

# Conspiracy theories in the era of COVID-19: A tale of two pandemics

Conspiracy theories, omnipresent in traditional and modern societies,<sup>1</sup> span demographic strata and political differences<sup>2</sup> and have fascinated people for ages.<sup>3</sup> While many conspiracy theories are harmless and may even be entertaining, the ones related to medical and public health topics can be particularly dangerous for the individual and collective well-being.<sup>3</sup> This second category includes misinformation and conspiracy theories related to COVID-19, which is likely one of the most significant pandemics of our lifetime. Compounding the challenges that it opened for the economy, social and political sciences, and biomedical, translational and clinical research, COVID-19 also propelled discussions about conspiracy theories and media health literacy to the forefront of public health in ways that were nearly impossible to predict.

Situations of crisis, fear and uncertainty increase the likelihood of conspiratorial thinking.<sup>4</sup> A key difference between COVID-19 and the 1918 flu pandemic, which is sometimes used as a reference, is that a highly interconnected world, to a great extent on social media, is setting the stage for distributing information and misinformation about COVID-19.<sup>5</sup> In the short time since the beginning of the pandemic, the number of COVID-19-related conspiracy theories increased and propagated on social media. According to some metrics, online sensationalist and conspiratorial sites and articles generate more user engagement than more reputable sources such as the World Health Organization and the US Centers for Disease Control and Prevention<sup>6</sup> or mainstream news media such as the BBC and New York Times.<sup>7</sup>

An important way in which misinformation related to COVID-19 differs from misinformation that impacts other health-related topics is its multi-layered nature, in the sense that it concomitantly targets multiple facets of the pandemic. These include misinformation and conspiracies casting doubt on the very existence of the virus, minimising the value of long-proven preventive strategies, and questioning the safety, efficacy and potential ulterior motives of a vaccine that is not even available yet, and not sure it will ever be. In the wake of COVID-19, an *ocean of misinformation*<sup>8</sup> that spans all these domains has accumulated faster than for many other health-related topics. As a result, mutually incompatible and contradictory conspiracy theories were sometimes being endorsed and circulated together.<sup>9</sup> Misinformation and disinformation during the pandemic contributed to the demonisation of healthcare workers.<sup>10</sup> As patients avoided hospitals or had difficulties making appointments in the wake of the pandemic, they experienced delays in accessing healthcare.<sup>11-14</sup> This was accompanied, in several countries, by an increased mortality

from acute heart disease.<sup>15</sup> In this context, ambiguous messages about the pandemic endanger the delivery of healthcare in virtually all clinical areas and may place patients at a heightened risk of complications. Considering the disruption that the pandemic can impose on healthcare, the availability of accurate and reliable information becomes a critically important resource.

Some conspiratorial claims include assertions that COVID-19 is a hoax, arguments that the virus was created artificially<sup>16,17</sup> and spread on purpose<sup>18</sup> as a bioweapon,<sup>19</sup> or allegations that governments are using the emergency situation to pursue their anti-democratic goals.<sup>20</sup> As early as in January 2020, social media stories contained claims that 5G technologies either caused or accelerated the spread of the pandemic.<sup>21,22</sup> Other conspiracies argued that people in power are taking advantage of the pandemic as a plan to inject microchip quantum-dot spy software and monitor people.<sup>8</sup> Videos or articles perpetuating these theories were viewed by millions of people on social media platforms. Another conspiracy theory, circulating in several languages, claimed that the swab test reaches the back of the nasopharynx and damages the blood-brain barrier, and urged people to refuse testing.<sup>23,24</sup> Yet another conspiracy theory, spread thousands of times on social media, claimed that testing itself infects people with the coronavirus and urged them to refuse testing.<sup>23</sup>

The use of face masks has become a passionately debated topic,<sup>25,26</sup> even though many studies support their benefit against SARS-CoV, SARS-CoV-2, MERS-CoV,<sup>27,28</sup> flu and seasonal coronaviruses.<sup>29</sup> Some people wearing masks have faced alienation or discrimination.<sup>30</sup> Claims on social media that the virus crosses the masks, and therefore the mask is useless, have been circulating together with claims that the virus persists on the surface of the mask and wearing a mask would, therefore, infect people, or that the mask could 'activate the virus'.<sup>31</sup> Other social media claims include warnings that masks may cause fungal or bacterial pneumonia<sup>32</sup> or oxygen deprivation and carbon dioxide poisoning,<sup>33</sup> an especially worrisome complication for children and pregnant women, despite evidence that no differences exist in heart rate and oxygen saturation between pregnant and non-pregnant women wearing N95 respirators for a short period of time.<sup>34</sup>

