Risk Communication and Community Engagement during COVID-19

Abstract

In today's information age, both excess and lack of information can cause a disaster. COVID-19 pandemic not only highlighted the significance of risk communication but also pointed out several unintended and distressing consequences due to information gaps and miscommunications. Despite facing a common threat, the local communities suffered differential impacts during the pandemic. This paper classifies the nature of risk communications experienced across different countries into three categories, namely: inadequate, ideal, and infodemic risk communication that influenced the local perceptions and responses. It further argues that inadequately planned risk communications tend to create new risks and compromise the efforts towards managing a disaster. As global risks are responded locally, there is a need for more inclusive and engaging risk communication that involves communities as responsible stakeholders who understand, plan, and respond to risks to increase their propensity for resilience during disasters and crisis situations.

Keywords

I. Introduction

COVID-19, the novel coronavirus disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV2), not only challenged how people think about a disaster but also exposed unaddressed intertwined risks in the globalized world (Alhazzani et al., 2020). As of 20th October 2021, the unprecedented disaster has infected nearly 242,348,657 people, with 4,927,723 casualties across 224 countries and territories (WHO, 2021a). The pandemic led to an outcry for accurate risk communication and an unparalleled flow of information and messages communicating risks worldwide, thereby generated diverse risk perceptions and responses to the disaster (Sholts, 2020). This paper evaluates risk communication and community engagement in both theory and practice aspects by drawing upon the examples and experiences of COVID-19 in 2020 and 2021.

The paper discusses various risk communications and responses in an international context considering the realistic constraints and opportunities. Risk communication here is used as an overarching concept that includes various communications pertaining to disaster risks including but not limited to risk assessment, warnings, forecasts, risk awareness, and crisis communication (Khan and Mishra, in press). It provides a comprehensive desktop review of various sources and literature, including websites and online newspapers covering risks and responses to COVID-19. The location of authors in different parts of the world helped to verify and provide the local perspectives from countries in Asia, Africa, and Europe. As the paper is written under an ongoing disaster situation, the assessment represents the situation till October 2021. It provides a brief background of risk communication in public health emergencies and disasters in theory followed by specific

characteristics of risk communication during COVID-19. Further, it explores common gaps pertaining to the involvement of communities in risk communication, and evaluates findings in the discussions section. It concludes with recommendations and future research.

II. Communities in Public Health Emergencies and Disaster Risk Communications

The term communication finds its root in the Latin word 'communis' that also means common or public, which evolved to become 'communicare', i.e. to share, and finally to 'communication' in the early 15th century (Online Etymology Dictionary, 2020). It indicates that both community and sharing rest at the heart of communication. When it comes to risk communication, the meaning of the term has changed in both understanding and implementation.

Risk communication is an interactive process of exchanging information about and beyond risk among individuals, groups, and institutions (National Research Council, 1989). It is not only limited to providing information about risks in the form of messages or opinions expressing concerns and reactions, but it also includes actionable information for how to prepare, protect, respond, and recover from the risk (Meredith et al., 2008). It is critical because it allows people to make informed decisions and influences public perception and response to varied risks (Shaw et al., 2013; WHO, 2021d). Risk communication notably plays a central role in the risk management cycle, where it is necessary to identify a hazard, conduct risk analysis, and develop, implement, and evaluate policies (Infanti et al., 2013). Besides, if not managed well, it also carries the potential to induce severe consequences due to misunderstanding of associated uncertainty by different stakeholders (Khan and Kelman, 2012, Dawson and Johnson, 2014).

Risk communication is also considered a two-way process wherein information is exchanged back and forth to close the gap between expert and lay assessment (Cronin, 2007; WHO, 2021d). However, studies have recurrently pointed out the intermittent application and inefficiencies of top-down communication applied for disaster preparedness and responses (Paton et al., 2005; Bürgelt et al., 2009). In theory, various models of risk communication have been proposed, e.g., mental model (Atman et al., 1994), value model (Finucane, 2006), evaluation framework (Dickman, et al., 2015), IDEA model (Sellnow-Richmond et al., 2018), along with various other models at the individual-psychological and organizational level for mitigation, preparedness, response and recovery (Sheppard et al., 2012). Despite the availability of various models, their applications are found limited during an emergency or disaster response (Boase et al., 2017). Most discussions around risk communications in disasters tend to focus on using communication tools to manage information flow, build awareness, generate a warning and govern response by following a top-down approach (Mackie, 2009, 2013; Sharma and Patt, 2011; Netten and van Someren, 2011). It has also shaped the use of information and communication technologies (ICTs) to design and enhance the effectiveness of risk communication (Albano et al., 2015; Charrière and Bogaard, 2016; Verrucci et al., 2016; Lohiniva et al., 2020).

