



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

## COVID-19 SERIES

# Social media can have an impact on how we manage and investigate the COVID-19 pandemic

Carlos Cuello-Garcia<sup>a,b,\*</sup>, Giordano Pérez-Gaxiola<sup>c</sup>, Ludo van Amelsvoort<sup>d</sup>

<sup>a</sup>World Health Organization Collaborating Center for Infectious Diseases, Research Methods and Recommendations, Michael G. DeGroot Cochrane Canada & McMaster GRADE Centres, Hamilton, Ontario, Canada

<sup>b</sup>Department of Health Research Methods, Evidence, and Impact, McMaster University, Hamilton, Ontario, Canada

<sup>c</sup>Department of Evidence Based Medicine, Hospital Pediátrico de Sinaloa, Cochrane Mexico, Culiacan, Sinaloa, Mexico

<sup>d</sup>Department of Epidemiology, CAPRHI Care and Public Health Research Institute, Maastricht University, Maastricht, the Netherlands

Accepted 24 June 2020; Published online 27 June 2020

## 1. Background

With more than 3.8 billion people using social media around the world [1], it is not surprising how the significant amount of information received through these platforms affects how we perceive and cope with the current COVID-19 pandemic [2]. Even before the outbreak, patients, clinicians, and scientists were frequently obtaining health and science-related information from Twitter, Facebook, or other social media channels [3].

With the advent of these technologies, health-care professionals are nowadays able to communicate among each other and with different stakeholders across the wide-ranging fields of medicine [4]. Similarly, scientists from all fields are able to rapidly interconnect and disseminate their research findings, thus increasing their scientific outreach and supporting easy access to information beyond the hindrances of the past.

Social media is now more than ever part of a big extent of our lives—for example, how we use it to cope with social distancing—and although it can give opportunities for better communication, it can certainly have its shortcomings and dangers.

In this commentary, we describe and explore the use of social media and science during the pandemic: first, we briefly explore the role social media has on the current wave of information and misinformation (also called an “infodemic” [5] or “infoxication”) that affects billions and offer guidance toward their optimal use. Second, we

address social media as a health technology intervention or tool that merits more research to improve our understanding of the COVID-19 pandemic.

## 2. Misinformation: problems and opportunities

The term misinformation, the same as the term ‘fake news’, is not new [6], yet today especially takes big significance due to its “virulent” effect and all the entailed consequences. With just one tweet, powerful “influencers”—from head of states to celebrities—can affect people’s lives by disseminating scientific news without veto or fact-checking to an audience of millions. From endorsing the use of hydroxychloroquine to recommending parenteral light or disinfectants as potential treatments for the virus [7,8], they brandish a powerful weapon and must be accountable and have a responsibility for introspection before using it.

Initial evidence suggests that the use of social media as a source of information about COVID-19 has been correlated with stronger beliefs in conspiracy theories and with less-protective behaviors during the pandemic [9]. Certainly, more than half of people on social media have encountered some to a lot of information about the COVID-19 pandemic which, for them, seemed completely made up [2]. Just in YouTube, the second most commonly used social media platform (second to Facebook), more than a quarter of the most viewed videos related to COVID-19 contained misleading information, representing more than 62 million views [10].

The World Health Organization is acting by enhancing its communication efforts to properly address rapidly spreading rumors and questions from the public obtained in social media channels, also using search optimization strategies within the social media platforms to guide anyone asking questions about the pandemic by redirecting them to reliable sources [5]. Similarly, social media platforms themselves are including alerts or ‘warnings’ with links to reliable sources and fact checkers when searching for information on COVID-19 and other health-related issues [11].

Conflict of interest: C.C-G. is a member of the GRADE working group. All authors have no financial conflicts to declare.

\* Corresponding author. Michael G. DeGroot Cochrane Canada & GRADE Centres, Department of Health Research Methods, Evidence and Impact, McMaster University, Health Sciences Centre, 1280 Main Street, West Hamilton, Ontario L8S 4K1, Canada. Tel./fax: +1 905 525 9140x24931.

