



E-ISSN: 2706-8927
P-ISSN: 2706-8919
www.allstudyjournal.com
IJAAS 2025; 7(3): 35-40
Received: 13-01-2025
Accepted: 15-02-2025

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Effective risk communication in risk management in India: An analysis

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DOI: <https://www.doi.org/10.33545/27068919.2025.v7.i3a.1390>

Abstract

Effective communication is always essential for disaster risk management. In order to develop sufficient risk communication approaches, it is necessary to take into consideration the current contextual factors. Effective risk communication generally means the timely flow of accurate and actionable information to the public in order to ensure proper decision-making and effective action in emergency situations. It is the major part of risk management because of India being a really diversified nation susceptible to disasters of various genres. Effective risk communication ensures that the right and timely material is released to the public, who are considered informed decision makers for the emergencies. A myriad of natural and man-made disasters strikes India every year, which makes risk communication the most important. Effective communication. In order to develop sufficient risk communication approaches, it is necessary to take into consideration the current contextual factors. However, in India, several barriers are there in risk communication. The linguistic and cultural diversity in the country creates a need for localized messaging. Further, the concern for the literacy level and the digital divide will also impact the reach and effectiveness of the communication. Infrastructure limitation combined with the spread of misinformation complicates risk communication efforts. Effective risk communication, therefore, entails approaches that are culturally sensitive and linguistically accessible and are targeted at both old and new forms of media. Combating misinformation with fact-checking and public education enhances the credibility of risk communication. However, such barriers and adaptation of the multi-faceted approach will further facilitate the quest of increasing India's disaster preparedness and response capacity. It reduces the impact of its disasters and secures its communities. This abstract calls for the continuous innovation and adaptation in the risk communication practices to build a more resilient and informed society. The Current Research examines the effectiveness of Risk Communication in disaster management in India, also the role of media in risk communication during various disaster management. This research embraces qualitative method and case study. The paper also talks about various obstacles related to risk communication.

Keywords: Risk communication, risk management, resilience, cultural diversity, disaster management

Introductions

Due to the fact that the media serves as a conventional bridge for the government and the public in the event of a potential threat, a lot of effort is required in facilitating people's acceptance of the threat and the response plan, if any. Stakeholders such as risk communicators should note the need for the media in moving societal and risk issues to any audience. This commentary then addresses the problems which arise in communication during disaster risk situations. Risk, it is often stated, is a subject that consists of risk communication as well as risk assessment and management. Risk communication otherwise known as communication of risk, refers to the art of telling people of large or small dangers any area could pose, altering their habits and being actively involved in decision making on those issues (Rohrmann, 2004) ^[11]. The end of risk communication is three-fold declaring that all risks must be communicated; patients must be warned; and actions that will mitigate the risks must be communicated and recommendations adhered to (Mileti & Fitzpatrick, 1991) ^[12]. Therefore, the contents of risk-related news stories should be researched carefully so that the general public receives essential information concerning a risk. Risk communication can also be any purposeful exchange of information about health or environmental risks between interested parties such as governments, and the public regarding (a) Measures of health or

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environmental risks (b) The meaning or value of health or environmental risks or (c) Policies, actions, or decisions that are adopted to control or mitigate health or environmental risks (Covello, Slovic, & Von Winterfeldt, 1986) [13]. It has been noted that definitions of risk communication evaluate the success of risk communication from the point of view of the senders of those messages, in terms of getting the message across. Risk communication is most often the process and the messages that occur prior to the occurrence of a hazard.

