Analysing issues of medical communication during the COVID-19 outbreak

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Abstract
The COVID-19 outbreak has created new opportunities for serious reflection on the connotations of and interrelationships among the elements of medical communication, including communication content, communicators, communication channels, communication audience and communication effects. There are four types of medical communicators: medical workers, medical researchers, public health workers and medical humanities scholars. Online media have provided the main channel for medical communication. The effectiveness of medical communication is premised on the authenticity and reliability of the content. The uncertainty of information on COVID-19 medical risks and the status of communication of such information will affect the results of medical communication. Information overload will also weaken the effectiveness of medical communication.

Keywords
COVID-19, medical communication, medical humanities, information epidemic

1. Introduction
The prevention and control of COVID-19 is an urgent systemic project. Committed to the principle of putting people’s lives first, the Chinese government has launched a nationwide campaign to contain the spread of the disease; Chinese researchers identified the genome sequence and transmission features of the novel coronavirus in a short time span; Chinese medical workers developed appropriate diagnostic and treatment plans; and Chinese residents in both urban and rural areas have actively cooperated with pandemic control guidelines by observing protective measures and nucleic acid testing requirements. China and many other countries have accumulated valuable experience in fighting the disease, such as building makeshift hospitals, conducting large-scale nucleic acid testing, locking down infected areas as appropriate and maintaining social distancing.

That said, there is another experience that is easily missed—health communication. Finset et al. (2020) asserted that health communication plays a critical role in saving the lives of COVID-19 patients. A number of valuable health science papers (both popular and academic) on COVID-19 have been

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published in scientific journals (Zhu, 2020). However, the importance of such health communication efforts in the prevention and control of the pandemic is not yet fully recognized by the medical community and the public. This may have to do with the fact that health communication covers a wide range of areas and therefore cannot be precisely defined. In this paper, the concept of 'medical communication', which has a relatively clear boundary, is the subject of study. The paper focuses on examining the interrelationships, characteristics and problems of the elements of medical communication during the COVID-19 outbreak, thus contributing to the development of the emerging science of medical communication.

2. The elements of medical communication

Medical communication is the process of transforming medical knowledge and ideas into popular knowledge or acceptable ideas that are easily understood by the public. A complete medical communication process consists of five elements: communication content, communicators, communication channels, communication targets (audience) and communication effects. If we see these as elements of communication, there is no particular order among them; they are in parallel and equally important, and none can be separated from the others. However, if we see them as links in the communication process, there is a sequence or causal connection between the five elements. Without communication content, there will be no communication channels or communication subjects and audiences, and the effects of communication will be non-existent. On the other hand, without the subjects of communication, there will be no one to initiate the content, and the other three elements cannot play their role either. Therefore, the communicators and the content of communication should be prioritized and interconnected. Even if there is a communicator, the effect of communication will be greatly reduced in the absence of proper content, and vice versa.

The exploratory analysis above is not enough to explain the intrinsic connections among the elements of medical communication. A specific context is therefore needed to truly digest these interrelationships. For example, on 20 January 2020, medical expert Zhong Nanshan gave an interview with CCTV host Bai Yansong. In this case, the channel of communication was CCTV, a mainstream media outlet in China; the subject of communication was Zhong Nanshan; and the target of communication was hundreds of millions of TV viewers and netizens (including the public, experts, policy makers and others). During the interview, Zhong offered the view that human-to-human transmission of the novel coronavirus definitely exists and explained the reasons for this inference, which was the main content of communication.

A collection of audiotape, text and video information presented on CCTV constitutes the specific content of this medical communication practice. Unlike the popularization of general health knowledge, the core content of medical communication here is not the interpretation of existing medical knowledge, but a new scientific judgement of ‘human-to-human transmission’ and the explanations that support such a judgement. How effective is the medical communication process that includes new medical knowledge? Although the strict traffic-control measures in Wuhan on 23 January 2020 were the result of a combination of factors, the inference about human-to-human transmission made by Zhong, head of the high-level expert group of the National Health Commission, clearly played a big role. After being played on CCTV, this simple but powerful statement had a great impact on the public, making more people aware of the possibility of a large-scale outbreak of the disease and the need for personal protection.