Most recently, warnings on social media advised people of the dangers of having their temperature checked upon entering closed spaces, based on the false claim that infrared light damages their pineal gland, when in reality infrared thermometers detect radiation emitted by the body.<sup>35,36</sup> Other pseudoscientific claims advanced unproven therapies, including homoeopathic arsenic-based

products or colloidal silver solutions,<sup>22</sup> advocated for prophylactic vitamin megadoses,<sup>37</sup> promoted vitamin C and garlic as miracle remedies<sup>6</sup> and recommended ginger, hot pepper and lemon to limit the impact of the pandemic.<sup>16</sup>

As of mid-October 2020, a vaccine is highly anticipated but not yet available, and it is uncertain which of the several vaccines that are currently pursued will succeed, if any. As of late July 2020, ~200 vaccine candidates were under active development and 15 were in human clinical trials.<sup>38</sup> Prior to the widespread use of social media and crowdsourcing to obtain medical information and advice, the spread of infectious disease outbreaks was usually limited to confined geographic locations; now, the availability of misinformation widens the footprint of its harm. Vaccine-related misinformation on social media is rampant. In late April 2020, a false story that circulated claimed that one of the first volunteers in the UK during a COVID-19 vaccine trial died from complications.<sup>39</sup> Another conspiracy theory claimed that the vaccine will be used to establish a global surveillance network.<sup>40</sup> Additionally, various social media posts are already providing advice on how to avoid the vaccine. A WebMD poll in late July 2020 found that if a COVID-19 vaccine was available, fewer than one-third of the respondents would take it in the first 90 days, and fewer than one-half of the people would take it in the first year.<sup>41</sup>

Each of these conspiracy theories may be destructive in itself. While it is challenging to demonstrate the direct influence of any given conspiracy theory on an individual's behaviour, there are some suggestive trends. In the wake of the misinformation linking 5G technologies to the pandemic, attacks were perpetrated against telecommunication masts on several continents and engineers were subjected to verbal and physical abuse.<sup>42</sup> Between April 2 and 6, 2020, it was estimated that at least 20 phone masts were damaged in the UK. This included a hospital in Birmingham, UK, whose phone mast was set on fire.<sup>21</sup> There are previous examples to illustrate the heavy price of denial and misinformation in the wake of an infectious disease crisis. During the HIV/AIDS pandemic, claims that the virus does not exist or that it does not cause AIDS were incredibly harmful.<sup>6</sup> When the South African government, in its widely criticised denialist approach,<sup>43</sup> withheld lifesaving drugs and promoted non-tested alternative solutions instead,<sup>44</sup> the public health damage was incalculable and estimated to have claimed >330 000 lives.<sup>45-47</sup>

Anti-vaccination rhetoric and conspiracies are not new. They existed since Edward Jenner's time, when some rumours claimed that vaccination will make people grow horns.<sup>48,49</sup> The themes have been strikingly similar across time, and include distrust of the medical establishment or governments mandating vaccination; revulsion at the idea of introducing unknown substances into the body; accusations that the ingredients are harmful; or suspicion that the real motives behind vaccines are to make people sick or to control the population. Like many conspiracy theories, some worries over history have been rooted in a kernel of truth. Such examples include the Tuskegee Syphilis Study, where the government and the medical establishment have abused their power at the cost of people's health<sup>50-52</sup>; the rare cases when contaminated vaccines caused harm<sup>53-55</sup>; or instances

when vaccination was used as a cover for intelligence operations.<sup>56</sup> During the Zika virus epidemic, some of the conspiracy theories claimed that the disease was caused by vaccines, and an Australian anti-vaccination Facebook group emphasised that the vaccine used to prevent diphtheria, tetanus and pertussis in pregnant women was introduced in Brazil only months before the Zika outbreak.<sup>57-59</sup> This makes it understandable, to a certain extent, why some people continue to view vaccines with suspicion.