E-mail address: [cuelloca@mcmaster.ca](mailto:cuelloca@mcmaster.ca) (C. Cuello-Garcia).

Although these represent good first steps, more is needed on the research efforts to understand the origins and spread of misinformation. Social media is an inevitable part of today's information channels. The risk of negative health effects (including death) from misguided health news in this pandemic is real [12].

Health professionals and scientists are unavoidably active social participants and have a responsibility to enter the arena. Here, we expand on some advice/proposals for scientists obtained from different experts to counteract misinformation [13–15]:

- Scientists should engage in social media. Sharing research knowledge with peers and learners is not only natural but also desirable; furthermore, new evidence provides more certainty that social media can increase visibility and citations over time [16]. Sharing science is perfectly achievable, and several strategies that take advantage of social network technology can help (e.g., Tweetorials, Reddit's 'explain-it-like-I'm-5', 'ask-me-anything' sessions, videos, etc.) [17,18].
- Assist and advocate for expert fact-checking. The scientist is the single greatest 'weapon' to counteract 'fake news.' Whether by serving as a professional fact-checker for a news network, or by crowdsourcing (the use of multiple minds to reach a common goal of better knowledge) on any of these platforms, their shared knowledge will always be the best source to scrutinize the news [19].
- Interact in social media channels with nonexperts (public) to raise the alarm when detecting misinformation by sharing the evidence or, if such is the case, by pointing out the scarcity of evidence and how we should make sensible recommendations under these circumstances—by weighing the desirable and undesirable consequences [20]. This includes teaching patients about science and how to deal with distressing interactions; for example, handling 'online trolls' by ignoring them, responding with facts, blocking them, and so forth. Guidelines and policies on this issue are available [21].
- Use, whenever possible, traditional media (TV or radio) to provide evidence-based information and reach a broader audience. This will eventually trickle down to social media users.

Advantages and disadvantages of social media use in clinical epidemiology and for other relevant stakeholders are summarized in Table 1. In addition, for each of the three groups, key advice is provided on how to shift the effects of social media use in a positive direction.

### 3. Research methods and social media

Social media is another technology that behaves in many situations as a health intervention or exposure, and as such, it should be well planned, designed, and evaluated in the pool

of studies addressing the pandemic. There are several areas of research in social media that justify more exploration.

#### 3.1. Research on misinformation

Current research on misinformation in social media focuses on better detecting its sources and how to efficiently counteract them to lessen any possible harm [15]. Certain gaps in research, however, should be explored, including the detection of susceptible populations and the sociodemographic and ideological asymmetries in the intention to spread misinformation [6]. This will certainly benefit from an interdisciplinary approach. For example, social scientists could team up with artificial intelligence (AI) scientists and clinicians to understand ideologies and susceptible populations to design and study better interventions.

#### 3.2. Big data and data mining

Another opportunity of research comes with the association of social media with big data, data mining, and surveillance [22] that it can be used to better detect patterns of future outbreaks or consecutive (second) waves of a pandemic. AI can be added to this promising partnership as a powerful tool that can help develop, for instance, data-driven algorithms (using text mining or topic modeling) and insight-led methods to acquire patient and consumer's experiences of health and illness, for example, to discover and manage "filter bubbles" or "community clusters" that reinforce confirmation bias [23,24]. AI can assist with this and other future developments as a robust computational research tool. It is encouraging to see that nowadays the most common use of AI for patients and health-care consumers are secondary analyses of social media data [25]. This field is still in its early stages and it is not free of error, but it is an area worth exploring.