Recent studies, however, point towards the role of human subjectivities, such as trust, past experiences, heuristics, socio-cultural context, scale or complexities for their influences on risk communications (Löfstedt, 2003; Alaszewski, 2005; Khan et al., 2017; Lin et al., 2020). Meredith et al. (2008) noted a critical gap in communicating risks with vulnerable populations such as children, senior citizens, and pregnant women in emergencies. Eisenman et al. (2007) emphasized that the involvement of the vulnerable communities in devising and pretesting risk communication can help to create effective crisis messages that are consistent, timely, actionable, and empathic to communities in the complex situation, and are more likely to get a positive response from the public. However, expanding risk communication to cover the wide spectrum of the population would require an understanding that there is no "public" in the crisis, but all are stakeholders (Sandman, 2003).

Public involvement, on the other hand, is frequently limited in disasters due to the traditional push strategy applied in the process that is found to be insufficient in generating an ideal response and, in turn, cause reduced trust in the organizations communicating risks (Mehta et al., 2017; Gray et al., 2011). The problem has been further aggravated with the emergence of ICTs that play a pivotal role in disseminating and spreading information about potential risks (Martins and Spink, 2015). Gamhewage (2014) notes three major shifts in the risk communication of the 21st century:

1. *Decreasing trust in experts and authorities* surrounded by the issues of real and perceived trust;

2. *Change in the mode of seeking public advice* from direct contact or public warning to online sources and social networks;

3. 24-hour *journalism* favours citizens' participation that beats limited experts and resources that impact opinions compared to evidence-based risk communication.

The increasing role of ICTs might achieve efficiency in information flow. However, new challenges accompanying innovation have arisen to even complicate the communication processes in emergencies. These emerging risks include amplifying the voice of elites and their social power, content filtering, and manipulating information (Marolla, 2019). The role of the community and the form of their engagement in risk communication have turned out to be significant in the era of "Fake News" and the description of a "post-truth" society (Iyenger and Massey, 2019). The widespread existence of misinformation and myths around science has led to a need for efforts towards retracting, correcting, and debiasing by the public campaigns as well as social media (Lewandowsky et al., 2012; Caufield, April 27, 2020). However, the cause of misinformation is not just limited to the people expressing their thoughts on social media but also includes the communication of uncertainty by experts or scientific organizations (Otway et al., 1988; Veland and Aven, 2013; Caufield, 2020). While an increasing number of stakeholders modify the risk perception and communication, the exclusion of the public in the formal risk communication tends to manifest as a gap reflected in the misinformation or infodemic (Haas, 2020). Lipshitz et al. (2006) argued that there is a need to understand an individual's dynamic reality of the world as influenced by communication. This need is rather an essential gap when the formal participation of the public in risk communication is limited along with the understanding of processes influencing the risks at the local level.

The following section collates the observations, challenges, and interpretations of COVID-19 risk communications and their impacts on the ground.

III. Risk Communications and Impact on Communities during COVID-19

Cheng et al. (2007) not only indicated the risk but also emphasized the need to prepare for the re-emergence of SARS and novel coronaviruses. Numerous government authorities also prepared documents for such events, for example, National Strategy for Pandemic Influenza in the USA or National Disaster Management Guidelines for Biological Disasters in India (Homeland Security Council 2005, NDMA 2008). However, the local responses to COVID-19 exposed inadequacies of preparedness measures to address the pandemic.

The disease appeared in China in December 2019, but no death was officially acknowledged by the World Health Organisation (WHO). The first death was reported on the 9th of January 2020 (Qin and Hernández, 2020). The country sent an official confirmation to WHO regarding novel coronavirus and human-to-human transmission on the 20th of January, 2020 (The Quint, 2020). WHO declared the outbreak a 'Public Health Emergency' of international concern on the 30th of January 2020, and on the 11th of February 2020, it is named as COVID-19 (WHO, 2020c). Three weeks after informing the WHO about the health emergency in Wuhan City, the government of China put 11 million people in the city on lockdown, followed by the lockdown of other cities in the province (Anner, 2020). Even though it was a clear warning sign combined with the declaration of a pandemic by WHO, the environment of confusion around timely responses prevailed across the world. While the number of

infections and deaths continuously increased, the process of countries adopting measures such as localized or national recommendations or lockdown was found to be ad-hoc and irregular (Dunford et al., 2020).

The data shows that countries that took early measures benefited more in controlling disease transmission. For example, following the initial speculation of unknown pneumonia cases in Wuhan, on the 31st of December 2019, Taiwan started implementing onboard checking of all passengers on direct flights from Wuhan for fever and pneumonia symptoms (Wang et al., 2000). By 20th January 2020, Taiwan Central Epidemic Command Center (CECC) had implemented at least 124 action items, including border control, case identification, quarantine of suspicious cases, proactive case finding, education of the public while fighting misinformation, formulation of policies toward schools and child care services (Wang et al., 2020). On the other hand, in many other countries like Indonesia, under-reporting of the number of total infected cases was observed during this time (Djalante, 2020). Internationally, much of the risk communication remained focused on controlling the disease transmission, with guidelines for testing general people for symptoms. In the early stage, the WHO guidelines were found to be generic and non-specific, focusing on the management of symptoms and advice to be cautious with patients with co-morbidities or pregnancy (Tobaiqy et al., 2020). In the absence of any vaccination, both doctors and the public remained confused about how to save lives. In such a situation, rumors and misinformation spread widely through different communication channels.