In 2020, at least 389 natural disasters were reported in the EM-DAT, which caused 15 080 casualties, affecting 98.4 million people and causing \$171.3 billion in economic loss (Centre for Research on the Epidemiology of Disasters [CREED] 2020) [14]. The damages of disasters in low-income countries as well as GDP per capita are always above \$2 282.55 (2020) (Kadkhodamanesh *et al.* 2020) [15]. In most instances, disasters cause complex and devastating consequences. Apart from the scale and intensity of disasters, the effect resulting from some is due to the nature of organization, management, and performance of the community (Kirschenbaum 2019) [16]. Effective communication, correct information, and proper analysis of potential risks can play a crucial role in prevention, the reduction of risk, and proper decision-making (Shrestha *et al.* 2021) [17]. Communication processes and tools, information and communication technologies, and other mass media including public education on emergencies are the principal considerations in managing these activities and reducing loss. Indeed, as one lesson learned from many disasters, risk communication has also been identified as one of the significant factors involved in planning and responding to emergencies and coordination and communication in the effective management of disasters have also been emphasized (Ow Yong *et al.* 2020) [18]. This situation demands rescue, health services prehospital and in the hospital, communicable and noncommunicable diseases, environmental health, family and population health, nutrition, psychosocial support, health education, laboratory services, and drug supply. Healthy managers should, therefore, communicate, answer questions from their senior officials, the community, and journalists, and interact in an effective manner with all levels of administration and society since they will be the first decision makers and respondents. It should be done in the shortest time (Khangah *et al.* 2017) [19]. These measures are defined in the process of risk communication, which is one of the efficient components in all stages of the disaster risk management cycle from preparedness to response and rehabilitation (Khangah *et al.* 2017) [19].

The process of risk communication varies among countries and is influenced by many factors. It includes various components. In the preliminary search, systematic review studies are the subject of this research by Sato *et al.* (2020) [20]. One among the existing problems is the lack of transparency of risk communication components, and clarity in the risk communication components will help plan accurately, comprehensively, and adaptively. This paper takes an attempt to provide an all-embracing overview by identifying components in disaster risk communication within the health system for principled management of emergencies, reduction of parallel work, community engagement, and management of rumors.

Related works

Communicating during disasters has been an essential area of study over the past years with numerous research papers highlighting the need for reliable means of communication in all the DM stages. This section describes related work and identifies the contribution of this paper. Ferris and Petz 15 [25] review the major ND that have hit various regions of the world and discuss their effects on society. Another one [16] examines, in detail, a design process for CS to be disaster tolerant and gives best performances during the crisis. Rautela and Pande 17 [22] highlighted the problems and issues that can occur if people are not well prepared for DM. The Guidebook [1] gives support to governments, professionals, and volunteers to identify hassle-free solutions to most of the problems encountered during ND. The requirements of CS by Townsend and Moss [10] have been described in great detail in the disaster recovery process.

Schryen and Wex [18] considered solutions for evaluation and mitigation of risk developed by information systems research in ND management. Brown and Mickelson [19] presented a framework in which suitable ICT to deploy in resource-constrained locations was explored, especially in rural regions. Fragkiadakis *et al.* [20] have proposed a scalable network platform offering a generic architecture for interoperable and heterogeneous networks during catastrophes. Miranda *et al.* [23] surveyed possible alternatives for critical communications by deploying a network without any previous information about the communications environment. Gomes *et al.* [21] did a survey of wide regional failures and solutions for achieving resilient routing, including disaster-aware routing. Saim *et al.* [12] examined the utility of cognitive radio technologies for emergency communications response and confirm that they are very convenient to fulfill the hard requirements of these systems.

Bartolacci *et al.* [22] described parameters for easily determining the placement of mobile network base stations and other telecommunications equipment in a disaster-stricken area. The paper [11] outlines the architecture needed to address the challenge of filtering or prioritization for limited bandwidth of Mobile Ad Hoc Networks. Wang *et al.* [23] discussed how smartphone systems work well during a disaster through the utilization of the sensors embedded in smartphones plus emergency applications. Srinivasarao *et al.* [24] conducted a survey of CS architectures for emergency situations, including warning processing and transmission network architectures. Premkumar and Jain [24] analyzed some requirements to make a CS operational effectively when performing relief operations after a disaster. Leah Davis and Robbin [25] examined some reasons for communication breakdown during the response to Hurricane Katrina. They also discussed the failures of communication, management, and information sharing that reduce the effectiveness of a network organization. In survey, Wang *et al.* [23] presented and demonstrated communication system architectures, research challenges, and performance specifications for intelligent power system management. Markakis *et al.* [26] discussed several new challenges that emergency service providers will face due to 5G's advent. Dial *et al.* [27] were assigned to study the currently existing systems and find out improvement opportunities in the emergency systems for Fujian Province. Channa and Ahmed [2] have conducted a survey of various

