

THE VIRAL SPREADING OF PSEUDOSCIENTIFIC AND QUACKERY HEALTH MESSAGES ON TWITTER – FINDING A COMMUNICATION VACCINE

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ABSTRACT

One of the most serious problems for both scientists and journalists reporting on scientific findings and research is the growing online presence of quackery, pseudoscience and alternative 'facts' in the health field. The focus on this phenomenon sharpened in the wake of the Ebola outbreak of 2013–2016 and has now come under the spotlight even more intensely during the COVID-19 pandemic. This viral spread of pseudoscience and quackery has reached communities at large, often leading to the adoption of conspiracy theories about vaccines and to pseudoscientific advice on medication against the viruses being heeded. This study investigates the presence and power of pseudoscientific messages about health matters on Twitter and how some scientists are trying to use the social media platform to counteract quackery.

Keywords: viral spreading, pseudoscientific messages, Twitter

INTRODUCTION

Various studies have scrutinised Twitter as a social media platform through which health messages are communicated to the broader public, either by scientists or by the media reporting on science.^{1–11}

The COVID-19 pandemic and its subsequent concomitant presence of pseudoscience and quackery, widely reflected in the media, brought home the need for a proper public understanding of science. This is to counter fake news and unproven pseudoscientific claims on Twitter and other social media, but also to bring the evidence-based findings of science – properly peer reviewed – to the attention of uninformed and often ignorant citizens bombarded by social media, as various studies have shown.^{11–27}

Over the past decade, media consumers have drastically altered their behaviour regarding their reading, listening and viewing patterns when accessing news. This is emphasised by Bell:²⁷

Our news ecosystem has changed more dramatically in the past five years than perhaps at any time in the past five hundred ... *Social media hasn't just swallowed journalism, it has swallowed everything.* (emphasis added)

The reason why science should be regarded as important to society and the public is intrinsically linked to a public understanding of science, one that enables the public to make

'informed consumer choices'.²⁸ In reporting on health issues where quackery and pseudoscience are rife to the extent that it can seriously harm consumers, the media's responsibility to reflect evidence-based science becomes even more imperative.

The influence of the social media environment, and specifically Twitter, in spreading false health claims and quackery virally has been illustrated graphically by the COVID-19 pandemic. This aligns with what Habermas describes as the public sphere, now vastly expanded from his 'coffee houses, ... salons and ... table societies'²⁹ to the highly active viral environment of false health messages propagated on social media and, specifically, for the purposes of this study, Twitter.

Pigliucci calls quackery and pseudoscience 'nonsense on stilts',³⁰ and to distinguish it from valid evidence-based science has become one of the most important communicating challenges of science over the past decade; and also for journalists, who must adhere to ethical codes of conduct. This ethical aspect is also a question of morality and the codes of the South African Press Council (for print media) and the Broadcasting Complaints Commission (BCCSA) set clear guidelines for ethical practices. However, they do not distinguish between valid and proven science, on the one hand, and pseudoscience, on the other.

Various research studies emphasise the importance for scientists and science communicators to react to and counter

pseudoscientific health claims which go viral on social media. This is imperative because the influence of celebrities and other role models, followed by vast numbers on social media, can have devastating effects when they spread quackery.^{31,32} Furthermore, the morality of not spreading false health news is often underestimated.^{33–35}

Quoting the 19th-century British scientist, Thomas Henry Huxley, on the moral duty of everyone in society to make a distinction between science and non-science, Pigliucci touches upon an often-neglected reason why science communication is so important in society:

The foundation of morality is to ... give up pretending to believe that for which there is no evidence and repeating unintelligible propositions about this beyond the possibilities of knowledge.³¹

Pigliucci warns that to accept

pseudoscientific untruths or conversely rejecting scientific truths, has consequences for us all, psychological, financial, and in terms of quality of life. Indeed ... pseudoscience can literally kill people.³¹

This was, for example, aptly illustrated by opponents of 5G technology who, during the height of the COVID-19 pandemic in 2020, were spreading misinformation via social media that 5G cellphone signals would either transmit the virus or reduce people's defences against it.³⁶

Often the reason why pseudoscience has such a dangerous viral spreading efficacy on social media platforms is that most members of the public fail to make a distinction between pseudoscience and non-science, or are incapable of recognising the difference between them, on the one hand, and evidence-based science, on the other. Quackery and fraudulent pseudoscientific claims thrive on these social media platforms if they are not immediately countered by scientists. Bucchi calls this distinction a 'demarcation between orthodoxy (science) and deviance (non-science)'.³⁷

Bronner refers to a paradox between the 'coexistence of progress in human knowledge with the persistence of certain ideas that are either false or questionable'.³⁸ Conspiracy theories about the moon landings, the attacks of 11 September 2001 on New York and Washington, DC and, in the health field, besides the 5G conspiracy theories, that Microsoft's founder, Bill Gates, sits behind the COVID-19 pandemic because he wants to make a lot of money through vaccinations, homeopathy and other pseudoscientific practices, also illustrate this sustained presence of fake news and aberrant ideas.³⁹

Nelkin¹³ warned about the media's role in causing health risks by incorrect reporting on health research. This was also emphasised by Dentzer, who cited 'inaccurate or misleading'⁴⁰ reporting.