On 7th March 2021, after a global milestone of 100,000 confirmed cases globally, WHO released the statement that called every country, leader, and community "to stop, contain, control, delay and reduce the impact of this virus at every opportunity" (WHO, March 7, 2020). On 11th March 2021, WHO released a call for urgent actions by every country that led to a significant surge in the number of countries choosing to adopt localized or nationalized lockdowns (WHO, January 29, 2021; Dunford et al., 2020). The WHO also released the guidelines for strategic preparedness and responses to manage COVID-19. It asked countries to do a risk assessment and prepare for a surge in testing and clinical care, to reduce transmission and impacts (WHO, March 21, 2020). It was followed by the launch of the appeal for a Global Humanitarian Response Plan. WHO asked countries to support it financially and politically to contain the spread of the virus (WHO March 25, 2020).

While ICTs played a critical role in communicating the risk of COVID-19, it also became a source of rampant and recurrent risk of misinformation and miscommunication. The flooding of information and messages occurred through various online platforms and news channels along with social media and personal messaging on smartphones. Several Facebook and WhatsApp messages and videos sharing information and conspiracy theories reached thousands of people unchecked, and a rapid circulation of misleading information became a cause of concern (Phillip, March 13, 2020; Charlton, 2020). On 31st March 2020, WHO issued a 'Medical Product Alert' warning consumers, health care professionals, and authorities for faulty products claiming a cure for COVID-19 (WHO, 29 January 2021). The extraordinary quantity and impact of the unofficial communications were later described as an 'infodemic' by the Director-General of WHO, when he expressed his concerns by saying, "We're not just fighting an epidemic; we're fighting an infodemic" (United Nations, 2020a). It also led to the emergence of the first conference of infodemiology by the WHO on 29 June 2020 (WHO, January 29, 2021).

The infodemic was, however, not just an information management issue but can also be seen as the failures of risk communication in addressing various factors of vulnerability at the local and global levels. In the study conducted by Wong et al. (2021), it was identified that adults over 60 showed anxiety symptoms due to contradictory information found on social media. Table-1 highlights some of the unintended consequences related to unplanned or inadequate risk communications either directly or indirectly. While it was challenging to cover all impacts worldwide, some of the typical impacts noted across different countries are highlighted in the Table 1. As Gottlieb and Dyer (2020) highlighted, there is a need to assign third parties to verify social media outlets.

Table 1: Risk communication in different phases of COVID-19 and impact on local communities

Phase*	Risk Communication	Local community impacts (countries)**
First wave (February 2020 – Feb 2021)	**Administrative information flow:** Top-down **Focus:** Disease transmission control **Measures:** Lockdown, social-distancing, quarantine centres, hospitalization **Level of control:** High **Uncertainty:** High	**Poisoning (India, Iran, Nigeria, USA):** Drinking industrial alcohol to cure coronavirus led to 480 deaths and 1000 sick; chloroquine poisoning. **Mass migration (Bangladesh, Cambodia, India, Vietnam):** A sudden lockdown led to unemployment that generated reverse migration of migrant laborers. **Running away from Quarantine Centre (Bangladesh, India, Nigeria):** Both educated and uneducated populations chose to run away, causing the further spread of the virus. **Suicides (India, Germany, France, Nigeria, Bangladesh)**: Hopelessness, despair, and increase in psychological impacts resulted in over 300 deaths in India. **Harassment and humiliation of workers (India, USA):** Doctors, nurses, and health care workers; flight crew engaged in the rescue of people; sanitary workers; people going out to feed stray dogs. **Racism, attacks, and xenophobia (China, India, USA, UK):** Cases of racism noted against Chinese, Asian, and African communities. **Hoarding and Fraud (India, Indonesia, Philippines, UK, USA)**: Medical supplies, food, and other necessities, even toilet paper and flour. **Vulnerable hardest hit (Bangladesh, India, Spain, UK, USA):** Elderly, poor income, less educated, marginal workers. **Domestic violence and family divisions (Bangladesh, China, Nigeria):** Increased family tensions, fights, divorces, and separation. There were reported cases of rapes of minors during the lockdowns. **Mass gathering (India, Malaysia):** Tablighi Jamaat in Malaysia spread the disease across the region. **Fines and legal actions (India, Malaysia):** People had to pay fines, face lathicharge, legal actions for violating the rules of social distancing
Second wave (February - 14 June 2021)	**Administrative information flow:** Top-down with engagement with associations. **Focus:** Quarantine and treatment **Measures:** Medication, hospitalization, oxygen availability, work from home. **Level of control:** Medium **Uncertainty:** High	**Vaccine hesitancy (Bangladesh, India, Nigeria):** Deaths after vaccination, reduced level of trust in vaccination and government, hesitancy due to cultural and religious reasons. **Vulnerable population hardest hit (Bangladesh, India):** Lack of hospital beds, critical drugs and oxygen in rural areas, and a severe dip in income of informal migrants, the elderly, single mothers, pregnant women, people with disabilities, children, Dalit, and tribal population. **Hoarding (India)**: Medical supplies and oxygen cylinders **Under-reporting of deaths and cases (India):** A gap in real and reported cases **Dead bodies floating in rivers (India):** No space and woods in crematoriums lead the dead bodies floating in the River Ganges. **Mass gatherings for elections, religious activities and festivals (India, Nigeria)**: Mass gatherings in election rallies and Kumbh Mela (9 million people) without adequate protocols increased cases.
Third-wave (15 June onwards)	**Administrative information flow:** Top-down with associations **Focus:** Vaccination **Measures:** Vaccination **Level of control:** Low **Uncertainty:** High	**Trust deficits and drive for vaccination (India, Nigeria, Uganda, USA):** Vaccine hesitancy, particularly in areas of trust deficits or to overcome rumors **Vaccine inequity (Bangladesh, India):** Rural-urban divide in vaccination **Walk-in vaccination centers and popup mobile vaccines (Bangladesh, India, UK, Vietnam):** Promotion of vaccination along with easy services. **Opening of schools (India):** Parents scared to send children to schools **Misinformation (India):** The third wave will impact children **Poisoning (Malaysia):** Cases of poisoning from self-medication **Fines and punishments (India, Malaysia):** Travelling without masks, putting white flag

