

‘Visible’ but not yet ‘Celebrities’: The Case of Indian Scientists during COVID-19

Siddharth Kankaria¹

*Simons Centre for the Study of Living Machines, National Centre for Biological Sciences, Tata Institute of
Fundamental Research, India*

Abstract

The COVID-19 pandemic has really underlined the need for effective and timely health and science communication efforts, and pushed several scientists to rise to the challenge of communicating health, risk and scientific information about COVID-19.

But, unlike Antony Fauci in the USA or Salim Abdool Karim in South Africa, no Indian scientist has quite acquired the status of a star scientist, or become synonymous with being the sole public authority on COVID-19.

Instead, there seems to be a wide array of Indian scientists that have become highly ‘visible’ but not quite acquired ‘celebrity’ status. Many of them have become active within public collectives of scientists and scientific organisations that surfaced in 2020 to jointly engage in public communication of COVID-19-related information.

This study examines a few case studies of such ‘visible’ but not yet ‘celebrity’ Indian scientists, and describes relevant features of their communication strategies during this global pandemic, such as the various roles of scientists in health communication efforts, their motivations for engaging in these efforts and the challenges faced by them.

In the true spirit of Indian plurality, the study also discusses the implications of having a wide diversity of ‘visible’ expertise for not only communicating COVID-19-related information but also for fighting misinformation, ensuring public trust in science and engaging stakeholders in discussions about the process of science.

Introduction

The advent of a global pandemic like COVID-19 has really highlighted the need for effective and timely health, risk and science communication efforts. In addition to professional science communicators and journalists, the pandemic has pushed several scientists to rise to the challenge of interpreting, evaluating and communicating health, risk and scientific information about COVID-19.

¹ Corresponding author: Kankaria, S. (siddharth.kankaria@gmail.com, Twitter/LinkedIn: [@SiddhrthKnkaria](https://twitter.com/SiddhrthKnkaria))

In this context, it is interesting to understand the function of such scientists within a broader range of science communication efforts around COVID-19. In particular, how does their degree of popularity, public recognition and societal status play a role in the effectiveness and trustworthiness of their health communication efforts? The concepts of 'visible scientists' and 'celebrity scientists' can be helpful in answering these questions.

The term 'visible scientists' was introduced by Rae Goodell in 1977 to describe a new breed of scientists who had achieved significant public visibility due to increased media attention (Goodell, 1977). Examples of such visible scientists include researchers working on controversial scientific topics or Nobel Prize recipients within scientific fields.

Often with increased media attention and interest, some of these visible scientists grow in popularity and influence to become thought leaders, scientific stars, or 'celebrity scientists'. This is often characterised by increased public attention into their personal lives, much like prominent figures in entertainment, sports or politics (Fahy & Lewenstein, 2014; Fahy, 2015; Johnson *et al.*, 2018; Scheitle & Ecklund, 2017; Giberson & Artigas, 2007; Elsdon-Baker, 2009; Goodell, 1985). Examples of such celebrity scientists include Carl Sagan, Richard Dawkins, Stephen Hawking and Jane Goodall to name a few (Johnson *et al.*, 2018).

Celebrity scientists often have the reach and capacity to circulate scientific ideas and concepts through our culture, shape public discussion around scientific issues, and address scientific controversies of public relevance such as evolutionary theory and vaccination – even though their actual impact in terms of changing public attitudes remains largely unproven (Fahy and Lewenstein, 2014).

More recently, in light of the COVID-19 pandemic, we've seen the emergence of various celebrity scientists like Anthony Fauci and Salim Abdool Karim, who have all played a critical role in engaging national and international audiences with various kinds of COVID-19-related information (Joubert, 2020; Abu-Akel *et al.*, 2021).

In this context, I wanted to understand if there were any Indian equivalents of such celebrity scientists? If so, who were these scientists and what was the impact of their celebrity status on the health communication of COVID-19 related information? If not, do we actually need such celebrity scientists? Further what were the broader contexts and challenges of health communication efforts undertaken by Indian scientists during the COVID-19 pandemic?

