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Review

Battling Misinformation in Disasters: The Critical Role of Health Communication

Afetlerde Yanlış Bilgiyle Mücadele: Sağlık İletişiminin Kritik Rolü

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Abstract

Disasters are events with major impacts on society. In such times, the timely and accurate sharing of information is crucial. However, misinformation also spreads rapidly during crises. This poses a serious challenge to crisis management and public health. False information circulates quickly through social media, traditional media, and personal communication, leading to panic, harmful health behaviors, and disruptions in official response efforts. Health communication plays a key role in ensuring accurate information and reducing the spread of misinformation. Effective strategies promote transparency, emphasize trusted sources, and improve media literacy. This study examines the dynamics of misinformation dissemination during disasters and explores preventive strategies within the scope of health communication. Based on a systematic review of recent and original studies, the findings underline the need to strengthen media literacy and ensure fast and reliable access to information. They also emphasize the importance of developing personalized health communication strategies to reduce information pollution during disasters.

Öz

Afetler, toplum üzerinde ciddi etkiler yaratan olaylardır. Bu tür durumlarda doğru bilgilerin zamanında ve etkili şekilde paylaşılması büyük önem taşır. Ancak kriz anlarında, yanlış bilgiler de aynı hızla yayılabilir. Afetler sırasında yayılan yanlış bilgiler, kriz yönetimini ve halk sağlığını doğrudan etkileyen ciddi bir sorundur. Yanlış bilgi; sosyal medya, geleneksel medya ve bireysel iletişim kanalları yoluyla hızla yayılır ve çeşitli olumsuz sonuçlara neden olabilir. Bu durum kamuoyunda panik yaratabilir, yanlış sağlık uygulamalarını teşvik edebilir ve resmi makamların kriz yönetiminde aksamalara yol açabilir. Bu noktada, halkın doğru bilgilendirilmesi ve yanlış bilginin önlenmesi açısından sağlık iletişimi kritik bir rol üstlenir. Etkili sağlık iletişimi stratejileri; bilgi akışında şeffaflığı sağlar, güvenilir kaynakları öne çıkarır ve medya okuryazarlığını geliştirir. Bu çalışmada afetler sırasında yanlış bilgi yayılımının dinamikleri incelenmekte ve sağlık iletişimi kapsamında önleyici stratejiler araştırılmaktadır. Yapılan sistematik literatür taraması, bilgi kirliliğini önlemek için medya okuryazarlığının artırılması, hızlı ve güvenilir bilgiye erişimin sağlanması ve kişiye özel sağlık iletişimi stratejilerinin geliştirilmesi gerektiğini ortaya koymaktadır.

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INTRODUCTION

Disasters have significant impacts on the social and economic structures of communities, and access to accurate information is one of the most crucial factors determining the success of crisis management. However, effective crisis communication requires proactive planning before a disaster occurs. Establishing strong and transparent communication networks in advance helps ensure that individuals can access accurate information during emergencies, thus forming a vital line of defense against misinformation.

During disasters, the rapid spread of misinformation through social media and digital platforms leads to public misguidance, the adoption of incorrect health practices, and disruptions in disaster management processes (1). Misinformation complicates crisis management by fostering panic and distrust within society and prompting individuals to engage in unsafe health behaviors (2). Social media, in particular, serves as a catalyst for the rapid dissemination of misinformation. The widespread sharing of unverified content by users allows misinformation to reach a broad audience during crises (3). Additionally, the proliferation of misinformation in disaster situations directly influences public perception and responses, creating additional challenges for crisis management efforts (4).

Misinformation also hinders individuals from making informed decisions in crisis situations and erodes trust in healthcare services (5). The COVID-19 pandemic and other global health crises have highlighted the crucial role of health communication in combating misinformation (6). In times of disaster, rapid, transparent, and reliable health communication ensures that the public has access to accurate information, thereby preventing the spread of misinformation. Research indicates that timely and credible information provided by health authorities enhances public resilience against misinformation (7).

