Jenssen et al., 2019). Our findings have also underlined that the gaps in explaining the rationale behind the recommendations, along with the paternalistic tone in health authorities' messages, was demobilizing for some. As the engagement of all is essential during a pandemic, the authorities must consider the public as engaged actors, not just 'recipients' of instructions, and communicate in a way that empowers them (Hyland-Wood et al., 2021).

In terms of accuracy and credibility of information, the most important challenge identified in our study, as in others (Capurro et al., 2021; Holmes et al., 2009), was related to uncertainties and evolving scientific knowledge. Unknowns with regard to the scientific basis of some recommendations were not always well communicated. While gaps in evidence-based data for a novel virus are to be expected, not recognizing uncertainties can damage trust (Sandman, 2022). Both communicators and members of the public who participated in our study criticized the lack of transparency in the rationale to justify the implementation of some measures, especially around mask-wearing and curfew. This is consistent with the findings of another Canadian study which highlighted that inconsistencies and contradictions in messages lead to frustration and lack of trust among the public (Zhang et al., 2021). Information gaps from official sources can lead to people searching for alternative sources of information, especially online. Internet and social media platforms are now an essential part of information-seeking behaviour but are also recognized as an important source of rumours and misinformation about health (Eysenbach, 2020). Different evidence-informed interventions to counter mis- and disinformation online have been recently used and studied (Lewandowsky et al., 2021). One of these interventions is pre-bunking, which is inspired by inoculation theory and consists in building resistance to misleading content by debunking rumours, false information, and tactics before they spread (Lewandowsky et al., 2021). Prompting people to think about the accuracy of information before sharing it (accuracy nudge) also seems to be a promising approach to reduce the amount of misinformation on social media (Nan et al., 2021).

Changing risk perception through communication requires messages to be tailored and targeted to account for the realities of local communities' own knowledge on an issue, and their unique information needs and preferences. Findings of our qualitative study also emphasized that health authorities' messages were not always aligned with local needs and—worse—could have contributed to blaming some communities. Stigma and blame are common negative outcomes of epidemics, as the search for scapegoats is a typical human response to a crisis (Guttman & Lev, 2021). It is well known that shaming is not an effective way to promote behaviour change and that acknowledging people's situation is better to foster cooperation (Cheng et al., 2021).

Limitations

Our study has some limitations. The number of participants was small, both for the focus groups and the individual interviews. Data were collected during the third and fourth waves of the COVID-19 pandemic in Quebec, which limits the conclusions of this study to a specific time and context. A majority of participants were from urban areas. It is possible that people living in rural areas—where the pandemic may have been experienced differently—share different opinions. Furthermore, this study is exploratory and, although participants raised several issues during our discussions, we are not able to draw any conclusions on the actual impact of the communication strategies on people's behaviours. In addition, we used a general approach to communication interventions, and we did not explore whether any specific campaign reached its target audience or how well it was received. Finally, even if individual interviews were conducted and confidentiality was guaranteed prior to the interview to minimize this bias for communication specialists, social desirability bias cannot be ruled out.

Conclusion

Using CERC as theoretical framework, our qualitative study has uncovered some of the strengths and challenges of health

authorities' communication during the COVID-19 pandemic. Our findings indicate that the core CERC principles have not all been applied systematically in communication interventions in Quebec. While the 'Be first' principle appears to have been respected, our findings show some issues with the 'Be right' and 'Be credible' principles. Even if uncertainties and evolving scientific knowledge can hardly be avoided in the face of a novel virus, participants in this study considered that knowledge gaps could have been communicated more transparently. Furthermore, during a crisis, the need for unified messages to build credibility and public trust can slip into 'top-down' approaches, paternalism, and lack of tailoring to communities' needs which can have a negative impact on individuals' adoption of protective behaviours. Further studies are needed to explore the complex interplay among communicators, health specialists, and target audiences of information.

Interestingly, a high level of COVID-19 vaccine acceptance and uptake and general adherence to recommended measures was observed in Quebec (Institut national de santé publique du Québec, 2022b). While this adherence to recommendations may reflect the higher trust in health authorities in Quebec than elsewhere in Canada (Environics Institute for Survey Research, 2021) and suggests successful communication strategies, public health messaging is likely not the only determinant. Quebec has implemented coercive measures such as a curfew and a vaccine passport that certainly have influenced Quebecers' behaviours.