Interestingly, many responses, such as hoarding, harassment, or discrimination, are noted in both developed and developing nations, not just in the beginning but even after a year in the second wave. Besides, occasional incidents were also reported, such as the claim suggesting 5G networks accelerate the spread of COVID-19, which led to the attacks on several 5G phone masts in the UK (Kelion, 2020). In India, pets were killed, and pet lovers were attacked due to WhatsApp messages spreading misinformation that 'animals spread coronavirus' (Bose, March 28, 2020). Many African countries, such as Nigeria, a multi-ethnic, multi-cultural and multi-religious country, reported vaccine hesitancy, especially within religious belief systems that see causation as coincidences rather than finding answers to phenomena that seem coincidental (Kayode et al., 2021). The impacts were certainly beyond these reported events and would require further studies to get the complete scenario. The rapid flow of misinformation led WHO and various countries to take several actions to control rumors and myths. In countries affected by infodemics, such as India and Bangladesh, the health authorities also issued notices for limiting the COVID communications on social platforms to be followed by legal actions (MoHFW, 2020, DGHS, 2020). Despite several efforts to bust the myths, the gap in actual and perceived risk continued, affecting response at different levels.

IV. The Gap: Unclear Community Engagement in Risk Communication

The WHO, in its six-point action plan, addresses the public in its very first point and notes that "the public must be effectively prepared for the critical measures that are needed to help suppress the spread and protect vulnerable groups, like the elderly and those with underlying health conditions" (WHO, March 25, 2020). The reality portrayed a different scenario. In many countries, top-down communication and information flow can be linked with the gaps in response that occurred at the local level. Various extreme measures suggested and implemented across different countries caught the people unprepared to either understand or adhere to the extreme conditions imposed. The following paragraphs discuss some of these measures:

Lockdown: The administrative risk communication suggesting lockdown was purely focused on the need to control COVID-19 transmission without adequate explanations for its possible impacts or responses to other related uncertainties. On the other hand, the local population feared the uncertainties relating to food, employment, and their overall future beyond the crisis (Dora, March 27, 2020). In India, thousands of laborers were stranded without work, money, or any other option except to return to their hometown due to the total lockdown in India declared on 24 March 2020. The concerns of people ranged from affording expenses of childrens' education fees to feeding their families in both short and long-term. As quoted by Prakash, an auto-rickshaw driver in Kerala (the first state in India to report COVID-19), the "virus doesn't worry me much as the uncertainty that awaits on the other side of the crisis" (Kidangoor, March 31, 2020). The decision of lockdown caused a mass exodus of laborers, industrial workers, and unorganized sector employees from the megacities like Delhi and Mumbai to rural areas across the country, which indicated both unpreparedness and inadequacy of risk communication of measures taken or promised to the affected population (PTI, March 27, 2020). Along with a fear of hunger and loss of livelihood, many people also carried the risk of spreading COVID-19 to distant rural areas. A similar trend of domestic migration is also noted in Bangladesh, Malaysia, and New Zealand. However, in contrast to New Zealand, in developing countries like India or Bangladesh, the people are given very limited time to travel or make arrangements to follow the guidelines of lockdown or social distancing (DhakaTribune, April 20, 2020; PTI, March 27, 2020; Wade, March 24, 2020). Many countries, including India and Taiwan, adopted partial lockdown during the second wave attributed to widespread social and economic impacts. Even in remote indigenous communities, small business and tourism were ceased in Taiwan. By realizing how insufficient health and medicine resources are in the marginal area, local communities adopted strict attitudes to prevent people from entering the community, including their younger generations studying and working in the cities. Public participation in implementing governmental instructions in Taiwan is noted to be very high. A similar situation is reported in African

indigenous communities, which indicates varying levels of trust and cooperation between the local communities and government in different countries that are not often addressed in global risk communications.