This study aims to examine the dissemination dynamics of misinformation during disasters and analyze the preventive role of health communication. The research explores how misinformation spreads through social media and other digital platforms, how individuals respond to such information, and how health communication can be made more effective in this process. Additionally, the study evaluates the impact of verification mechanisms, media literacy, and crisis communication strategies in preventing misinformation during disasters.

THE SPREAD OF MISINFORMATION DURING DISASTERS

Misinformation is defined as the unintentional dissemination of inaccurate or false information without the intent to deceive (8). The concept of misinformation is often confused with disinformation and malinformation. Misinformation refers to the unintentional spread of incorrect information, where the individual sharing it is unaware of its inaccuracy. Disinformation, on the other hand, involves the deliberate and manipulative distribution of false information, typically for propaganda, personal gain, or public manipulation purposes. Malinformation refers to the use of factual information in a misleading or deceptive manner by taking it out of context (9).

The spread of misinformation is a process that accelerates, particularly during crises. Studies examining the dissemination of misinformation via social media during disasters have identified key factors influencing its spread, including geographical proximity, social media network structures, and emotional contagion (10). The dissemination of misinformation in times of crisis typically occurs in three main stages (7):

- Information Gaps and Panic Environment: During disasters and crises, the demand for information significantly increases. However, when reliable and timely information is unavailable, it creates uncertainty and panic among the public. Information gaps arise when people struggle to comprehend unfolding events, and these gaps are often filled with misinformation. In many cases, official sources fail to provide adequate or prompt updates, leading individuals to seek information from unreliable sources. Moreover, the complexity of scientific and technical information can contribute to the formation of information gaps or a state of panic.

- Rapid Spread of Misinformation: The rapid spread of misinformation is a process that becomes particularly prevalent during crises and disasters, primarily through social media and digital platforms. While these platforms facilitate the swift dissemination of critical information, they also enable the uncontrolled spread of misinformation. False information often gains traction due to its sensational, emotionally charged, and attention-grabbing nature, making it more likely to be shared.

- Verification and Reduction of Misinformation: Preventing misinformation and minimizing its negative impact on society requires the implementation of fact-checking mechanisms and information correction strategies. If misinformation is not countered effectively during crises, it can lead to public panic, the adoption of unsafe health practices, and diminished trust in reliable sources. To mitigate misinformation, a multi-faceted approach is necessary, including real-time information dissemination, social media regulation, media literacy initiatives, and legal interventions.

The rapid spread of misinformation during disasters and crises poses significant risks at both individual and societal level (7). Preventing the dissemination of misinformation requires timely and transparent information from official authorities. Moreover, improving media literacy and strengthening the monitoring systems of social media platforms are essential to help the public identify reliable information (6). Similarly, Clemente-Suárez et al., examined the effects of misinformation and disinformation on society, revealing that both phenomena can have severe consequences during health crises (11). Their study emphasized the necessity of early detection systems to prevent the rapid spread of misinformation. To combat misinformation effectively, social media platforms should employ supervised learning algorithms to detect false information automatically. Additionally, increasing official and reliable information dissemination during disasters and crises is crucial. Enhancing users' media literacy will enable them to recognize and avoid spreading misinformation. Hunt et al., investigated the effectiveness of corrections on social media during disasters and found that official institutions' verified accounts serve as the most reliable sources in combating misinformation (1).