Lessons learned during the COVID-19 pandemic should not be forgotten once back to a new normality. Enhanced multidisciplinary and multilateral collaboration and engagement of communities in development and deployment of communication strategies are key assets as authorities will have to deal with future public health emergencies (Carlson et al., 2021; Intergovernmental Panel on Climate Change, 2022).

Contributions to knowledge

What does this study add to existing knowledge?

- This study presents the perceptions of communication specialists, healthcare professionals, and members of the public on health authorities' communication during the COVID-19 pandemic in Quebec.
- This study uses the principles of the Crisis and Emergency Risk Communication (CERC) model as a theoretical framework and shows that the six core principles were unevenly applied. While communications were deployed rapidly and consistently, gaps in knowledge were not always transparently communicated. Some messages conveyed by the authorities were also perceived as stigmatizing.

What are the key implications for public health interventions, practice, or policy?

- Adherence to recommended public health prevention measures requires public trust in public health officials who play a critical role in communicating accurate information.
- The COVID-19 pandemic has severely tested public health communication capabilities. Our study highlights some opportunities to adjust communication interventions to build and maintain public trust.
- Balancing the importance of unified messaging to enhanced credibility with the importance of tailoring messages to communities' needs remains an important issue. Addressing online misinformation and developing public health infrastructure to better communicate on social media platforms will also be critical.

Acknowledgements The authors thank all the participants in the interviews and focus groups who openly shared their perceptions and experiences. We also want to thank Angèle Larivière, Mary Lou Malo, and Geneviève Gauvreau for their work in transcribing the interviews.

Code availability N/A

Author contributions ED: conceptualization, writing – original draft, funding acquisition; FL: investigation, writing – review and editing; BM: investigation, writing – review and editing; CP: investigation, formal analysis, writing – original draft.

Funding This study was funded by the Canadian Institutes of Health Research (grant no. 420096).

Data availability To maintain confidentiality of participants, the verbatim of the interviews are not included. Details on thematic analysis can be provided by the authors upon request.

Declarations

Ethics approval This study was approved by the Ethics Review Board of the CHU de Québec-Université Laval Research Centre.

Consent to participate Informed consent was obtained from all individual participants included in the study.

Consent for publication Participants signed informed consent regarding publishing of de-identified excerpts from the interview data.

Conflict of interest The authors declare no competing interests.

References

Asch, D. A., & Rosin, R. (2016). Engineering social incentives for health. *New England Journal of Medicine, 375*(26), 2511–2513. https://doi.org/10.1056/NEJMp1603978

Bavel, J. J. V., Baicker, K., Boggio, P. S., Capraro, V., Cichocka, A., Cikara, M., Crockett, M. J., Crum, A. J., Douglas, K. M., Druckman, J. N., Drury, J., Dube, O., Ellemers, N., Finkel, E. J., Fowler, J. H., Gelfand, M., Han, S., Haslam, S. A., Jetten, J., … Willer, R. (2020). Using social and behavioural science to support COVID-19 pandemic response. *Nature Human Behaviour, 4*(5), 460-471. https://doi.org/10.1038/s41562-020-0884-z

Brunson, E. K. (2013). The impact of social networks on parents' vaccination decisions. *Pediatrics, 131*(5), 1397–1404. https://doi.org/10.1542/peds.2012-2452

Capurro, G., Jardine, C. G., Tustin, J., & Driedger, M. (2021). Communicating scientific uncertainty in a rapidly evolving situation: A framing analysis of Canadian coverage in early days of COVID-19. *BMC Public Health, 21*(1). https://doi.org/10.1186/s12889-021-12246-x

Carlson, C. J., Albery, G. F., & Phelan, A. (2021). Preparing international cooperation on pandemic prevention for the Anthropocene. *BMJ Global Health, 6*(3), e004254. https://doi.org/10.1136/bmjgh-2020-004254

CDC. (2014). *Crisis Emergency and Risk Communication*. Retrieved April 21, 2022 from https://emergency.cdc.gov/cerc/ppt/cerc_2014edition_Copy.pdf

Cheng, T., Horbay, B., Nocos, R., Lutes, L., & Lear, S. A. (2021). The role of tailored public health messaging to young adults during COVID-19: "There's a lot of ambiguity around what it means to be safe". *PLoS One, 16*(10), e0258121. https://doi.org/10.1371/journal.pone.0258121

Environics Institute for Survey Research. (2021). *All in this together? Canadians' views on masks, vaccines and lockdowns during the COVID-19 pandemic* (p. 18). Retrieved April 26, 2022 from https://www.environicsinstitute.org/docs/default-source/default-document-library/cot2021-report1-final_corrected-ap-19.pdf?sfvrsn=6f378628_0