proposed frameworks that may be applied as an emergency communications response and actual security requirements for information exchange properly and securely. Li28 has identified many challenges for deploying the emergency warning CS.

Risk communication and global agreements for risks and response

It is considered 'the year of big three' when leaders of nations agreed to manage global risk from the perspective of disasters (SFDRR), development (SDGs), and climate change (Paris Agreement). That was indeed a huge step in the management of existing and emerging risks within an increasingly globalizing world. The three agreements—SFDRR, SDGs and UNFCCC go deep to assess varied challenges and issues that the world faces relating to disasters, sustainability, and climate change respectively. Assorted focus and varied resources and capacities of different implementing agencies make it hard to integrate practices to reduce risks at the local level (Hori and Shaw 2014) [34]. Although there is accordant emphasis on cooperation and implementation of the major international policies including each other; the three agreements differ in language and understanding of risk communication (UNISD 2015; United Nations 2015a; 2015b) [35, 36]. While the differential treatment of risk communication within the three global agreements has been noted, what influence they entail to the risk response at local levels needs to be further investigated (Khan and Mishra, n.d.) [33].

Risk communication has emerged as one of the most integral components of the disaster risk response (Fakhrudin *et al.* 2020; Winograd *et al.* 2021) [28, 37]. It is defined as the two-way process of exchange of information in real-time, advice and views among experts and those whose health, economic, or social well-being is or likely to be adversely affected by hazards or their consequences (WHO 2021a, b). The importance of risk communication is that it does more than help the people make the right decisions; it also affects people's perception, preparedness, and response to various disaster risks (Shaw *et al.* 2013; WHO 2021a, b) [26]. However, most studies focus on the one-way information flow conception for the dissemination of hazard forecasts, disaster warnings, alarms, risk messages, or even crisis communication to which recurrent challenges are identified in the literature (Barnes *et al.* 2007; Mackie 2013; Netten and van Someren 2011; Sharma and Patt 2011; Palttala *et al.* 2012) [27]. The risk communication here would imply all communications pertaining to any activity meant for the mitigation, preparedness, response, and recovery concerning disaster risks (Infanti *et al.* 2013). It is used as an overarching concept that can help provide a holistic understanding of risk at various levels, having incorporated various kinds of risk communications: such as risk assessments and generation and dissemination of information, risk awareness programs, forecasts, early warning, and crisis communication. It is critical because in the dynamic risk landscape, the role of risk communication goes beyond simply transferring information or persuasiveness of a passive public to calling for public engagement, local voices, and values, and to unleash action that catalyzes social change and change in behavior and norms (Moser 2010; Moser and Dilling 2011) [31, 38]. There lies, thus, a gap between the theory consideration and practical use of risk communication wherein risk

communication practice is often limited to its traditional role as an instrument of creating awareness, informing, and warning for risk responses that contrast with the expansive discourse of risk communication invoking trust, heuristics, emotions, experiences, and socio-cultural contexts to be appraised and integrated for dealing with various disaster risks (Sheppard *et al.* 2012; Khan *et al.* 2017) [32, 33]. There is a gap partly because at the international level, there is no recognition of deficiencies in risk communication that would imply at the local level.