To address these questions, I spoke to five prominent and visible Indian scientists extensively engaged in COVID-19-related health communication efforts since 2020. These scientists include Prof. Gagandeep Kang (Christian Medical College, Vellore), Prof. Gautam Menon (Ashoka University, Sonapat) and Dr. Soumitra Pathare (Centre for Mental Health Law and Policy, ILS, Pune), who are respectively experts in the fields of virology, disease modelling and mental health policy. I also interviewed Prof. R Ramanujam and Dr. Vishwasha Guttal, who along with Prof. Menon, were active members of the *Indian Scientists' Response to COVID-19* (ISRC), a collective of more than 700 Indian scientists that came together to produce an enormous number of resources, toolkits, myth-busters, infographics, videos, podcasts and events aimed at spreading awareness about COVID-19 in more than 16 Indian languages (ISRC, 2020).

Together, these scientists have written more than 30 original articles, been quoted in more than 200 newspaper articles, participated in more than 100 public panel discussions, appeared in more than 70 television interviews, and contributed to hundreds of Twitter threads and social media posts.

Methods

The five scientists that were interviewed were selected from a list of Indian scientists actively involved in COVID-19-related health communication efforts, primarily on the basis of their availabilities and on their experiences and ability to comment on ‘celebrity status of scientists’ as well as their involvement within ‘public collectives of scientists doing COVID-19 outreach’. In retrospect, such a selection criterion did not allow for a larger sample size of scientists to be considered or ensure a more representative selection of scientists in terms of gender and other socio-cultural metrics. These are some obvious limitations of this study and something that future studies on this topic should try to address.

The five scientists mentioned here were interviewed over a Zoom call, using a semi-structured interview approach, with most of these interviews lasting between 30 to 40 minutes. Transcripts of their interviews were analysed qualitatively using a thematic analysis-based approach. This analysis revealed several overarching themes ranging from features of these scientists’ health communication efforts, the presence and role of their celebrity status in such efforts, and the benefits of having a diversity of expertise engaged in such public discourses around COVID-19.

A summary of these emergent themes was presented along with supporting quotes from these Indian scientists as an *Individual Talk* during the PCST 2020+1 conference in May 2020, and are now described below in some detail as part of the Results section.

It is important to highlight the reasoning behind presenting detailed verbatim quotes from these scientists, instead of a paraphrased summary of their views. Paraphrasing these quotes would have led to generalisation of the scientists’ views further, and this would have been difficult to back quantitatively, given the small sample size of this study. Presenting such direct quotes from the scientists, however, provides a much richer qualitative description of the contexts, challenges and features of health communication efforts by these scientists. Such quotes also shed light on the scientist’s motivations for engaging in these health communication efforts and makes room for the readers to engage with such qualitative data more deeply.

Results

COVID-19 Health Communication Efforts in India

The scientists described several positive and negative aspects of health communication efforts in India during the COVID-19 pandemic. For instance, Menon noted that many of the risk communication efforts around big public events like the Kumbh Mela had failed spectacularly.

“And where communication has flagged a little bit, or becoming a little unclear is, communications around the big public events that happened this year [...] Had we been consistent in that messaging [this could have been avoided]!”

– **Gautam Menon**

He also remarked that there were several untested cures and remedies that were being officially endorsed by organs of the Indian government.

“We have a little problem with official organs of the government pushing untested cures, for example, from Ayurveda, etc., which we don't know [...] There is no evidence base that supports their use!”

– Gautam Menon

Guttal questioned the nature of data available to the public and why health communication efforts needed to focus on filling in these missing links.

“But, of course, those are all just the data of infections, recoveries, and that sort of things. But what about data on severity of disease? What about data on reinfections? What about data on vaccinated people – you know, individuals who had vaccines – but were getting infected?”

– Vishwesh Guttal

On the other hand, Menon praised the Indian government's leadership for taking the pandemic seriously and imposing stringent measures like a nationwide lockdown early on.

“I think, one advantage that we had [...] was [that] the leadership, right from the beginning [...] was quite clear about the fact that this is an important disease that we have to deal with seriously. So, public health measures such as masking [and] the lockdown were all part of [their response]”

– Gautam Menon

Kang, Guttal and Menon all congratulated Indian scientists & voluntary scientific organisations for rising up to the challenge of communicating nuanced science, health and risk information around COVID-19.

“I think, independent efforts at communication from scientists have worked better than official efforts at communication”

– Gagandeep Kang

Pathare, Kang and Menon also lauded the efforts of science journalists in contributing to these health communication efforts, keeping track of rapidly-evolving science and ensuring that academics and bureaucrats remained equally accountable.