3. Classification of medical communication content

3.1 Classification of medical communication content based on known and unknown knowledge

Generally, the content of medical communication can be divided into two categories: one is the popularization of existing medical knowledge, and the other is the dissemination of the latest medical research results. First, the purpose of popularizing existing medical knowledge is to encourage the public to learn, understand and use that knowledge. For example, to prevent the spread of infectious diseases, medical workers can
teach the public how to wash their hands and wear masks properly by giving in-person guidance, producing brochures and making health education videos. The security guards or staff at residential communities, shopping malls and bus stations can help the elderly scan QR codes with their HealthKit app to identify suspected COVID-positive cases. Through various forms of medical communication, general medical knowledge, methods and procedures for controlling infectious diseases could be disseminated quickly and efficiently.

Second, the purpose of disseminating the latest results of medical research is to promote public awareness and apply what has been learned. During an outbreak, policymakers, health professionals and the public are eager for new medical knowledge that can answer their questions and correct misunderstandings. In January 2020, the National Health Commission started to issue the Diagnosis and Treatment Protocol for Novel Coronavirus Pneumonia (Trial Version) to local health commissions. The protocol, which had been updated seven times as of 4 March 2020, is a powerful guide for clinical diagnosis and treatment.

Finally, known and unknown medical information are interchangeable. In just two months, the COVID-19 diagnosis and treatment protocol had undergone six major revisions. This indicates that knowledge about the virus was incomplete at the beginning of the outbreak. However, through a process of trial and error, experts managed to retain what had proven effective, and the seventh edition of the document became a source of relatively stable medical knowledge. Subsequently, China’s COVID-19 diagnosis and treatment protocol was translated and communicated in different languages, which can be viewed as the international promotion and popularization of existing medical knowledge. The popularization of existing information and the dissemination of new knowledge are a dynamic transformation process, and new medical knowledge will become existing knowledge when it is gradually adopted by the public.

### 3.2 Classification of medical communication content based on the types of knowledge

According to the nature of medical disciplines, the content of medical communication can be divided into two categories: biomedical communication and medical humanities communication. The content of medical communication in clinical medicine, basic medicine, preventive medicine/public health, nursing and other fields is quite different. During conversations between surgeons and patients and their families before heart bypass surgery, the chief surgeon will use illustrations and even 3D animations on a computer to help the patients and their families understand the three-dimensional structure of the human heart, the principles of bypass surgery, intraoperative risks and postoperative quality of life. Such preoperative conversations are a living example of the communication of medical knowledge and concepts. In addition, considering that medicine is the organic unity of science, technology and the humanities, medical knowledge includes not only biomedical information, but also medical humanistic knowledge. The content of medical communication is illustrated in Table 1. The significance of classifying medical knowledge according to its content is that, by using this approach, the subjects and audience of communication are clear.

The dissemination of medical humanistic knowledge and concepts is not only an important element, but also the soul or essence of medical communication. During the COVID-19 outbreak, humanistic knowledge, spirit and concepts have been widely used in public health, in the development of new vaccines and drugs, and in clinical diagnoses and nursing practices. By writing blogs and posting articles on social media, some medical experts are not only spreading medical knowledge but also sharing their thoughts about life and giving care and counselling to patients, all of which are deeply shaped by medical humanistic ideas.

That said, the dissemination of medical humanistic content also faces serious challenges. Medical humanities involve topics of socio-culture, ethics and risks, and the effect of communication may vary across audiences, as people have different opinions, interpretations and feelings. For example, during the early stage of the outbreak, both Italy and Germany faced an ethical dilemma: Which acute COVID-19 patient should be treated first? The primary criterion established by the Italian medical community was the patient’s age, while the German medical community prioritized the
likelihood of survival. Medical communication on the question of ‘Who should be saved first?’ is very necessary but also tricky. In my view, when faced with ethical dilemmas, such as the fair distribution of scarce medical resources, the purpose of medical communication is not necessarily to find a right answer that satisfies all parties but to present the dilemmas and helplessness faced by medical staff, hospital administrators, patients and their families, and the public, thus inspiring public discussion and building public consensus on the criteria for fair distribution. This is the kind of medical humanities communication that is needed to produce society-wide impacts.