During the COVID-19 pandemic, health communication strategies played a crucial role in preventing misinformation and ensuring public access to accurate information. Fahim et al. conducted a study in Canada in which participants were asked to evaluate their sources of information about COVID-19 (12). The results indicated that most individuals considered local television and official health authorities as the most reliable sources. However, a significant proportion of respondents also relied on social media platforms, where they were frequently exposed to misinformation. Chipidza et al., analyzed news content related to COVID-19 across traditional and social media. Their findings demonstrated that while traditional media focused primarily on the economic and political aspects of the pandemic, social media content was largely speculative and often lacked a scientific basis (13). Chhatwal et al. further examined the role of social media in spreading misinformation but emphasized that public health authorities could counteract this issue by leveraging these platforms to disseminate accurate information effectively. The study also highlighted the efforts of the World Health Organization (WHO) in identifying and addressing misinformation, which became increasingly effective as the pandemic progressed (14). Additionally, Albarracín et al., demonstrated that public trust in health authorities depended significantly on their ability to manage uncertainty and communicate COVID-19-related information effectively (15).

The February 6, 2023 Kahramanmaraş earthquake provides valuable insights into the rapid spread of misinformation during crises. In the aftermath of the earthquake, false information circulated on social media at an alarming rate, disrupting both rescue operations and humanitarian aid efforts. A study by Karacaoglu & Ozkaya found that the most prevalent misinformation in the post-earthquake period included fabricated voice recordings of trapped individuals, false aid distribution details, and politically motivated speculation. The study emphasized that misinformation fueled public panic and undermined trust in governmental and emergency response institutions (16). Similarly, Ali argued that a lack of media literacy prevented people from identifying credible information sources, allowing false news to spread rapidly. The study noted that a lack of coordination between traditional and digital media outlets led the public to rely on unreliable sources (17). Özdemir also investigated the role of social media in crisis management and found that while it was an essential tool for disaster response, it amplified misinformation as well. The study highlighted that the Turkish Disaster and Emergency Management Authority (AFAD) primarily used Twitter to share updates on search-and-rescue operations and ensure public access to reliable information. However, misinformation was most prevalent in posts related to "disinformation and communication issues," which garnered high engagement levels (18). Additionally, Belli & Aydın examined the social media presence of the Kahramanmaraş Metropolitan Municipality and

underscored the need for local governments to play a more active role in disaster communication (19). Their research confirmed that timely dissemination of accurate information by local authorities significantly reduced the spread of misinformation during the crisis.

THE ROLE OF HEALTH COMMUNICATION IN DISASTERS

Health communication during disasters is a strategic process that ensures the timely and effective dissemination of accurate information before, during, and after a disaster. This process enables the public to make informed decisions during crises, protects them from misinformation, and facilitates access to reliable healthcare services. The primary functions of health communication in disasters revolve around risk communication and awareness-building. To achieve these goals, planning must encompass both pre- and post-disaster phases. Before a disaster, public awareness about health risks should be enhanced, while during the disaster, timely and accurate information from reliable sources should be shared to foster public awareness. An effective health communication strategy requires the development of appropriate message frameworks and consideration of the public's psychological needs (20).

Another essential function of health communication is facilitating access to healthcare services. Guiding individuals in need of medical assistance after a disaster is a crucial aspect of this function. Communication disruptions following disasters can cause significant delays in accessing healthcare services, underscoring the need to strengthen emergency communication network. Additionally, vulnerable populations, such as the elderly, require tailored health communication models to ensure effective access to healthcare services (21).

Another critical role of health communication is combating misinformation. The spread of misinformation during disasters poses a serious threat to public health. The development of verification systems and clear official statements from health institutions can mitigate this risk. To better illustrate these risks and emphasize the importance of health communication during disasters, Figure 1 has been created.

Figure 1 shows how misinformation spreads during disasters and how health communication can mitigate its effects. The process begins with a crisis, which creates confusion and a lack of clear information. This allows misinformation to spread quickly through social media, traditional media, and personal communication. As a result, people may panic or make wrong decisions. The figure also shows how health communication by providing clear, reliable, and timely information can reduce the spread of false information and support better crisis management.