“I've actually been very impressed by many of the young science journalists and the effort that they are investing in trying to understand the issues in [terms of] what is based on science, what is speculation and to question [them]”

– Gagandeep Kang

COVID-19 Health Communication Efforts by Indian Scientists

Most of the interviewed scientists shared that they had been involved in a wide variety of science communication and public engagement efforts since 2020. For instance, as a virologist and clinical scientist with a long-standing experience of in developing vaccination programs, Kang explained that she had been speaking to as many people as she could handle.

“So, I've been doing pretty much [all kinds of things]. I've been talking to schools; I've been talking to colleges; I've been doing Q&A sessions with members of the community; I've been talking to scientists; I've been talking to TV, to newspapers, to as many people as I can handle.” – **Gagandeep Kang**

Menon stressed on the importance of scientists communicating rapidly evolving updates on the scientific front during a pandemic, especially for people who may not be scientifically trained.

“I've actually been writing – sort of trying to interpret science to general audiences, for a while now, for example through articles in The Wire [...] For COVID-19, I felt it was particularly important, because I wrote my first article about COVID-19 for the public [...] to try and explain what models were and how they worked. And the second was to look at [prediction] models for India, and try and assess them at that point.” – **Gautam Menon**

Some scientists like Ramanujam have been involved in science communication efforts for as long as 1998, and were quick to take on the mantle of health communication during COVID-19.

“I'm an editor of a magazine called Thulir for children. And I have been writing science fiction for a very long time, and [developing] science communication for the public through Tamil Nadu Science Forum. In 1998, a group of us [also] formed a group called Indian Scientists Against Nuclear Weapons [that was engaged in many such efforts].” – **R Ramanujam**

Pathare also highlighted the importance of scientists amplifying relevant messages in addition to their own messaging.

“My team's public health communication has largely revolved around mental health and around suicide prevention. I, at a personal level, also do a little bit of COVID-related public health communication, mostly to amplify messages rather than to come up with my own messages.” – **Soumitra Pathare**

Lastly, Guttal stressed on the importance of contributing to community efforts during a pandemic.

“I discovered a community of scientists that eventually got called ‘Indian Scientists Response to COVID-19, or ISRC. So, I became a part of that. In the initial 2 to 4 months, I was actively involved in the modelling part and communication of the modelling work. I also did some interviews for a popular Kannada podcast.” – **Vishweshha Guttal**

Scientist's Motivations to Engage in COVID-19 Health Communication Efforts

The scientists described various forms for motivations for engaging in these health communication efforts around COVID-19. For instance, Kang felt compelled to contribute to these efforts even when it came at the expense of her own research productivity.

"I realized that there aren't that many credible scientific voices out there. So, anything that I could do to contribute was important. It's actually damaging because I'm not getting my own work done. But, I think it's important!"

– **Gagandeep Kang**

Menon cited the rise of misinformation and eroding public trust as a primary motivation for getting involved.

"I felt this is important because there were all sorts of scary numbers coming out. People didn't know who to trust, who not to trust. So, I thought it would be a good idea to give people an overview of what these models were saying, what you should trust, [and] what should look for in a mathematical model"

– **Gautam Menon**

Guttal particularly sensed a lack of understanding around many COVID-19 related concepts and wanted to help fill these gaps.

"I realized that there were a lot of lacuna in the understanding of COVID and the issues associated with that in the Indian community. So, I thought there has to be something that we as scientists can do"

– **Vishwesh Guttal**

Pathare acknowledged that scientists were just one of the stakeholders within this larger societal dialogue around COVID-19 and ought to put their (scientific) perspectives out there for people to engage with.

"At the end of the day information is like a free market, everyone puts out their bids, puts out their stall, and then the consumers will look at whatever is available and decide to take what they wish to take. So in that sense, we thought right, we should also put out our stall in how we think mental health awareness and messaging should be happening."

– **Soumitra Pathare**

Lastly, Menon also highlighted the need for scientists to better acknowledge their broader societal roles, especially during a pandemic.

"It's good for scientists to be able to understand that their work intersects a larger number of people, and to be able to understand the relationship between the funding they get from the public, and the work that they do."

– **Gautam Menon**

Challenges Faced by Indian Scientists during COVID-19 Health Communication Efforts

Not surprisingly, these scientists also faced several challenges while engaging in public health communication efforts around COVID-19. For instance, Menon described the difficulties of allocating time to these communication efforts during the pandemic.