Quarantine: Quarantine measures are vital in controlling the spread of COVID-19, as they reduce social interaction, maintain physical distancing to prevent spread, and also help to facilitate the contact tracing processes needed to limit outbreak cluster growth (Sjödin et al., 2020). However, compliance with quarantine orders requires high levels of trust and confidence in officials, as well as adequate risk communication to develop an understanding of the risk posed by breaking quarantine (Doctor, March 21, 2020). Unfortunately, inadequately planned communication also led to the loss of trust in the planned response by the government. As the governments placed quarantine measures for public safety, even the educated crowd and professionals chose to run away, as seen in India and Nigeria. On March 11, 2020, three out of the 17 pilots and flight attendants who flew 14 Chinese medical doctors and medical supplies from China to Nigeria, boycotted the Lagos quarantine center provided by the Lagos State Government. The pilots left the quarantine center and went to their homes, despite knowing that it could put their family members and people with whom they may come in contact in grave danger (Punch, April 12, 2020). Similarly, many migrating laborers in India in the state of Uttar Pradesh and Bihar broke the quarantine to go to a home in the absence of any police or security personnel to stop them (Pandey, 15 April 2020). While inadequate arrangements can be argued as a cause, such incidences also indicate a gap in risk communication about the safety of the affected individuals and their families while they stay in quarantine.

Social-distancing: The term social distancing refers to the practices of maintaining a greater physical distance from people, usually 6 feet or more, to avoid the spread of the disease. However, it comes with other challenges such as psychological fallouts or mental health problems or a decline in care for those who need it the most, e.g. elderly (Gupta, March 29, 2020). Besides, the solution is not applicable in many high-risk areas, e.g. the marginal communities residing in densely populated regions such as slum areas of Bangladesh (Saleh, April 6, 2020). These communities living in close proximity cannot maintain social distance despite official orders, which gives little detail of what to do or practice in such situations. The inadequate communication and understanding of people about social distancing were also reflected in the immediate rush and breach of social distancing to buy liquor in India as the government eased some of the lockdown conditions (Mathur et al., May 5, 2020). It clearly indicates that the communication didn't address the risk involved or how to manage it when services resume. Besides, the usage of the term also attracted reactions for its literal meaning, which is also acknowledged by the Risk Communication & Community Engagement Technical Officer WHO Regional Office for South-East Asia, who suggested that social distancing should be understood as physical distance and social connection (UNISDR, April 30, 2020). However, real-time communication and practices didn't reflect this understanding on the ground level. Lack of community participation is witnessed in the fact that even the community leaders became sources of misinformation or breach of social distancing in many cases. In South Korea, a religious leader said God would protect people who attended the gathering and not be infected by COVID-19 (BBC News, March 2, 2020). However, this cluster of people was infected by the virus and became a key source of COVID-19 spreading in South Korea. Similar cases occurred in Malaysia, where two major clusters of infection originated from religious gatherings that ignored the Ministry of Health's advice. The first gathering was a three-day Islamic Tablighi gathering at the Sri Petaling mosque, Kuala Lumpur, held from February 27 to March 1, attended by nearly 16000 people (Tan et al., 2021). By April 11th, 2020, 40.2% of the cases in Malaysia were related to this Tablighi gathering (Supramaniam and Ghazali, April 11, 2020). The gathering had even become the source of virus spread internationally in Brunei, India, and Indonesia. In India, legal cases were registered against Tabligh participants for spreading the disease (PTI, April 7, 2020). In Taiwan, on the other hand, ICT's is used to alert people for social distancing rules.

Vaccination: Throughout the COVID-19 exposure, vaccination remained an important point of discussion. The communication of pandemic initially projected herd immunity, which was soon

replaced by the urgent need to vaccinate the entire world (Vignesh et al., 2020; Kumar et al., 2021). The formal process of vaccination could only start by the end of 2020. Although it was not made mandatory, it created misunderstandings and apprehensions among people and government agencies for those without vaccination. The reason for vaccine hesitancy, on the one hand, was apparent due to untimely deaths without COVID-19 or other diseases after vaccination (Prasad, April 09, 2021). On the other hand, governments kept on vaccinating people with and without being fully approved by the WHO (Biswas, January 5, 2021). It also led to a drive for building trust in COVID-19 vaccination. Many governments used multiple channels, social media, and ICTs to alter public perception and implement vaccination to the entire population. A survey revealed that more than 80% of the Taiwanese people approved the government's efficacy for handling the crisis (Wang et al., 2020). And for vaccination, although there were rumors about severe side effects and high mortality rate after vaccination, the CECC, together with third parties of experts in medical science, have voiced to correct the rumors and justified the effectiveness of the vaccines and the importance of getting herd immunity for the society. As of October 2021, the coverage of first-dose in Taiwan has reached 70%. India also completed and celebrated the mark of 1 billion vaccination by the end of October 2021 (Sharma, October 21, 2021). This left the gap in addressing the concerns of people who lost lives either due to COVID19 extreme measures or vaccination.