#### 3.3. Research planning and conduction

Other ways social media is being used by researchers is as an application to help them recruit patients or populations that are hard to reach (e.g., rare diseases) or are very specific to their research needs (e.g., military veterans, teenagers, etc.). There are promising findings about obtaining representative group demographics for their research purposes in areas such as cancer and mental health; most studies, however, focus on study recruitment rather than retention [26,27]. Finally, there is currently an explosion of research papers related to COVID-19, and worries about quantity over quality, research waste, and duplication are justified [28,29]. Social media and other technologies could help in this area by properly monitoring, filtering, and sharing research.

#### 3.4. Knowledge translation

Disseminating health policies and valid information for the purpose of reducing the knowledge translation gap is

**Table 1.** Impact of fast information exchange through social media for different stakeholders within clinical epidemiology

Key stakeholder	Advantages	Disadvantages	Measures to encourage advantages and mitigate the disadvantages
Patient	<ul style="list-style-type: none"> <li>Better informed patient-centered health-care choices.</li> </ul>	<ul style="list-style-type: none"> <li>Receiving health misinformation or even iatrogenic advice.</li> <li>Discomforting with some interactions (e.g., 'trolls').</li> <li>Privacy concerns.</li> </ul>	<ul style="list-style-type: none"> <li>Stimulate health literacy and critical thinking among patients.</li> <li>Learn interaction techniques.</li> <li>Address misinformation by asking questions and provide guidance to reliable sources of information and critical thinking.<sup>a</sup></li> <li>Suggest relevant social media resources (patient associations, patients, and relevant physicians)</li> </ul>
Clinician	<ul style="list-style-type: none"> <li>Fast access to new findings with clinical relevance.</li> <li>Possibility to present clinical cases for peer to peer advise.</li> </ul>	<ul style="list-style-type: none"> <li>Abundance of information and disinformation.</li> <li>Fast access to poor quality and/or non-peer-reviewed studies.</li> </ul>	<ul style="list-style-type: none"> <li>Follow key experts in your medical field who are active on social media and relevant experts in adjacent fields.</li> <li>Follow critical appraisal remarks on studies by other clinicians, clinical epidemiologists, or other experts on 'ground-breaking' studies.</li> <li>Always watch and advocate for privacy of patients when using social media.</li> </ul>
Scientist	<ul style="list-style-type: none"> <li>Improved citation and dissemination of study results.</li> <li>Fast access to new information (pre-prints, publications).</li> <li>Source for new ideas.</li> <li>Potential to start and/or participate in relevant discussions of new ideas and results.</li> </ul>	<ul style="list-style-type: none"> <li>Overload of information and disinformation (i.e., "infoxication").</li> </ul>	<ul style="list-style-type: none"> <li>Be active and visible on social media.</li> <li>Start with a relevant and clear profile.</li> <li>Link to social media channels of journals related to your publications; react and get involved in relevant messages and discussions.</li> <li>Follow relevant experts active on social media.</li> </ul>

<sup>a</sup> For example: [TestingTreatments.org](https://www.testingtreatments.org), [informedhealthchoices.org](https://www.informedhealthchoices.org), [Thatsclaim.org](https://www.thatsclaim.org).

another advantage that scientists and clinicians can make use of and deserves further examination [30]. Social media platforms can have a role in improving several steps in the knowledge transfer cycle; for example, researchers can assess barriers to knowledge use, tailor and implement interventions, monitor knowledge use, or by researching negative and positive behaviors once a health intervention is being disseminated so they obtain feedback and continue the cycle.

#### 4. Conclusions

The importance of increasing and improving research on a technology that is having a massive impact in the current pandemic cannot be overstated. As of the writing of this commentary, a search on [clinicaltrials.gov](https://clinicaltrials.gov) yields only four studies related to COVID-19 and social media (out of 1,546 related to COVID-19). All are surveys or observational studies aiming to explore behaviors and monitor the impact and spread of misinformation.

Clinicians and researchers are using social media to share recommendations and explain the decisions being made in times of the COVID-19 pandemic, no matter if there is enough, scarce, or even no evidence at all [20]. They are

the frontline not only in hospitals and laboratories but also in the cyberworld. Fact-checking of online content is certainly rapidly evolving, and its impact can be perceived when it is even creating major political disputes [31].