“To sort of take time away from research that was centred around COVID and devote it to writing something, to putting the work into making something accessible to the public – is a fair amount of work!”
– **Gautam Menon**

Pathare expressed concern about the impacts of mixed messaging by politicians and its after-effects.

“Our politicians or policy-makers often say one thing, but do another thing! And when you get such dissonant messages, people follow your behaviour, [and] not your words!”
– **Soumitra Pathare**

He was also worried about the sustained use of war metaphors in public health communication efforts, and the impact this has on the mental health of people, especially healthcare workers.

“You can’t sustain a ‘war metaphor’ messaging for 14 and 15 months. You know, people will be exhausted!”
– **Soumitra Pathare**

Further, Guttal expressed frustration at the extent of misinformation spreading during the pandemic.

“I’m just amazed that despite many, many, many efforts, the misinformation is so much easier to spread than [correct] information [...] I just don’t know how to resolve this issue!”
– **Vishwesh Guttal**

Kang alluded to the difficulties in dealing with scientific uncertainties, given the rapidly-evolving nature of COVID-19 science, and the need for cultivating and establishing trusted voices within public health communication efforts.

“So, I think the problem with scientists, or proper scientists, is that scientists will always have caveats [...] I think the issue that we have today is not only about communicating the right science, but it’s about building trusted voices that don’t have an agenda!”
– **Gagandeep Kang**

On the other hand, Ramanujam specifically highlighted the lack of communication efforts in regional languages and why this needed to be addressed going forward.

“The country is big [with] so much diversity! The terrible, terrible weakness is not having scientists fluently talking science in Indian languages.”
– **R Ramanujam**

Menon also raised a very pertinent point that was also echoed by the other scientists, regarding the lack of credible efforts for evaluating and measuring the impact of these communication efforts!

“We have no mechanism for measuring impact! Anecdotally, these efforts are having an impact, but to what extent, we still have to know!”
– **Gautam Menon**

Pathare stressed on the need for framing our messages more carefully and not dumbing down science too much.

“The challenge really has been primarily to do with messaging [...] While wanting to simplify things, we have tried to make them simplistic, which carries a huge risk. We do a disservice both to people, as well as to science by doing that, [and] by trying to presume that our consumers are not intelligent enough to be able to understand a slightly more complex kind of formulation.” – Soumitra Pathare