Risk Communication in India: an Overview

India is highly prone to many types of natural disasters. The list starts from floods, cyclones, earthquakes, to landslides. As per NDMA reports, Indian landmass has about 60% areas prone to earthquakes, about 12% to floods, and about 8% areas prone to cyclones. Communication could be one of the greatest keys to saving lives and reducing damage during such events. IMD has given early warnings significantly, especially in the case of Cyclone Fani in 2019. Many lives were saved due to timely communication and evacuation efforts in the case of Cyclone Fani, from NDMA over 1.2 million evacuations have taken place because of early warnings. India, however, poses many challenges in terms of geography and socio-economic factors to efficient risk communication. More than 80 percent of the population lives in rural areas and infrastructure for rapid communication is somewhat lacking. Moreover, linguistic and literacy issues pose vast challenges in establishing a mechanism whereby risk information reaches vulnerable populations in an efficient and timely manner.

Public health crises, especially the COVID-19 pandemic, brought an actual focus on risk communication in India. During the period of this pandemic crisis, problems in communication surfaced, particularly regarding the spread of false information on social media. With a recognition of the challenges posed by misinformation, the Ministry of Health and Family Welfare, in collaboration with the World Health Organization, began campaigns aimed at addressing misinformation and instead providing the right health tips. Data from WHO indicate that India had one of the biggest challenges in the world to fight misinformation regarding COVID-19, and particularly on WhatsApp. The Press Information Bureau (PIB) established fact-checking units to combat the misinformation and provide correct information. However, gaps in public trust along with fragmentary channels of communication hindered effective risk communication.

India has an important industrial sector; risk management in connection with industrial disasters is a huge and grave concern. The Bhopal Gas Tragedy, which killed more than 3,000 people in 1984, is a proof of failure in risk communication. Relatively recently, it is the Vizag Gas Leak in Andhra Pradesh on May 2020, which compelled to point out that industrial sector's risk communication systems are also not yet on maximum levels. This includes risk communication as part of disaster preparedness in industries under the Environment (Protection) Act, 1986 and subsequent regulations. In fact, compliance and enforcement are very sporadic. Gaps in risk communication infrastructure also show up in inadequate information flow during the environmental hazards themselves, such as the pre-holiday air pollution spikes.

Media in Risk Management Communication

The Indian media acts as a passage between the authorities and the public, especially in times of crisis. Its activities can be neatly divided into three phases of risk management:

Pre-crisis stage: Media plays a role in heightening awareness regarding such threats and how it may be mitigated. For example, the campaigns under pre-cyclone seasons prepared and disseminated among the populations of cyclone-prone regions like Odisha the evacuation plans, measures for disaster preparedness, and safety precautions. **Crisis stage:** The time of the unfolding disaster or crisis is proper and timely for the media to update the people on what is really going on. News channels and digital outlets may air live updates on the levels of floodwaters, the success of rescue operations, and public advisories on the situation. **Post-crisis phase:** With the crisis over, the media reviews what happened, analyses it, and publicizes what can be learned. It usually forces authorities to try to do better next time by forming more responsible responses and making greater transparency in its handling of the situation.

Case Study

Media and the 2013 Floods in Uttarakhand, Perhaps one of the worst storms in Indian history is the 2013 Uttarakhand floods, caused by heavy rainfall and cloudbursts. According to estimates, nearly 6,000 people were killed, and thousands of houses and infrastructure were destroyed. This is why the media has faced much criticism from the very beginning of the crisis. **Early reports and media attention:** News channels like NDTV and Times Now, among others, did report on the storm, that brought torrential rains and inundations right from the very early days, but all of them underestimated the scale of disaster. Even reports kept advising to stay indoors with travel restrictions to risk-prone areas. **During the disaster:** With every rise in the flood, the reporting of the media also crossed all the barriers and heights. It featured 24/7 reporting on rescue operation, exploring and showing the heroic work of the Indian Army and National Disaster Response Force (NDRF), as well as local volunteers. Social media avenues like Twitter and Facebook were also taken for updating real-time photos and videos taken from flooded locations. The media helped in mobilizing public support, collecting donations, and organizing relief efforts. **Post disaster:** Once the water, siltation, and debris washed away, the media turned its attention to recovery programs and failures in early warning systems and other infrastructure development that may have exacerbated the scale of the disaster. Most news providers initiated inquiries into policies related to urbanization and the lack of regulatory measures on construction in sensitive ecozones. A flurry of media attention necessitated that the government undertake improvements to the region's disaster preparedness and risk management.