It is important to note that medical humanities communication should not be isolated from medicine itself or reduced to empty talk. For example, behind the ethical controversy over the criteria for who should be saved first, it is factors such as survival rate, life expectancy, postoperative quality of life and the condition of medical equipment in the ICU that really matter. Ethical issues are yet another important link in the decision-making process of clinical medicine (Zhang, 2020). Therefore, humanistic communication can only become more vital with the participation of clinicians based on medical principles.

4. The subjects and audience of medical communication and its forms

4.1 Four main types of medical communicators

Compared with health science popularization, the content of medical communication is more professional, and the threshold for the subjects of communication is higher. Not all health science communication practitioners can be called subjects of medical communication. There are four main types of medical communication subjects: medical workers, medical researchers, public health/preventive medical workers and medical humanities scholars. During the COVID-19 outbreak, all four types of medical experts were involved in medical communication. Some medical workers on the front lines of the battle against the disease gave interviews to the mainstream media or participated in press conferences held by the State Council’s
inter-agency COVID-19 response mechanism. If you search for ‘COVID-19’ and the names of famous medical experts on Baidu, you can find a lot of information given by these experts. They either gave interviews on TV or allowed journalists to write articles based on the transcripts of the interviews. There are also many medical experts who wrote popular science articles during the pandemic, many of which have gone viral on the internet.

4.2 The medical communication audience: Members of the public and health professionals

In most cases, members of the public are the audience of medical communication. For example, in Wuhan Tongji Hospital and Union Hospital, which are designated to treat patients with acute COVID-19 symptoms, medical experts need to carefully explain the pros and cons of various therapeutics and obtain the informed consent of the patients and their families. During this process, most patients and their families cannot fully understand technicalities such as the risks of medical intervention, surgical success rates, quality of life and expected survival time. Patients with different educational backgrounds, professions and disease experiences may have different perceptions, attitudes and reactions towards the information on medical risks that is communicated by the same medical expert. For this reason, it is important for communicators to accurately deliver information required by the audience and improve the scientific and health literacy of patients, their families and the public. For example, on its special COVID-19 website, the Korean Centers for Disease Control and Prevention has set up a message board on science popularization and a section on ‘target-specific information’ services. Health professionals can use the website to provide scientific information or answers to the public, verify the authenticity of information to offset the impact of rumours, and thus improve communication between the public and the government.

Under specific circumstances, the target audience of medical communication also includes medical workers, public health workers, hospital administrators and other health professionals. For example, the article titled ‘Selection and use of protective clothing in COVID-19 response’ (Li et al., 2020), although published in the academic medical journal Chinese Journal of Infection Control, is a popular science article with health professionals as its target of communication. During the outbreak, medical professionals needed to read many articles on this topic to quickly gain medical knowledge about the prevention and control of infectious diseases. The consensus among the experts on COVID-19 containment and their interpretations of the consensus can also be seen as a kind of peer communication. For example, the Expert Consensus on Nursing Ethics for Prevention and Control of Major Infectious Diseases and the Expert Consensus on Ethical Review of Clinical Research on Emerging Infectious Diseases, to which I contributed, include both the ethical guidelines for nursing and the ethical norms for clinical research. These expert agreements and experts’ interpretations of the agreements were published in academic journals and on the official websites of medical societies, and disseminated among medical peers, so nursing staff and medical researchers thus became the targets of medical communication. The precise dissemination of medical knowledge, concepts and operational practices helps to rapidly promote standardized services, develop interdisciplinary cooperation, build consensus and improve the efficiency of the treatment of COVID-19 patients (Griffin et al., 2020).