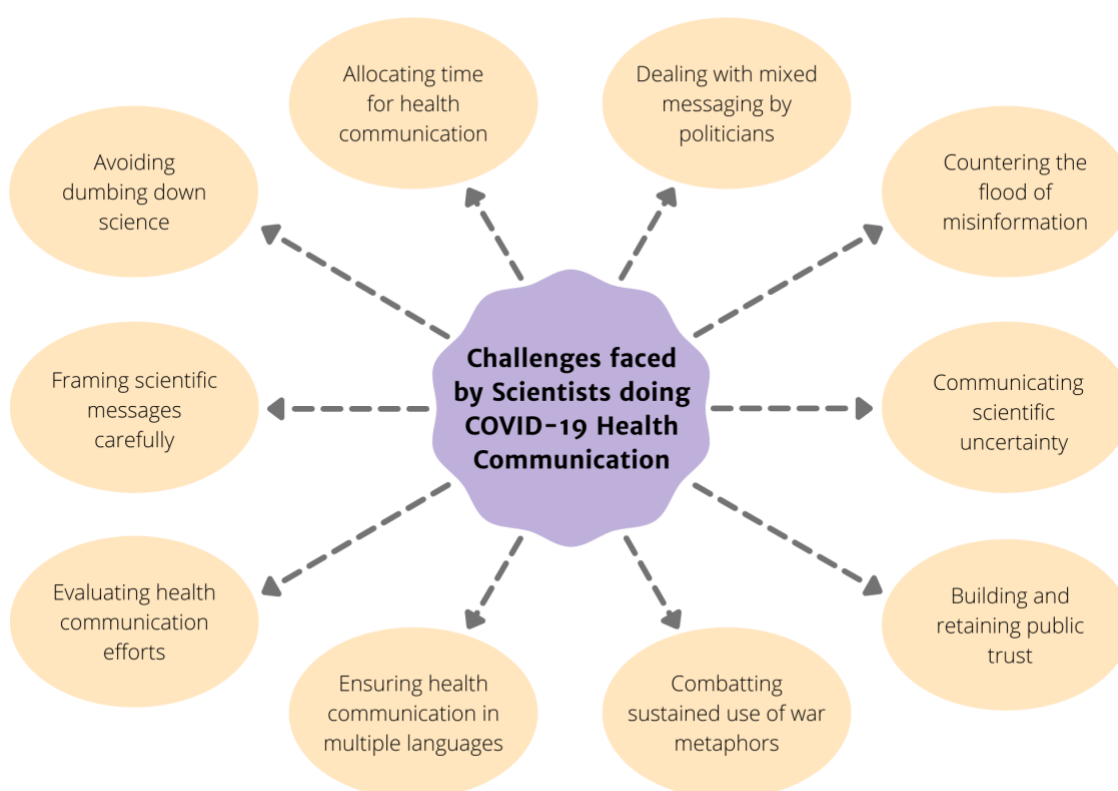


Fig. 1: Summary of challenges faced by Indian scientists while engaging in COVID-19 health communication efforts

Role of Indian Scientists in COVID-19 Health Communication Efforts

The interview also helped shed light on the scope and extent of the roles played by scientists while engaging in public health communication efforts around COVID-19. For instance, both Ramanujam and Menon described the importance for scientists in simplifying jargon and making emerging scientific advances and concepts more accessible.

“Many people appreciated the fact that things that they thought were complicated and abstruse were explained to them in a straightforward way, emphasizing what principles were involved in language that they could understand.”
– **Gautam Menon**

“And we were doing this in 16 languages – we did it in Gujarati, Marathi, Kashmiri, all kinds of languages, Hindi, Tamil, Malayalam.”
– **R Ramanujam**

Kang specifically felt that it was important for scientists to prioritise health communication in such times, and respond to public concerns in real-time.

“I think it's important to respond in real-time - that's why I've been prioritizing communication in and around the pandemic, over communication about the many other things that I also think are important, but not as urgent.”
– **Gagandeep Kang**

Menon felt that scientists played equally important roles in flagging concerns that may not be obvious to other stakeholders, as well as for connecting the dots and making sense of constantly emerging pieces of scientific evidence during a pandemic.

“For example, Soumitra is now a very trusted figure. When he talks about mental health, he is consistent about what he says [...] and he brings these points to the notice of a public that has not thought about it before [...] Gagandeep clarifies many issues connected with vaccines. [She] tries to make [sense of] all of these nuanced discussions and tries to understand what is right to do.”
– **Gautam Menon**

Guttal felt it was important for scientists to exercise caution and only speak on issues they had expertise in.

“I think scientists must be aware of what is their knowledge and what are the limitations of their knowledge – and that they must clearly communicate. And they should [only] speak on the issues that they have expertise on!”
– **Vishweshha Guttal**

Pathare suggested that scientists should take the onus of framing health communication messages themselves, instead of constantly being frustrated at the kinds of sensationalist framings used by the popular media.

“Another option is to actually get in there and start structuring messages the way we would have liked to see the messaging going out.”
– **Soumitra Pathare**

Ramanujam felt scientists had a responsibility to actively engage with different stakeholders like bureaucrats, policymakers, & NGOs in order to contribute towards the state's COVID-response efforts.

“We should be a resource group which provides scientific resources for people's groups [...] And the other thing that we were trying to do was to interact with state governments, where we were invited to several discussions with the [state's COVID] taskforce.”
– **R Ramanujam**

Menon also described the vital need for remaining objective and ensuring that scientists both praise and criticise different aspects of the governments' response, as and when appropriate.

"They have this sort of difficult role of being both critical of the government where it needs to be, but also supportive of the government where it does something good." – **Gautam Menon**

Pathare highlighted the need for connecting with the public using personal examples and stories in one's communication efforts.

"I believe in the power of stories and narratives [...] and pepper a lot of my science communication with stories from my experiences and personal life." – **Soumitra Pathare**

Lastly, Kang exemplified the importance of using a wide diversity of approaches to reach different publics in the spaces and platforms they frequent.