Eysenbach, G. (2020). How to fight an infodemic: The four pillars of infodemic management. *Journal of Medical Internet Research, 22*(6), e21820. https://doi.org/10.2196/21820

Gagnon, D., Dubé, E., & Pelletier, C. (2022). *Aperçu des conversations en ligne durant la pandémie de la COVID-19 de mars à décembre 2020* (p. 44). Institut national de santé publique du Québec. Retrieved March 30, 2022 from https://www.inspq.qc.ca/sites/default/files/publications/3198-apercu-conversation-en-ligne-covid-19.pdf

Glik, D. C. (2007). Risk communication for public health emergencies. *Annual Review of Public Health, 28*(1), 33–54. https://doi.org/10.1146/annurev.publhealth.28.021406.144123

Guttman, N., & Lev, E. (2021). Ethical issues in COVID-19 communication to mitigate the pandemic: Dilemmas and practical implications. *Health Communication, 36*(1), 116–123. https://doi.org/10.1080/10410236.2020.1847439

Holmes, B., Henrich, N., Hancock, S., & Lestou, V. (2009). Communicating with the public during health crises: Experts' experiences and opinions. *Journal of Risk Research, 12*, 793–807. https://doi.org/10.1080/13669870802648486

Hyland-Wood, B., Gardner, J., Leask, J., & Ecker, U. K. H. (2021). Toward effective government communication strategies in the era of COVID-19. *Humanities and Social Sciences, 8*(30). https://doi.org/10.1057/s41599-020-00701-w

Institut national de santé publique du Québec. (2022a). *Données COVID-19 au Québec*. Retrieved April 21, 2022 from https://www.inspq.qc.ca/covid-19/donnees

Institut national de santé publique du Québec. (2022b). *COVID-19 – Sondages sur les attitudes et comportements des adultes Québécois*. Retrieved April 21, 2022 from https://www.inspq.qc.ca/covid-19/sondages-attitudes-comportements-quebecois

Intergovernmental Panel on Climate Change. (2022). *Climate change 2022: Impacts, adaptation and vulnerability.* Retrieved April 26, 2022 from https://www.ipcc.ch/report/ar6/wg2/

Islam, M. S., Sarkar, T., Khan, S. H., Mostofa Kamal, A. H., Hasan, S. M. M., Kabir, A., Yeasmin, D., Islam, M. A., Amin Chowdhury, K. I., Anwar, K. S., Chughtai, A. A., & Seale, H. (2020). COVID-19-related infodemic and its impact on public health : A global social media analysis. *The American Journal of Tropical Medicine and Hygiene, 103*(4), 1621–1629. https://doi.org/10.4269/ajtmh.20-0812

Jenssen, B. P., Buttenheim, A. M., & Fiks, A. G. (2019). Using behavioral economics to encourage parent behavior change: Opportunities to improve clinical effectiveness. *Academic Pediatrics, 19*(1), 4–10. https://doi.org/10.1016/j.acap.2018.08.010

Jin, Y., Austin, L., Vijaykumar, S., Jun, H., & Nowak, G. (2019). Communicating about infectious disease threats: Insights from public health information officers. *Public Relations Review, 45*(1), 167–177. https://doi.org/10.1016/j.pubrev.2018.12.003

Labbé, F., Pelletier, C., Bettinger, J. A., Curran, J., Graham, J. E., Greyson, D., MacDonald, N. E., Meyer, S. B., Steenbeek, A., Xu, W., & Dubé, È. (2022). Stigma and blame related to COVID-19 pandemic : A case-study of editorial cartoons in Canada. *Social Science & Medicine, 296*, 114803. https://doi.org/10.1016/j.socscimed.2022.114803

Lewandowsky, S., Cook, J., Schmid, P., Holford, D. L., Finn, A., Leask, J., Thomson, A., Lombardi, D., Al-Rawi, A. K., Amazeen, M. A., Anderson, E. C., Armaos, K. D., Betsch, C., Bruns, H. H. B., Ecker, U. K. H., Gavaruzzi, T., Hahn, U., Herzog, S., Juanchich, M., … Vraga, E. K. (2021). *The COVID-19 vaccine communication handbook. A practical guide for improving vaccine communication and fighting misinformation*. Retrieved April 21, 2022 from https://sks.to/c19vax

MacKay, M., Colangeli, T., Thaivalappil, A., Del Bianco, A., McWhirter, J., & Papadopoulos, A. (2022). A review and analysis of the literature on public health emergency communication practices. *Journal of Community Health, 47*(1), 150–162. https://doi.org/10.1007/s10900-021-01032-w