The aforementioned examples highlight that while the public was the main target of the risk communication, they were excluded from the formal risk communication process. The communications also lacked clarity of their role as a key stakeholder in risk communication beyond the expectations that they would follow the orders, which can be seen as a direct cause behind the info-demic and subsequent unintended impacts.

V. Discussion

Public participation or involvement in the understanding, communication, and management of global risks is not just a recommendation for good governance but also crucial for its success (Jonsson et al., 2016). Renn (2008) identified four different types of risk communication, i.e. documentation, information, dialogue and involvement. Although all four types of communications were observed for COVID-19, the first two dominated the process across most countries. The dialogue and involvement of the public were not just insufficient at times but also discouraged in several instances. The scenario, however, varied across different countries depending on varied risk perceptions rooted in the complexity of the situation, past experiences, or socio-cultural context. The review of COVID-19 information flow highlighted some trends in the risk communication leading to differential impacts on the ground. The nature of risk communication as experienced in different countries can be classified into three broad categories:

Info-demic: Info-demic represents a situation of excessive risk communications, wherein multiple stakeholders share their perceptions, fears, knowledge, or thoughts about risk or response without much consideration to its overall impact. A mix of risk information from official and multiple unofficial sources creates confusion, fear, stress, and loss of trust. The impact of such communications is rather severe, such as suicides, harassment, xenophobia, or hoardings of essential goods, as noted in countries like India, Bangladesh, Nigeria or the USA (see Table 1). It is important to note that many of these incidents occurred in urban areas which became the epicentre of pandemic with excessive concentration of people, pre-existing inequalities and hightened socio-economic impacts of lockdown (United Nations, 2020b). While the 'public' is seen as the dominant source of misinformation or info-demic, in many of these cases, the exclusion of the community as a responsible stakeholder in timely risk communication can also be an important cause. The excessive fear in the situation of very high uncertainty can be seen as a reason behind such outbursts of miscommunication. Further, the governments' interpretation and usage of the terms and war approach also added to this fear (see Raman April 21, 2021, Bedi May 19, 2021). In this situation, the administration not only had to deal with the real cases of COVID-19 but also with several other issues

that emerged from the miscommunication, including violence, large-scale unemployment or loss of trust in the government.

Figure 1: Diagrammatic illustration of levels of risk communication and outcome
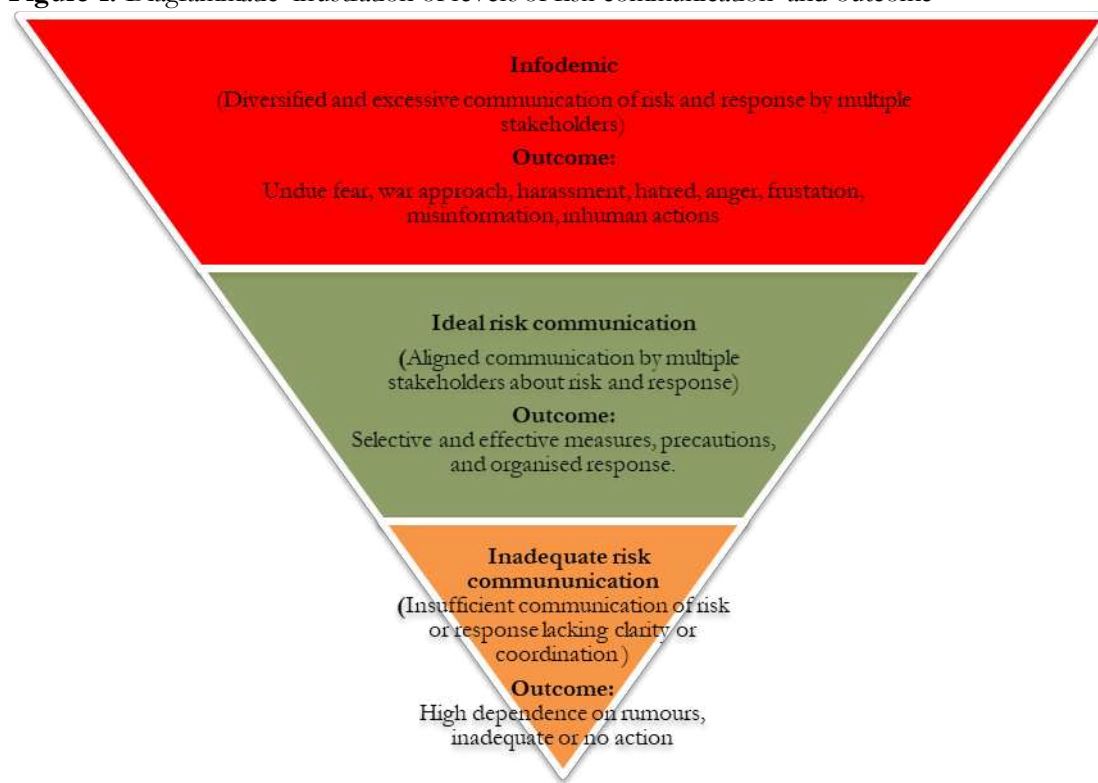
Nature of Risk Communicati on [RC]	RC of and around COVID	Outcome	Countries	Community engagement in COVID measures	Impacts to address
Infodemic	Excessive & diversified	Anxiety, stress, loss of trust, excessive control	Bangladesh, India, Nigeria USA	Forced with drastic measures	COVID 19 deaths suicides and voilence
Ideal	Aligned and adequate	Preparedness and response with reduced stress	African countries (e.g. Democratic Republic of Congo), Mongolia, New Zealand, Sweden	Invited with shared responsibility and collaborative measures	COVID 19 deaths
Inadequate	Insufficient	Rumours, confusion, excessive fear	Iran, Italy	Scarce with unclear measures	COVID 19 deaths, and unnecessary deaths