I've been talking to schools & colleges; I've been doing Q&A sessions with members of the community; I've been talking to scientists; I've been talking to TV, to newspapers, to as many people as I can handle. It's a bit overwhelming, but I think it's important. – **Gagandeep Kang**

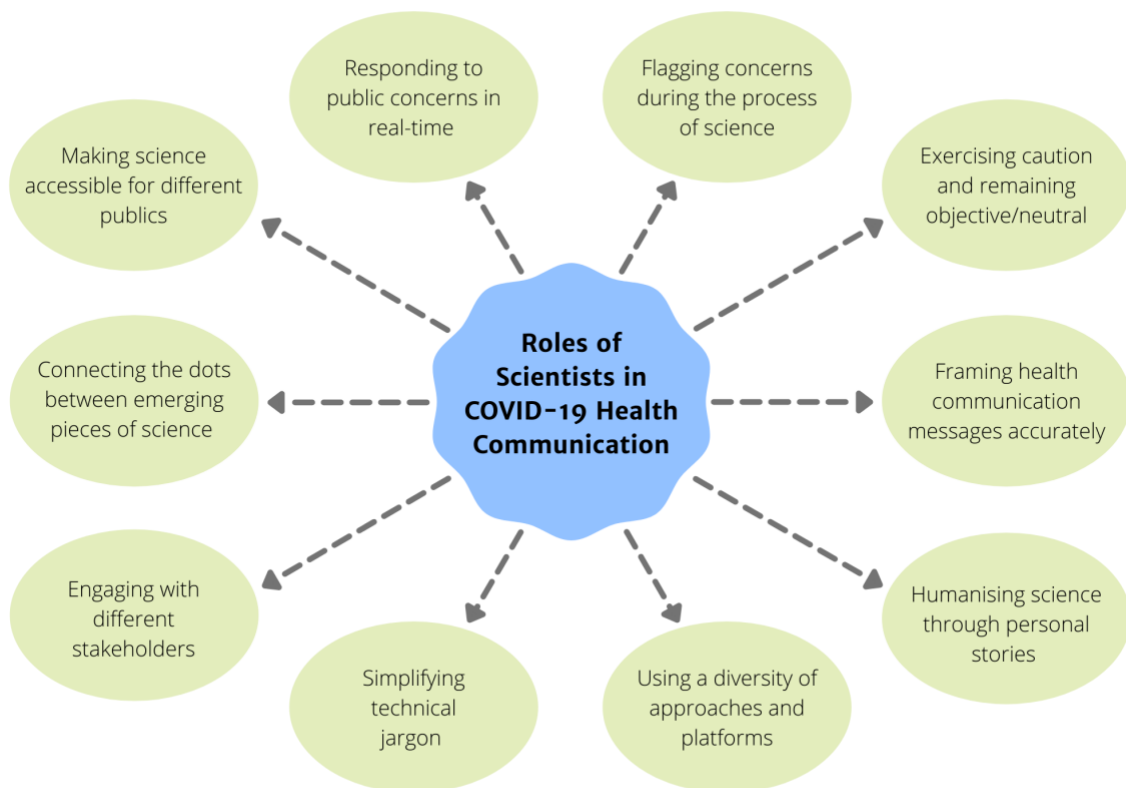


Fig. 2: Summary of specific roles fulfilled by Indian scientists while engaging in COVID-19 health communication efforts

Do we have any 'celebrity Indian scientists'?

Next, it was important to address the question if India really has any 'celebrity scientists', specifically with regards to engaging in COVID19-related health communication efforts? Most of the interviewed scientists felt that there wasn't any such clear candidate for a 'celebrity Indian scientist'.

The closest candidate for such a celebrity scientist would perhaps be Gagandeep Kang, who has emerged as a particularly visible scientist since 2020, given her significant contributions towards developing the Rotavac vaccine, and her recent election as a Fellow of the Royal Society. But, when asked about being a 'celebrity scientist', Kang clearly felt she wasn't one.

"I don't think of myself as a 'celebrity scientist'."

– Gagandeep Kang

Ramanujam agreed that even though Kang was very well known within the scientific community, the average person on the street wouldn't probably know about her.

"I don't think that person on the street would say, 'Gagandeep Kang is saying. So, therefore I must listen to this' – I'm afraid we are very far from this!"

– R Ramanujam

Pathare also felt that no existing scientists in India could fit into the category of a star scientist yet.

"We're not like in that category of 'star scientists'. I don't think anyone in India is!"

– Soumitra Pathare

Menon, on the other hand, questioned the very model of using singular celebrity scientists as vehicles of public health communication and asked if it was the best strategy to employ.