Malik, A., Khan, M. L., & Quan-Haase, A. (2021). Public health agencies outreach through Instagram during the COVID-19 pandemic: Crisis and Emergency Risk Communication perspective. *International Journal of Disaster Risk Reduction, 61*, 102346. https://doi.org/10.1016/j.ijdrr.2021.102346

Nan, X., Iles, I. A., Yang, B., & Ma, Z. (2021). Public health messaging during the COVID-19 pandemic and beyond: Lessons from communication science. *Health Communication*, 1–19. https://doi.org/10.1080/10410236.2021.1994910

Neville Miller, A., Collin, C., Neuberger, L., Todd, A., Sellnow, T. L., & Boutemen, L. (2021). Being first, being right, and being credible since 2002: A systematic review of Crisis and Emergency Risk Communication (CERC) research. *Journal of International Crisis and Risk Communication Research, 4*(1), 1–28. https://doi.org/10.30658/jicrcr.4.1.1

Ow Yong, L. M., Xin, X., Wee, J. M. L., Poopalalingam, R., Kwek, K. Y. C., & Thumboo, J. (2020). Perception survey of crisis and emergency risk communication in an acute hospital in the management of COVID-19 pandemic in Singapore. *BMC Public Health, 20*(1). https://doi.org/10.1186/s12889-020-10047-2

Reyes Bernard, N., Basit, A., Sofija, E., Phung, H., Lee, J., Rutherford, S., Sebar, B., Harris, N., Phung, D., & Wiseman, N. (2021). Analysis of crisis communication by the Prime Minister of Australia during the COVID-19 pandemic. *International Journal of Disaster Risk Reduction, 62*, 102375. https://doi.org/10.1016/j.ijdrr.2021.102375

Reynolds, B., & Seeger, M. (2005). Crisis and Emergency Risk Communication as an integrative model. *Journal of Health*

Communication, 10(1), 43–55. https://doi.org/10.1080/10810730590904571

Sandman, P. M. (2022). *Public health tells noble lies*. Retrieved April 21, 2022 from https://www.psandman.com/col/Corona64.htm

Sandman, P. M., & Lanard, J. (2004). *Crisis communication: Guidelines for action*. Retrieved April 21, 2022 from http://www.psandman.com/handouts/AIHA/AIHA_book.pdf

Sauer, M. A., Truelove, S., Gerste, A. K., & Limaye, R. J. (2021). A failure to communicate? How public messaging has strained the COVID-19 response in the United States. *Health Security, 19*(1), 65–74. https://doi.org/10.1089/hs.2020.0190

Veil, S., Reynolds, B., Sellnow, T., & Seeger, M. (2008). CERC as a theoretical framework for research and practice. *Health Promotion Practice, 9*(Supplement 4), 26S–34S. https://doi.org/10.1177/1524839908322113

Wieland, M. L., Asiedu, G. B., Njeru, J. W., Weis, J. A., Lantz, K., Abbenyi, A., Molina, L., Ahmed, Y., Osman, A., Goodson, M., Torres-Herbeck, G., Nur, O., Porraz Capetillo, G., Mohamed, A. A., & Sia, I. G. (2022). Community-engaged bidirectional crisis and emergency risk communication with immigrant and refugee populations during the COVID-19 pandemic. *Public Health Reports, 137*(2), 352–361. https://doi.org/10.1177/00333549211065514

World Health Organization. (2022). *Infodemic*. Retrieved April 21, 2022 from https://www.who.int/health-topics/infodemic#tab=tab_1

Yang, B., Li, Y., Yan, K., Choi, Y., & Bennett-Jones, B. (2021). Analyzing U.S. state governments' COVID-19 homepages during the initial lockdown in March and April 2020: Information content and interactivity. *Health Communication*, 1–11. https://doi.org/10.1080/10410236.2021.2007574

Zhang, Y. S. D., Young Leslie, H., Sharafaddin-zadeh, Y., Noels, K., & Lou, N. M. (2021). Public health messages about face masks early in the COVID-19 pandemic: Perceptions of and impacts on Canadians. *Journal of Community Health, 46*(5), 903–912. https://doi.org/10.1007/s10900-021-00971-8

Publisher's note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Springer Nature or its licensor holds exclusive rights to this article under a publishing agreement with the author(s) or other rightsholder(s); author self-archiving of the accepted manuscript version of this article is solely governed by the terms of such publishing agreement and applicable law.