This danger is seriously increased by false health claims made on Twitter. The benefits of countering the viral spread of misleading claims about health issues may lie in scientists' and research

institutions' having an online social media presence.^{4,5,10,11,41–43} Furthermore, better public engagement with science can be advanced by scientists who use Twitter. Novak also found that communicating science on Twitter 'works partly by relaying science to a more diverse audience'.⁴³ Another study showed that social media users are often intermediaries making visible and assessing the evidence of social impact.⁴⁴

Concerning the presence of scientists on Twitter, another study found that scientists

are increasingly using Twitter as a tool for communicating science. Twitter can promote scholarly discussion, disseminate research rapidly, and extend and diversify the scope of audiences reached. However, scientists also caution that if Twitter does not accurately convey science due to the inherent brevity of this media, misinformation could cascade quickly through social media.⁴⁵

The presence of scientists on Twitter and their role in making science news more quickly available and more accessible is leading to serious and often vigorous debate in the scientific community, especially after the publication of the K-Index by Hall.³¹ He defined the 'Kardashian Index' as a 'measure of discrepancy between a scientist's social media profile and publication record based on the direct comparison of numbers of citations and Twitter followers'. He continues:

in the age of social media there are people who have high-profile scientific blogs or twitter feeds but have not actually published many peer-reviewed papers of significance; in essence, scientists who are seen as leaders in their field simply because of their notoriety.³¹

Despite Hall's reservations, Twitter's benefit to science in general is the announcement of scientists' own findings or those of other scientists. It breaks down the pay-wall problem for the general public – a problem of the accessibility of scientific research – bypassed by scientists on Twitter providing a link to peer-reviewed articles. This also helps journalists following Twitter to have quick and easy access to peer-reviewed studies which, before the age of social media, were often hidden behind expensive pay-walls.¹²

Twitter has become immensely popular in science communication and so scientists have started using it to their advantage, opening their research to a broader public rather than having it confined to pay-wall-restricted science journals. Various studies have shown this trend.^{11,46–49} Joubert and Costas highlight the significance Twitter has gained in the way scientists have started communicating to a broader public:

Twitter, a microblogging platform and social networking tool, has emerged as a particularly popular and powerful science communication platform that researchers (or scholars) embrace more readily than other social media platforms, possibly because it is viewed as more professional and more suitable for science communication than other tools such as Facebook.⁴¹

Bell explained the reasons for the growth in popularity of social media, a reason why scientists have also started using Twitter. He maintained that traditional 'news publishers have lost control over distribution of news ... Now the news is filtered through algorithms and platforms which are opaque and unpredictable'.²⁷ Bell further explained that the

inevitable outcome of this is the increase in power of social media companies. The largest of the platform and social media companies, Google, Apple, Facebook, Amazon, and even second-order companies such as Twitter, Snapchat and emerging messaging app companies, have become extremely powerful in terms of controlling who publishes what to whom, and how that publication is monetised.²⁷

Owing to its immediacy in spreading news, Twitter has also become a very popular social media platform for scientists to counter pseudoscience and quackery and, specifically, unscientific, non-proven claims made by celebrities in support of misleading and often even fraudulent marketing of products and ideas by non-scientists. In the health field, this practice is rife.^{50–53}

The role that charlatans, quacks and celebrities play in spreading pseudoscientific claims about health issues is very noticeable.¹² Fake claims and news about health issues are common on Twitter, most notably by celebrities such as the actress, Gwyneth Paltrow, whose venture into the field of quackery through her goop website (Twitter handle @GwynethPaltrow or @goop, the latter described as: 'The latest from goop, a lifestyle publication and shop.'). has brought sanctions against her by the Food and Drug Administration (FDA) in the United States.^{54,55}

Examples of just a few scientists countering quackery on Twitter are medical specialist Jennifer Gunter (@DrJenGunter); health law and science policy author of *Is Gwyneth Paltrow Wrong About Everything?*, Timothy Caulfield (@CaulfieldTim); medical scientists David Gorski (@gorskon) and Alastair McAlpine (@AlastairMcA30); trauma surgeon under the pseudonym @DocBastard; Edzard Ernst, co-author of *Trick or Treatment – Alternative Medicine on Trial* (@EdzardErnst); award-winning scientist and science author Simon Singh, who famously won a case against the British Chiropractic Association when sued for defamation (@SLSingh);⁵⁶ the health activist and project director of the Good Thinking Society, Michael Marshall (@MrMMarsh and @GoodThinkingSoc), and numerous other Twitter accounts that expose quackery and campaign against health pseudoscience.