"Is it necessary? My feeling is probably not. I'm not so sure that it should be one person doing it!"

– Gautam Menon

Diversity of Expertise

The next question that this study wanted to address was if collectives of 'visible but not yet celebrity' scientists could prove to be a better model for contributing to COVID-19-related health communication efforts in the Indian context, instead of the 'celebrity scientist' model observed in countries like the USA, South Africa, and Italy.

In this regard, there have been multiple Indian collectives such as ISRC, CovidGyan, IndCovidSOS, and Covid19India that have seen a wide diversity of scientific and non-scientific experts coming together to contribute towards the nation's COVID-19 relief efforts.

But, what were some of the defining features of such collectives of ‘visible scientists’? Did they have any particular benefits or limitations as compared to singular ‘celebrity scientists’? When posed with this question, almost all of the interviewed scientists outlined some benefit of having a diversity of expertise in dialogue with each other publicly.

Both Menon and Ramanujam stressed on the importance of having multidisciplinary insights while designing such health communication efforts.

“So, I find organizations like ISRC particularly interesting, because it's not just scientists – it's scientists, it's communicators, it's visual artists, it's doctors, it's people from a whole range of different areas. And that sort of fertilization has led to something very unique.” – **Gautam Menon**

“And not just scientists. I mean, historians should be talking about the Spanish flu. And social scientists [should be] talking about the economics! We need all of this and more!” – **R Ramanujam**

Pathare stressed on the need for having redundancies built into any system and not relying on a few selective voices for such important public health communication efforts.

“I think it adds value to when you have this diversity because very often people bring out different nuances to everything [...] It's also very good not to have one person as the sole authority, because if they go rogue, then your entire messaging goes rogue.” – **Soumitra Pathare**

Guttal reiterated the strengths of having a diversity of people, expertise and viewpoints in such efforts, especially given the fact that India itself is a country of incredible socio-cultural and ethnic diversity.

“I think that [a] culture of building those teams, [a] culture of having teams with diverse type of people and diverse views [...] should really [be] inculcated [...] because India is very diverse geographically as well.” – **Vishwesh Guttal**

Menon also underlined the role of such diversity in being able to scale up these efforts and produce resources and communication outputs in more than 16 Indian languages.

“ISRC is a completely voluntary activity that has now been sustained for over a year. You have 600 to 700 people involved in this communication activity, doing new things, putting out material in multiple languages, realizing the fundamental importance of telling people, just busting hoaxes.”

– **Gautam Menon**

Discussion

Based on anecdotal observations of health communication efforts around COVID-19 in India, as well as the interviews conducted as part of this study, it was clear that no Indian scientist (including the ones interviewed here) could neatly fit into the category of a ‘celebrity scientist’, comparable to say, Anthony Fauci in the USA or Salim Abdool Karim in South Africa.

The study’s findings did, however, reveal the presence of a wide diversity of ‘visible scientists’ engaged in COVID-19-related health communication efforts since early 2020 in India. Such a diversity of visible scientists publicly in dialogue with each other, along with a unique trajectory and framework of health communication efforts around COVID-19 in India, offer an interesting alternative to the ‘celebrity scientist’ model observed in other countries.

Further, in the true spirit of Indian plurality, a wide diversity of visible expertise engaged in active cross-talk with each other also offers some interesting implications and benefits.

Firstly, having scientists with different forms of expertise and professional experiences collectively engage in scientific discourses around COVID-19 can play an important role in fighting misinformation and fake news. Such public scientific discourses enable a quorum of scientists to collectively refute claims of misinformation, help boost public confidence in science and scientists, and allow for messages to be more easily assimilated by various publics. The *Hoax-busters* created by ISRC is a good example of a group of multidisciplinary scientists coming together to fight misinformation around COVID-19 topics (ISRC, 2020).

Secondly, having an assortment of experts in different fields not only allows for a more holistic communication of science, risk and health-related topics around COVID-19, but also enables various stakeholders to be engaged in meta-discourses about the process of science itself. This becomes possible because individual experts can contribute smaller pieces of knowledge to the larger puzzle of COVID-19 science, while still continuing to question how other pieces of the puzzle are being generated and applied by other experts. This process of collectively solving the puzzle in public provides a great opportunity for engaging publics with the process of science more deeply and do so in real-time while the science is still rapidly evolving.