Cyclone Fani was one of the most destructive cyclones to hit Odisha on May 2019. Which effected about 15 million lives. Millions of people displaced. There was a massive destruction to infrastructure and livelihoods. However, due to proper management of the disaster and mainly as a result of the critical role played by the media, loss of life was significantly curbed. OSDMA along with IMD responded to the crisis properly and managed it. The warnings were given well in advance of its touching the coast, giving enough time to the government to arrange for massive evacuations. **Mass Evacuation:** Nearly 1.2 million people evacuated from

low-lying areas to over 4,000 cyclone shelters one of the largest evacuations in the history of India. **Preparedness:** The state government prepared ahead in anticipation of the heavy rains and pre-positioned relief supplies, food, medical aid in vulnerable districts and put emergency teams on standby - like National Disaster Response Force (NDRF) and the Indian Coast Guard.

Media played a very important role in spreading early warnings, timely evacuation of people, and spread of relief work after the mishap. **Early Warnings:** NDTV, India Today and regional media covered widely the approach of the cyclone, broadcasting from IMD. This gave people a sense of urgency in action as viewers realized how serious the situation was, and hence accepted the evacuation orders of the government. **Social media campaigns:** Here, the government and the media houses have very rightly utilized platforms such as Twitter and Facebook to disseminate real-time updates to rescue operations and safety measures and contact numbers of emergency services, even coordinating their relief efforts through hashtags like #CycloneFani. **Post-storm reporting:** The media would report only on the damage that occurred from the cyclone, specifically with regard to housing and livelihoods, with an emphasis that the government had acted quickly. It would help solicit donations and relief throughout the country.

Role of Traditional Media in Risk Communication.

Traditional media is playing a very important role in risk management in India by acting as an essential source of information at the time of emergency, whether it is related to human safety or natural disasters. In this country where diversity and size are of such a great scale, newspapers, radio, and television become instrumental in providing them with necessary updates or warnings. Such platforms are key in broadcasting warnings, safety precaution guidelines, and even time-barre-tracker updates on disasters like floods, cyclones, and industrial mishaps. In a scenario like the 2020 Assam floods, local radio stations along with regional newspapers were able to guide the community to rising water levels and evacuation procedures ensuring prompt responses were taken. The traditional media strikes out the wrong pieces of information offered by transforming it with fact-checking information and expert analyses. This raises a very relevant point, especially given that traditional media continue to form part of the risk management infrastructure in India, particularly in areas that remain less internet-friendly or where people have limited digital literacy. Thus, if risk management can avail itself of the reach and credibility of traditional media to take public awareness and preparedness to new heights, and consequently, make an appropriate response to a disaster possible, then in all probability, effective risk management would be accomplished.

Barriers of Risk Communication in Risk Management

Risk communication is a very integral part of risk management because it shows people that they are informed, prepared, and able to take action in the face of various hazards such as natural disasters, industrial accidents, and public health crises. The country of India has made some level of progress in relation to risk communication; however, a number of barriers still seem to impede its effectiveness, mainly due to the country's socio-economic, cultural, and infrastructural complexities. This

section discusses the major barriers to risk communication in India. India is a highly diversified country in terms of language, culture, and socio-economic status. This has made the challenge to effective risk communication highly stiffer by virtue of more than 1,600 languages and dialects spoken throughout the nation, making uniform messages hard to communicate. Official warnings are usually disseminated in Hindi or English, which may not be understood by all sections of society, especially in rural and tribal areas. For example, during Cyclone Phailin in 2013, all warnings were in Hindi and English only, which seemed to miss many community circles in backward areas on time. A similar situation arises in regions where the communication is culturally and linguistically designed to suit very big pockets of population who remain unaware of potential risks.