4.3 Diverse forms of medical communication

There are diverse forms of medical communication, including short videos, ‘battlefield’ diaries, media interviews, official press conferences, lectures and research news. TV programmes that feature doctor–patient dialogues and personal accounts, as well as public accounts on Weibo and WeChat, have all been widely used. For example, members of the medical team sent by Peking Union Medical College Hospital to Wuhan recorded how they treated COVID-19 patients in the form of ‘battlefield’ diaries, which received extensive public attention. Medical bloggers also play an important role in medical communication. They publish high-quality original content in a storytelling mode, which is effective in conveying the message. Social media provide a brand-new channel for medical
communication, and the inherent advantages and features of this new channel also have an automatic filtering effect on the content of medical communication. Medical experts who are able to adapt can benefit greatly from social media communication. Some online medical platforms have provided online consultations for patients during the pandemic, and many doctors have gained popularity by posting new insights on COVID-19 and answering patients’ questions on their personal homepages. Medical communication on social media is open to the public, patients and medical professionals and does not set a high threshold for understanding the information. Even patients can share their stories of fighting the disease through interpersonal and media communication. This has allowed them to process their experiences, confirm their emotions and switch their role from being a ‘bearer of disease’ to being a ‘medical communicator’ (Fisher, 2014). The new media environment has a significant impact on the sources and methods of health communication. Likewise, the outpatient clinics, wards, doctors’ offices and patient waiting areas of medical institutions all provide venues for doctor–patient communication and real-time discussion of knowledge and ideas.

5. The factors affecting the effectiveness of medical communication

5.1 Authenticity and reliability of the communication content

Medicine is an evidence-based science. Both clinical treatment activities and medical research need to be based on facts. Similarly, medical communication is also a serious task. Although academicians and experts, such as Zhong Nanshan, Li Lanjuan and Wang Chen, have different linguistic styles, they can all deliver accurate, objective and timely medical information and clear analysis and judgements to the public. Their remarks and opinions are well grounded in facts, and their attitudes are sincere. This has increased public trust in experts. The diversity of the subjects and forms of communication should not come at the expense of the science and the accuracy of the content being communicated. Otherwise, no matter how novel and eye-catching the form of communication is, it will still be difficult to achieve a sound communication effect that lasts. Imagine this: if medical communicators spread content that deviates from the scientific track and issue statements proved to be wrong, they will destroy their own reputations and lose the trust of the audience; ultimately, medical communication will also be deprived of its discursive power.

5.2 The uncertainty of information on COVID-19 medical risks and the status of communication

The communication of information on medical risks is a difficult medical ethics issue. When admitting patients with acute and severe COVID-19 symptoms, clinical staff are often asked questions such as: What are the chances of survival of the patient after the rescue and treatment? How good is the quality of life after surgery? Will there be serious after-effects? For these basic questions on the health and lives of patients, even a medical expert would find it difficult to give an accurate answer on site. Only a medical expert with extensive clinical experience and proper communication skills is able to provide a prompt and effective explanation of these difficult issues of medical risks.

Ofirin et al. (2020) emphasized that, due to factors such as medical risk information systems, mass communication, community involvement, risk behaviours and disinformation, the ability to communicate health risks varies from country to country. It is important to note that the communication of well-organized medical risk information will guide patients and their families to face COVID-19 with a positive mind-set, promote a shift in their attitudes and behaviour, help them better understand the uncertainties in medicine, and reduce social panic and discrimination. Moorhead et al. (2013) conducted a quantitative analysis of 98 papers on related topics from nine international journal databases (2002–2012) and concluded that mutual understanding, access to medical information, timely sharing of information, messages through social media communication, and peer, social and emotional support are conducive to the organization of public health testing and to the implementation of infectious
disease containment protocols and policies. For this reason, medical experts need to deeply understand the methods and mechanisms of medical communication and develop flexible medical communication strategies (Back et al., 2020; Ratzan et al., 2020).