Social media is in no way a cure for misinformation, but it is widely used and is here to stay. Just sharing facts will not change behaviors, and more needs to be done. The research methodology to address social media's role in health policy and individual health decisions has yet to be defined, but it is worthy of examination by using a multidisciplinary approach to obtain better research methods and dissemination.

#### CRediT authorship contribution statement

**Carlos Cuello-Garcia:** Conceptualization, Writing - original draft. **Giordano Pérez-Gaxiola:** Writing - review & editing. **Ludo van Amelsvoort:** Writing - review & editing.

#### References

- [1] Social Media Users. DataReportal — Global Digital Insights. Kepios; 2020. Available from: <https://datareportal.com/social-media-users>. Accessed 18 May 2020.

- [2] Jurkowitz M, Mitchell A. Americans who primarily get news through social media are least likely to follow COVID-19 coverage, most likely to report seeing made-up news. *Journalism & Media: Pew Research Center*; 2020: [updated 25 March, 2020]. Available at: <https://www.journalism.org/2020/03/25/americans-who-primarily-get-news-through-social-media-are-least-likely-to-follow-covid-19-coverage-most-likely-to-report-seeing-made-up-news/>. Accessed 18 May 2020.
- [3] Hitlin P, Olmstead K. The science people see on social media. *Science & Society. Pew Research Center*; 2018: [updated March 21, 2018]. Available from: <https://www.pewresearch.org/science/2018/03/21/the-science-people-see-on-social-media/>. Accessed 18 May 2020.
- [4] Smailhodzic E, Hooijsma W, Boonstra A, Langley DJ. Social media use in healthcare: a systematic review of effects on patients and on their relationship with healthcare professionals. *BMC Health Serv Res* 2016;16:442.
- [5] Zarocostas J. How to fight an infodemic. *Lancet* 2020;395:676.
- [6] Wang Y, McKee M, Torbica A, Stuckler D. Systematic literature review on the spread of health-related misinformation on social media. *Soc Sci Med* 2019;240:112552.
- [7] Cohen M. Trump mum on hydroxychloroquine as early trials falter, but sick Americans still taking 'desperate measures' to fill prescriptions. *CNN*; 2020: [updated 24 April, 2020]. Available from: <https://www.cnn.com/2020/04/22/politics/trump-hydroxychloroquine-shortages-blackmarket-coronavirus/index.html>. Accessed 18 May 2020.
- [8] Glatter R. Calls To Poison Centers Spike After The President's Comments About Using Disinfectants To Treat Coronavirus. *Forbes*; 2020: [updated 25 April, 2020]. Available from: <https://www.forbes.com/sites/robertglatter/2020/04/25/calls-to-poison-centers-spike-after-the-presidents-comments-about-using-disinfectants-to-treat-coronavirus>. Accessed 18 May 2020.
- [9] Allington D, Duffy B, Wessely S, Dhavan N, Rubin J. Health-protective behaviour, social media usage and conspiracy belief during the COVID-19 public health emergency. *Psychol Med* 2020;9:1–7.
- [10] Li HO, Bailey A, Huynh D, Chan J. YouTube as a source of information on COVID-19: a pandemic of misinformation? *BMJ Glob Health* 2020;5:e002604.
- [11] Twitter. Coronavirus: Staying safe and informed on Twitter. *Twitter Inc.*; 2020: [updated 3 April, 2020]. Available from: [https://blog.twitter.com/en\\_us/topics/company/2020/covid-19.html](https://blog.twitter.com/en_us/topics/company/2020/covid-19.html). Accessed 29 May 2020.