Source: The authors, 2020

Ideal risk communication: Ideal risk communication represents a situation where varied risk communications from different stakeholders are aligned to resolve the issues associated with a hazard. Various governments tried to achieve this with or without sufficient public participation. While control measures can help manage risk for a short time span, it becomes problematic when hazard exposure is prolonged. Some of the countries, however, not only acted proactively but also encouraged public participation as a shared responsibility for risk communication and management. The Ubuntu philosophy of Africa is rather noted as a framework for dealing with COVID-19 in social psychology that is based on community consensus and participation (Chigangaidze, Matanga and Katsuro, 2021). It is noted that past experiences of dealing with Ebola and community participation not only helped west Africa and Democratic Republic of Congo in managing COVID-19 response but also found essential for avoiding misinformation during crisis (Kuehn, 2021). Several efforts to enhance community participation are also observed in other countries. Mongolia's preliminary stakeholder engagement plan emphasized inclusive and culturally sensitive risk communication for

various affected, interested and vulnerable groups with a clear operational procedure for grievances redress mechanism (WHO, March 20, 2020b). Sweden, on the other hand, is seen as an outlier in Europe when it adopted a different approach to deal with COVID-19 by allowing essential services to be open. However, the plan is not just backed by the local people, but the impact of the shared responsibility was witnessed in voluntary social distancing, reduced mobility and precautionary public behavior (Savage, April 25, 2020). While the number of cases affected by COVID-19 is found to be high in the country, the response seems to have reduced side-effects of COVID-19 in terms of its impact on the economy or mental health (Rolander, April 20, 2020; Ahlander and O'Connor, April 20, 2020). New Zealand is another good example where local people are not only given time to prepare for a lockdown but physical movements were also allowed locally for better health and well-being (Wade, March 24, 2020, Hargreaves et al 2021). While which country's approach can be considered is ideal, it can be argued, however, that enhanced degree of community engagement as responsible stakeholder is an essential element for ideal risk communication.

Inadequate risk communications: This reflects a situation of inadequate communication giving little or no clarity about the hazard, impact, or measures to manage the risk. The situation leads to a high dependence on rumors that cause anxiety, fear, confusion or loss of trust among people. While the reason for inadequate risk communication could vary, such as high uncertainty or insufficient information, the gap in risk communication results in high exposure and loss of lives, as seen in Iran and Italy in the first wave (Chakrabarti, March 11, 2020). While local vulnerabilities and situations can be seen as the cause behind the high mortality rate, the existence of gap in risk communication that can ensure trust in people about their safety cannot be denied.

As the public is frequently the ultimate target of risk communication, their understanding, concerns, role, and participation become the critical aspects of risk communication. Contrary to this, the information shared to them depends on the availability of information about the hazard, associated uncertainties and the previous knowledge of best practices to manage the situation that follows a certain direction of formal information flow, as noted in COVID-19 (Table 2). The table highlights the change in the nature of information in terms of its quantity, emotions, uncertainty and understanding as it moves from the scientists assessing risks to various bodies understanding and communicating risks for its management. By the time information reaches the public, it is diversified and tends to be more confusing, high in emotion, and generate varied responses from different communities.

Table 2: Tentative flow of risk communication across various stakeholders during COVID-19 to date

Stakeholders	Scientists	WHO	Government	Media	Social Media	Public
Direction of information flow	--→					
Number of messages	Limited	Limited	Many	Many	Abundant	Variable
Communication of uncertainty	High	Medium	Low	Variable	Multiple	Diverse
Power	Less	Medium	High	High	Medium	Low
Community participation	Less	Nil	Nil	Less	High	High
Emotions	Low	Low	Medium	High	Very High	Variable
Confusion	Less	Less	Moderate	Moderate	High	High

Source: The authors, 2021.

A sudden emergence of information having the potential to disrupt normal life not only creates fear but also generates varied reactions from the public. In such a case, understanding the risk and even vulnerabilities only fulfils the partial purpose of risk communication. For example, the warning of health authorities regarding the vulnerability of the elderly population led to their further isolation and ageism (Brooke and Jackson, 2020; Keeley, 2020). Similarly, the increasing cases of racism during the pandemic led to the risk communication articles focusing on how to communicate without fueling anti-Chinese sentiments (Sibarani et al., 2020). Although modification of the risk communication can help in managing a specific situation, it is difficult to address every problem for every section of the society. It is noted that despite communicating the risks and various efforts to bust the myths at

different levels, the gaps tend to continue in terms of addressing all issues or reaching out to every community, particularly those which did not have access to the internet (WHO, March 20, 2020a; Wong, 2020). Studies argue that it is a mistake to consider 'public' as one stakeholder as it represents strata of varied socio-economic, cultural and political communities (Lohiniva et al., 2020).