Other examples of platforms in the fight to counter health quackery include Quackery Detector (@QuackDetector), Blue Wode (@Blue_Wode), Bob Blaskiewicz (@rjblaskiewicz), ScienceBasedMedicine (@ScienceBasedMed), Health Watch (@HealthWatch123), medical scientist and author Paul Offit (@DrPaulOffit), medical scientist, author and campaigner against bad science, Ben Goldacre (@bengoldacre), and Quackoscope (@quackoscope), to mention just a few.

The dangerous viral spread of health quackery became most prominent again during the progression of the COVID-19

pandemic and the subsequent development of vaccines to counter it. An anti-vaccination campaign not to take the vaccines against the SARS-CoV-2 virus⁵⁷ could be linked directly to the Andrew Wakefield MMR–autism debacle, following the publication of a very small study in *The Lancet*, retracted in February 2010.⁵⁸

Wakefield's fall from grace in the scientific community – he may not practice as a medical doctor in the United Kingdom – does not deter him. In 2021, his strong presence and campaign against vaccination on social media – as well as the open support he gets from celebrities such as Jenny McCarthy, Jim Carrey, Robert de Niro, Jessica Biel, Oprah Winfrey ('one of the most powerful enablers of cranks on the planet'⁵⁹) and former US Congressman Robert Kennedy – have led Twitter to 'announce that it would be launching a new tool in search that would prompt users to head to vaccines.org, which is run by officials' at the US Department of Health and Human Services (HHS). In this regard, Kelly adds:

Over the past few months, social media companies like Facebook and Twitter have faced intense pressure from lawmakers and the public to remove anti-vaccination propaganda from their platforms.⁶⁰

Journalists' lack of scientific knowledge²³ and their exposure to the pseudoscientific and quackery views of celebrities have aggravated the role social media, and specifically Twitter, play in spreading misleading health information virally. Julie Gunlock, a senior fellow at the Independent Women's Forum and leader of the organisation's *Culture of Alarmism Project*, emphasises in an opinion piece in the *Wall Street Journal* that the 'anti-vaccine hysteria Ms Winfrey helped incubate was more dangerous than mere "fake news"'. It actually put people's lives at risk.⁶¹

Habermas's theory of the public sphere²⁹ has been confirmed and has come to fruition during the COVID-19 pandemic, where social media, including Twitter, have been prominent in spreading anti-vaccination messages. These messages and their acceptance have spread virally through the public sphere. The anti-vaccination movement has been characterised by conspiracy theories abounding in the movement, as elaborated by the warning of Infectious Disease Advisor just one year before the outbreak of the COVID-19 pandemic:

Anti-vaccination rhetoric has become part of the mainstream dialogue regarding childhood vaccination, and social media is often employed to foster online spaces that strengthen and popularise anti-vaccination theories ... Conspiracy theories have become endemic among anti-vaccination groups. These sentiments have been compounded in recent years by decreased trust in the institutions that manufacture or distribute vaccines. The effect of vaccination refusal on public health is particularly challenging when misinformation is disseminated through social media. Thought influencers in the anti-vaccine movement include doctors, celebrities, community organisers, and 'mommy bloggers' who collectively speak to an audience of about 7 million Facebook followers. The potential for disseminating harmful health-related

information through social media seems to be at an all-time high.⁶²

During the COVID-19 pandemic, anti-vaccination messages, for example, claimed that the vaccine would put a microchip in your bloodstream so that governments could know all about you;⁶³ or the role of Bill Gates or The Gates Foundation in developing and rolling out this technology as a way of tracking who has been vaccinated; or the chip is purportedly the 'mark of the beast' – a reference to Revelation 13:16.

CONCLUSION

In dealing with 280-character messages on Twitter, science reporters should adopt the mode of evaluating evidence that is such an integral part of the scientific method and should weigh the veracity of marketing messages by pseudoscientists and quacks on the scale of science. For both scientists and journalists, social media have enormous advantages but also serious disadvantages. The viral spread of misinformation by harmful quacks should be countered timeously and without

hesitation by both groups, probably most effectively also on social media, where the original false claims have been posted.

Furthermore, the ethical codes of the South African Press Council and the BCCSA require that the media should be vigilant not to report news inaccurately. The dangers of celebrity capture on Twitter should be constantly monitored by scientists and journalists alike and nipped in the bud when they appear before quackery claims are able to spread virally. Science is too intricate to be left to ignoramuses; too often, scientifically illiterate journalists hold up a 'dirty mirror'²⁹ of science, reflecting through an opaque lens celebrities' views of life, 'a tale told by an idiot, full of sound and fury, signifying nothing', as Oreskes and Conway⁶⁴ quote *Macbeth* (Act 5, Scene 5).

DECLARATIONS OF CONFLICT OF INTEREST

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