A paradox in the vaccination debate seems to be the fact that even though vaccines have well-known and widely reported adverse effects,<sup>60-62</sup> most conspiratorial discussions focus on false claims about adverse effects that were never linked to vaccines, while the actual adverse effects, that scientists and regulators are attempting to address and avoid, are rarely discussed, if ever. What makes the COVID-19 vaccine refusal so different is that the debates are directed against a vaccine that was not even manufactured yet. Amidst these multiple layers of misinformation and conspiratorial discourse, the potential for damage is unpredictable, poignant and difficult to manage, and the challenges associated with bringing the pandemic under control adopt a new, amplified and more acute perspective.

On the bright side, overall, social media harbours a larger volume of accurate information than misinformation.<sup>63</sup> The sobering news is that misinformation seems to be more popular,<sup>63</sup> become more prevalent over time<sup>63</sup> and spread faster, farther and deeper<sup>64,65</sup>—though whether this is true of health emergencies is less clear.<sup>66</sup> Several studies found that COVID-19 conspiracy beliefs negatively correlate with COVID-19 health-protective behaviours,<sup>67,68</sup> and individuals who support COVID-19 conspiracy theories are less likely to accept the advice of public health experts.<sup>69</sup>

Even though social media made it easier to disseminate misinformation, it is not clear to what extent it causes more people to believe in them. Surveys of public opinion around conspiratorial beliefs, particularly during an ongoing global event such as the current pandemic, should be interpreted with caution. The responses to such surveys depend on the questions asked. As noted, conspiracy theories often make a multitude of specific, sometimes mutually contradictory claims; COVID-19 conspiracy theories are no exception. As a result, it is difficult for a single survey to cover all variants of any given conspiracy theory. While research suggests that endorsement of one conspiracy theory predicts the endorsement of others, general conspiratorial ideation has been found to be relatively weakly predictive of general conspiracy claims about COVID-19, and even more weakly predictive of a plethora of specific claims.<sup>68</sup> Even more basic aspects of survey design such as the wording of available response options can have a substantial influence on responses.<sup>70</sup> The extent to which such surveys over- or underestimate true engagement with conspiracy theories is therefore unknown. It must also be noted that misinformation constitutes only a small fraction of people's news consumption, and that news consumption itself is only a small fraction of people's overall information diet.<sup>71</sup> The nuances of public opinion around conspiracy claims should receive increased attention in the years to come, as they have the potential to directly impact public health.

While initial surveys indicate that many people would hesitate to adopt a coronavirus vaccine, it is important not to over-extrapolate, as responses to hypothetical questions may reflect many unstated assumptions and variables. However, the link merits increased focus over the coming months and years. We also need to recognise that hesitancy does not necessarily suggest that someone is a conspiracy theorist, or that they will not actually seek vaccination should it become a reality with demonstrated safety and efficacy. A lot remains to be understood about people's attitudes towards vaccines, and we should support this topic to further develop in the years to come.

Misinformation can muddy not only public discourse but also the scholarly literature. A survey of academics, researchers, clinicians, journal editorial board members and editors, while recognising social media as the most common resource for COVID-19-related information, and as a significant source of misinformation, pointed out that in the wake of the pandemic, misinformation may also originate in peer-reviewed literature. One concern identified in the survey is that manuscript preprints, which have not yet been peer-reviewed, are increasingly mentioned and cited on social media. Additional considerations identified as being problematic included the deluge of COVID-19-related articles recently submitted to journals, which also includes large volumes of misinformation, and the publication of several flawed articles that were subsequently retracted, a source of confusion and misinformation for readers and authors alike.<sup>72</sup>

As we are exploring the best way forward during the COVID-19 pandemic, it will be an ongoing challenge and a critical task to understand how to limit the rapid spread of misinformation, for which the term 'infodemic' was coined to reflect its amplitude and extent.<sup>73-75</sup> Prompt, effective and targeted interventions that seek to delegitimise misinformation emerge as an important strategy to reduce its impact. It was suggested that social media users should take advantage of the mechanisms available to report misinformation on the respective platforms.<sup>21</sup> More extensive efforts need to be dedicated to advance and promote media and social media literacy, and to interrogate the impact of misinformation, disinformation and conspiratorial thinking on the different facets of this pandemic and of other public health emergencies. For sure, the road ahead will be long and tortuous.

## DISCLOSURE

The authors declare that they have no conflict of interest.

## DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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