At the same time, there are examples of countries, which effectively engaged communities in risk communication with top-down apporach. For example, in Taiwan everyday press conference by the CECC authority, the deployment of ICTs during covid-19 has been further invented for information exposure and dissimilation of infection, resource allocation (such as where to get masks and tests nearby your neighborhood), social distancing and vaccination nationalwide. Here, apart from a top-down approach, a bottom-up mechanism was established through several smart phone apps to facilitate citizen participatory communication. Singapore is also noted globally for its high preparedness and successful risk communication, promoting a strong community engagement and less emphasis on extreme measures such as lockdown despite following a top-down approach (Ketchell, March 18, 2020).

The increasingly homogenizing response across the countries has an underlying assumption that the information shared about risk is likely to be received, understood, and responded in a similar manner with some modifications. Subsequently, the efforts are focused on either improvising the risk communication on the basis of overall feedback from the ground or busting individual myths (e.g. Lohiniva et al., 2020). However, the compromised role of the public as a key stakeholder in risk communication not only creates a wider gap in the way the information is received but also how it is responded to, as seen in the cases of info-demic or inadequate risk communications. Besides, though the rapid transmission tends to bring valuable data such as concentrated impacts and measures, e.g. demography informed COVID-19 policy (Dowd et al., 2020), it takes time for the governments to mobilize and make policy decisions at the national level. Adapting the messages and responses can be managed with ease and rigor at the local level by using a participatory approach.

At any given time, the local population tends to deal with various circumstances situated in a dynamic reality, wherein they are not only pressed by their day-to-day concerns but also exposed to multiple hazards (Khan, 2012). Frequently, a specific risk communication doesn't address most of the other concerns people may be dealing with. For example, earthquakes in Croatia or Delhi that remind us of the vulnerability to other natural hazards that continue to exist while all the response mechanisms were focused on the pandemic (Wei-Haas, April 17, 2020). In Delhi, the COVID-19 led to a complete closure of all public spaces, including park gates during lockdown, which left people confused without any option to move out of their houses or apartments, putting them at a higher risk of earthquakes. Such events, however, give little time or scope for improvisation of the risk communication, and the role of communities in managing local risks becomes all the more important. Studies note that a participative approach for risk communication can effectively trigger adaptive behaviors (Atterns et al., 2020). COVID-19 also created a situation of increased mental and emotional stress, which further suggests the significance of community for not just informing risks and responsible behavior for safety but also providing physical, psychological and emotional support during a disaster situation. The role of community is also essential in establishing trust in information and support provided by the government or international organizations like WHO attributed to varied impacts and socio-cultural responses (Verghese et al., 2021).

Effective public participation is not only essential to deal with the info-demic but also for the effective use of the local indigenous knowledge and wisdom to deal with disasters. The value of public participation and indigenous knowledge has been recurrently emphasized in the disaster literature in the form of community-based disaster risk reduction (Shaw, 2012; van Niekerk and Coetzee, 2012). However, it has yet to be explored in terms of risk communication. Although the use of ICTs has tremendously increased in informing the public about best practices and busting myths and rumours, its use for effective community engagement is still in its nascent stage and requires further research. It is essential that risk communication is interactive and inclusive as risk emerges in a complex socio-economic and political context and accordingly perceived and responded to (Eiser et al., 2012). To

achieve this effect, it would require comprehensive planning and evaluation of risk communications that addresses the local context, constraints, and the local knowledge to facilitate effective and responsible community participation.

VI. Conclusion

In this rapidly changing world, it is crucial that disaster risk communications address the increased public exposure and participation in the globalization of knowledge, economy, and information flow. While global guidelines are useful, they lack structures, specific guidelines, and to an extent, scope to encompass all possible diversities. Although countries choose their response and methods of risk communication, a gap is noted in the top-down risk communication that may overlook various local risks. Communities, on the other hand, not only face multiple risks but also receive information and risk messages from multiple sources that could induce confusion or dilemmas in their decision-making. Ensuring effective response of communities thus requires a shift from a top-down approach focusing on what should or should not be done to an exploratory and interactive risk communication that recognizes public emotions, builds trust, understands heuristics, and the socio-cultural context of power relations and cultural practices that affect the local response. For this, it is essential that risk communication for emergencies or disasters is inclusive and engages with communities at the local level, where new risks are formed and responded to.

Although several models have been developed for engaging communities and using a participatory approach for risk communication, there is limited research on their applications in different socio-cultural contexts. There is a need to call for further research on various structures and guidelines to engage communities as responsible stakeholders in the process of risk communication where they are not only informed about the risks but also empowered to make informed decisions that incorporate and respect local socio-economic and cultural diversity, varied risks, and the local governance system.

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