- [12] Waldrop T, Alsop D, McLaughlin EC. Fearing coronavirus, Arizona man dies after taking a form of chloroquine used to treat aquariums. *CNN*; 2020: [updated 25 March, 2020]. Available from: <https://www.cnn.com/2020/03/23/health/arizona-coronavirus-chloroquinedeath/index.html>. Accessed 18 May 2020.
- [13] Trethewey SP. Strategies to combat medical misinformation on social media. *Postgrad Med J* 2020;96:4–6.
- [14] Merchant RM, Lurie N. Social media and emergency preparedness in response to novel coronavirus. *JAMA* 2020;323:2011–2.
- [15] Chou WS, Oh A, Klein WMP. Addressing health-related misinformation on social media. *JAMA* 2018;320:2417–8.
- [16] Luc JGY, Archer MA, Arora RC, Bender EM, Blitz A, Cooke DT, et al. Does tweeting improve citations? One-year results from the TSSMN prospective randomized trial. *Ann Thorac Surg* 2020. <https://doi.org/10.1016/j.athoracsur.2020.04.065>. Epub ahead of print.
- [17] Bernstein L. Tweetorials — From Early Beginnings to Huge Growth and Beyond. *Symplur LLC*; 2019. Available from: <https://www.symplur.com/blog/tweetorials-from-early-beginnings-to-huge-growth-and-beyond/>. Accessed 21 May 2020.
- [18] Breu AC. Why is a cow? Curiosity, Tweetorials, and the return to why. *N Engl J Med* 2019;381:1097–8.
- [19] Pennycook G, Rand DG. Fighting misinformation on social media using crowdsourced judgments of news source quality. *Proc Natl Acad Sci U S A* 2019;116:2521–6.
- [20] Schünemann HJ, Santesso N, Vist GE, Cuello C, Lofti T, Flottorp S, et al. Using GRADE in situations of emergencies and urgencies: certainty in evidence and recommendations matters during the COVID-19 pandemic, now more than ever and no matter what (in publication). *J Clin Epidemiol* 2020;217:202–7.
- [21] Clark T. *Social Media Trolls: A Practical Guide for Dealing with Impossible People*. Hootsuite; 2019.
- [22] Neumann G, Kawaoka Y. Predicting the next influenza pandemics. *J Infect Dis* 2019;219:S14–20.
- [23] Chitra U, Musco C. Analyzing the impact of filter bubbles on social network polarization. In: *Proceedings of the 13th International Conference on Web Search and Data Mining*. Houston, TX: Association for Computing Machinery; 2020:115–23.
- [24] Holone H. The filter bubble and its effect on online personal health information. *Croat Med J* 2016;57:298–301.
- [25] Lau AYS, Staccini P, Section Editors for the IYSoE, Consumer Health I. Artificial intelligence in health: new opportunities, challenges, and practical implications. *Yearb Med Inform* 2019;28:174–8.
- [26] Whitaker C, Stevelink S, Fear N. The use of Facebook in recruiting participants for health research purposes: a systematic review. *J Med Internet Res* 2017;19:e290.
- [27] Frampton GK, Shepherd J, Pickett K, Griffiths G, Wyatt JC. Digital tools for the recruitment and retention of participants in randomised controlled trials: a systematic map. *Trials* 2020;21:478.
- [28] Glasziou PP, Sanders S, Hoffmann T. Waste in covid-19 research. *BMJ* 2020;369:m1847.
- [29] Brainard J. Scientists are drowning in COVID-19 papers. Can new tools keep them afloat? *Science*. AAAS; 2020. Available from: <https://www.sciencemag.org/news/2020/05/scientists-are-drowning-covid-19-paperscan-new-tools-keep-them-afloat>. Accessed 19 June 2020.
- [30] Roland D. Social media, health policy, and knowledge translation. *J Am Coll Radiol* 2018;15:149–52.
- [31] Fung B, Nobles R, Liptak K. Trump signs executive order targeting social media companies. *CNN*; 2020: [updated 28 May, 2020]. Available from: <https://www.cnn.com/2020/05/28/politics/trump-twitter-social-media-executiveorder/index.html>. Accessed 29 May 2020.