5.3 Information overload
At the beginning of the COVID-19 outbreak, there was no information about the pandemic. Later, more information became available. With the spread of the virus and rising public demand for medical knowledge, there was an explosive growth in the amount of available medical information, such as therapeutic guidelines, containment policies, information on clinical practices, hygiene requirements (such as wearing masks and washing hands) and social distancing rules (Poonia and Rajasekaran, 2020). As COVID-19 has become a pandemic, people around the world can access all types of medical information related to the outbreak through the internet. Netizens participate in online discussions based on their medical knowledge and spread information through social media; medical communicators are no longer just following the guidance of medical experts and health professionals but are also turning into online opinion leaders, which has accelerated the medicalization of the discourse in social life. Scientific communication is no longer limited to discussions within the medical profession and the resolution of various clinical issues but is now blended with knowledge from other professions and disciplines. The blurred boundaries between medicine, health and diseases make it difficult for the public to distinguish right from wrong. Disinformation, conspiracy theories, miracle cures and racist comments are spreading at an alarming rate on the internet.

On 15 February 2020, World Health Organization Director-General Dr Tedros Ghebreyesus said that we are not just fighting an epidemic; we are fighting an infodemic. Fake news spreads even faster than the virus. Members of the public who have no medical education cannot judge the reliability of the massive amount of medical information on the internet. As part of the emergency plans for major public health events, medical communication can enhance the public’s preparedness and increase their trust in medicine and containment measures (Jung, 2014). Disinformation misleads the public and aggravates panic, psychological stress and discrimination. One of the reasons for the abundance of disinformation on the internet is the information asymmetry caused by the gap in access to content. Social media sites such as Facebook, Twitter and YouTube are filled with rumours and fake news. Vitamin C became a high-frequency search subject on the websites of major retailers such as Amazon only because it was falsely reported as a cure for the novel coronavirus (Rathore and Farooq, 2020). Once misinformation is posted online, it can spread quickly and mislead the public. Even cutting off the source of misinformation is difficult and might not stop its spread. It is therefore imperative to ensure the authenticity of information at the source and reduce the overload of medical information.

6. Opportunities and challenges to medical communication created by COVID-19
In research on health communication theories, Wang et al. (2019) published a book titled Medical Communication: From Theoretical Models to Practical Exploration, which defined the elements of medical science communication based on the ‘5W’ model of communication. The authors proposed the model of contextual participation under a multiple-knowledge structure and established the differences and connections between medical communication and health science and health communication.

In the area of education and teaching, Wang Shuangmiao of Guangdong Medical University introduced an optional course titled ‘Medical Communication’, the first of its kind in the country, in 2017. Two years later, the School of Medicine of Shanghai Jiaotong University also introduced this course. The COVID-19 outbreak has accelerated the development of medical communication and raised a series of questions for the medical communication discipline that require both theoretical reflection and practical solutions. In addition, it will also serve as a touchstone for this emerging discipline.

I think that, at the initial stage of the development of the medical communication discipline, it is necessary to conduct a comprehensive and systematic examination of the connotations, interrelationships
and influencing factors of the five elements of medical communication. Medical communication involves multiple subjects and forms. How to effectively mobilize the participation of medical experts in high-quality medical communication is the key to solving the problem. With top-level medical experts providing high-quality content and delivering the message to the audience through various communication channels, medical communication will produce effective results. Industry associations could coordinate the efforts in setting up studios for medical science popularization to provide professional support for medical experts and create a platform for deeper integration with the media. We could also study the communication style of key opinion leaders from the medical profession, such as Zhang Wenhong, and gauge the public’s demand for and feelings about medical information. Considering the uncertainty and ambiguity of new medical knowledge, the limitations of medical instruments and the ethical controversies of the medical humanities, medical experts should be given some room for error in conducting medical communication. On the other hand, they should deliver medical information truthfully and avoid downplaying the limitations, uncertainties and possibilities for errors in medical science. The public should also improve their scientific and medical literacy and actively participate in healthy interactions with medical communicators.

Acknowledgements
I would like to thank Director Wang Ting of the Chinese Research Institute for Science Popularization, Professor Zhang Zengyi of the School of Humanities at the University of Chinese Academy of Sciences and Research Fellow Wang Shuangmiao of Guangdong Medical University for their guidance throughout my study.

Declaration of conflicting interests
The author declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Funding
The author received no financial support for the research, authorship and/or publication of this article.

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