In today's world the digital platforms like mobile apps, SMS alerts, and other social media platforms have transformed the way of risk communication, however the digital divide still continues to remain as a barrier to communication in rural and marginalized regions of India. Till 2022, internet was available for only 37% rural households, according to TRAI. So there is a huge number of people left who do not receive real-time information through digital platforms.

In addition to access, rural and disadvantaged populations do not have smartphones or a reliable power supply for the most part, which poses an impediment to receiving digital alert. This exclusion renders large parts of the population reliant on traditional media or community networks that might not be effective in emergencies.

ICT in Disaster Risk Reduction

With the advancement of Information & Communication Technology in the form of Internet, GIS, Remote Sensing, satellite-based communication links; it will be able to help a lot in planning and implementation of disaster risk reduction measures. These technologies have played a major role in designing early warning systems, catalysing the process of preparedness, response and mitigation. ICT tools are also being widely used to build knowledge warehouses using internet and data warehousing techniques. Such knowledge warehouses enable preparedness, response, recovery and mitigation planning & policy decisions at all levels. Similarly, the quality of hazard vulnerability and capacity assessments improves significantly with GIS-based systems, providing guidance in development planning and assisting planners in the selection of mitigation measures. Communication systems have also become indispensability for emergency communication and timely relief and response measures.

To minimize the risk and vulnerabilities in India, the Ministry of Home Affairs, being the Nodal Ministry for Disaster Management, is taking a lead role on disaster management and mitigation in the country. The Ministry has evolved a National Disaster Management Framework for the country. This National Framework covers the prime sectors including institutional mechanisms at all administrative levels, disaster mitigation/prevention to be mainstreamed into the development process, envisioned legal/policy framework, early warning systems, preparedness & emergency response measures and human resource development. The Ministry has undertaken various nationwide initiatives to strengthen disaster management

systems in the country.

United Nations Development Programme (UNDP) has joined hands in this effort of Government of India and is implementing GoI-UNDP Disaster Risk Management (DRM) programme in 169 most vulnerable Districts of 17 States in India. Information coordination and management is seen as one of the major challenges in India due to large geography and diversity of languages/cultures. GoI-UNDP DRM Programme addresses these issues very carefully by using Information and Communication Technology tools for faster response, effective decision making and develop well informed practitioners. There are number of ICT based initiatives, tools and applications developed to help the disaster managers function efficiently.

Conclusion

Effective risk communication becomes the key for proper disaster management in India-ensuring that people, as well as the community, is fully prepared and can respond appropriately in times of crisis. There are, however, several challenges involved in widespread diffusion of risk information: linguistic diversity, low literacy, mistrust of authorities, digital divide, and infrastructural issues. So, the strategy for improving risk communication must be more localized and inclusive. Messages should be communicated regionally and in appropriate cultural formats reaching every segment of society, while traditional channels of communication such as community radio, visual aids, and locally accepted leaders and heads can enhance access amongst the people in far-flung and rural settings. Expansion of mobile and internet access would bring an almost equal need to bridge the digital divide and ensure access for real-time updates to save lives in disaster-prone regions. This will elicit cooperation from the public if, in terms of government sources, there were sure promises of clear, consistent, and proactive communication concerning their approach for trust-building. Counter-measures must be strengthened to deal with fake news, particularly social media, via fact-checking and media literacy programs. All these hurdles can be taken off if a multi-faceted approach is adopted in which India's risk communication strategies are made better through better preparedness, more coordinated responses to the problem, and ultimately fewer casualties and damage during disasters.

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