Lastly, having a multidisciplinary mix of scientists in dialogue with each other as well as with other stakeholders like medical professionals, policymakers, administrators, economists, social scientists and different non-expert publics can be a great catalyst for fostering wider public trust in science. It also helps keep experts working across different domains and levels of COVID-19 response (district, state and national) mutually accountable, and provides more opportunities for concerns from a range of socio-cultural demographics to be taken into consideration. Such a democratisation of ‘science in the making’ is thus, another potential benefit of having a diversity of experts publicly engaged in dialogue with each other.

These observations are, of course, very preliminary and could greatly benefit from more detailed and systematic studies of how such a diversity of expertise operates both within specific Indian contexts as well as more generally. Studies interviewing a much wider diversity of visible scientists in different areas of expertise across the natural sciences, social sciences and humanities could also help shed light on the dynamics of what constitutes expertise and how it interacts with each other in closed spaces as well as publicly within larger socio-cultural domains.

Conclusion

This study provides an exploratory inquiry into the role of visible scientists in India for communicating scientific, risk and health-related information during the COVID-19 pandemic. It describes a range of COVID-19 health communication efforts happening in India, as well as those specifically being undertaken by Indian scientists and collectives of scientists since 2020.

The study elaborates on scientists' internal and external motivations for voluntarily engaging in health communication efforts around COVID-19, and enlists various challenges faced by them in this process. The study also describes several roles fulfilled by scientists while engaging in these health communication efforts, such as making COVID-19 topics more accessible, addressing emerging public concerns in real-time, connecting the dots between evolving COVID-19 science and ensuring such messaging reaches a wider demographic of publics.

The study further concludes that even though India does not have any clear examples of 'celebrity scientists' engaging in COVID-19 health communication efforts, it does have an incredible diversity of 'visible scientists' contributing to such efforts both individually and as part of collectives like ISRC.

The study questions the presence and the need for 'celebrity Indian scientists' for communicating important science, risk and health information to various Indian publics, and instead proposes that a diversity of 'visible scientists' engaged in cross-talk with each other might serve as a better framework for understanding the role of scientists in health communication efforts around COVID-19.

The study lastly reiterates that having such a diversity of expertise in dialogue with each other can have interesting implications for fighting misinformation, building public trust in science, and engaging stakeholders in meta-discourses about the process of science.

Acknowledgements

I would like to sincerely thank Gagandeep Kang, Gautam Menon, Soumitra Pathare, Vishwesh Guttal and R Ramanujam for taking out the time to share their experiences for this study, and for all their valuable inputs while writing this manuscript.

References

- Abu-Akel, A., Spitz, A., & West, R. (2021). The effect of spokesperson attribution on public health message sharing during the COVID-19 pandemic. *PLoS one*, 16(2), e0245100.
- Elsdon-Baker, F. (2009). *The selfish genius: how Richard Dawkins rewrote Darwin's legacy*. Icon Books.
- Fahy, D. (2015). *The new celebrity scientists: Out of the lab and into the limelight*. Rowman & Littlefield.
- Fahy, D. & Lewenstein, B. (2014). Scientists in Popular Culture: The Making of Celebrities. In Bucchi, M. & Trench, B. (Ed.), *Handbook of Public Communication of Science and Technology* (2nd ed.), Routledge. 83-96.

Giberson, K., & Artigas, M. (2007). *Oracles of science: Celebrity scientists versus God and religion*. Oxford University Press on Demand.

Goodell, R. (1977). *The Visible Scientists*. Boston, MA: Little, Brown and Company.

Goodell, R. (1985). Problems with the press: Who's responsible?. *BioScience*, 35(3), 151-157.

ISRC. (2020). *Indian Scientists' Response to COVID-19 website*. <http://indscicov.in>

Johnson, D. R., Ecklund, E. H., Di, D., & Matthews, K. R. (2018). Responding to Richard: Celebrity and (mis)representation of science. *Public Understanding of Science*, 27(5), 535-549.

Joubert, M. (2020). 'From top scientist to science media star during COVID-19 — South Africa's Salim Abdool Karim'. *South African Journal of Science* 116 (7/8), 8450.

Scheitle, C. P., & Ecklund, E. H. (2017). The influence of science popularisers on the public's view of religion and science: An experimental assessment. *Public Understanding of Science*, 26(1), 25-39.