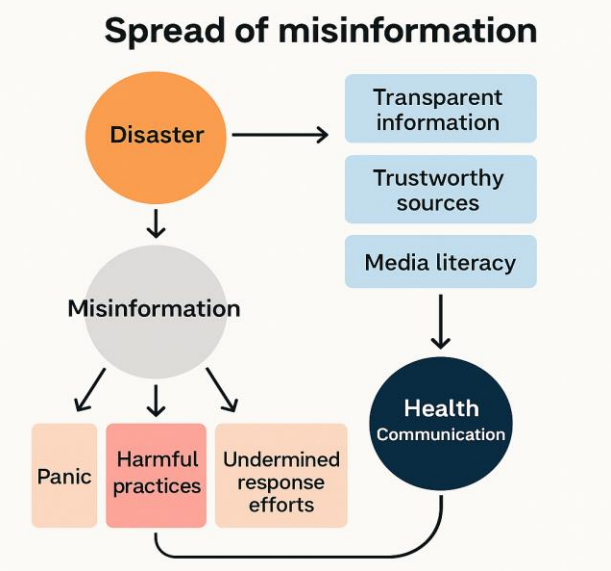

Figure 1. Spread of Misinformation in Disasters and the Role of Health Communication

The another factors influencing health communication during disasters include lack of coordination, the dual impact of social media, and the absence of specialized communication strategies. A major challenge in disaster management is communication gaps between healthcare and emergency response teams, which often lead to delays in delivering essential health services (22). Inefficient coordination among medical teams, emergency responders, and local authorities can hinder effective crisis response, limiting timely access to life-saving treatments and resources. Social media serves as a powerful tool for disseminating health-related information to the public during disasters. It enables rapid information sharing, facilitates emergency updates, and enhances public awareness. However, it also amplifies misinformation, leading to confusion and panic. Kawai et al., found that miscommunication during hospital-based disaster management resulted in patient misdirection and inefficiencies in resource allocation. The study emphasized the need for improved health communication systems to mitigate these risks and enhance disaster response efforts. The lack of targeted health communication strategies tailored to different

populations—such as vulnerable groups, medical personnel, and first responders—reduces the effectiveness of disaster communication (23).

Specialized messaging frameworks that address the needs of diverse demographics are essential for ensuring accurate information dissemination, efficient patient management, and public trust in health authorities. To improve health communication during disasters, it is crucial to enhance inter-agency coordination, regulate social media misinformation, and develop tailored health communication models for effective crisis response. Mason et al., identified one of the major shortcomings of post-disaster crisis communication as the lack of sufficient information from official sources. Effective health communication strategies are essential to prevent misinformation (22). Van der Meer & Jin emphasized the importance of providing accurate information to the public during crises, highlighting that government institutions must prioritize reliable sources in health communication to maintain public trust (23).

HEALTH COMMUNICATION STRATEGIES TO PREVENT THE SPREAD OF MISINFORMATION DURING DISASTERS

The spread of misinformation during disasters poses a direct threat to public health. Misinformation can cause panic, lead individuals to make poor decisions, and undermine public trust in health services (26). Therefore, health communication strategies play a crucial role in preventing misinformation and ensuring the public receives accurate information. To be effective, these strategies must be comprehensive, evidence-based, and grounded in scientific data. Key approaches such as media literacy education, transparent information dissemination, social media monitoring, and verification mechanisms are essential in enabling public access to reliable information.

Media Literacy and Education in Combating Misinformation

The dissemination of misinformation during disasters negatively impacts public health and crisis management. Media literacy is a critical skill that enables individuals and communities to identify misinformation, verify facts, and distinguish credible sources. McDougall et al., emphasize that media literacy is a key public health tool for reducing misinformation during crises and that educational programs must be developed to prevent its spread (27). Furthermore, McGowan-Kirsch & Quinlivan argue that media literacy extends beyond mere information consumption—it also enhances critical thinking skills, empowering individuals to make informed decisions in the face of misinformation (28). The study by Hasibuan et al., highlight that television and social media can play a preventive role in misinformation spread, and media literacy education can increase public awareness regarding disaster-related news (29). Research by Huang et al., confirms that media literacy education strengthens individuals' resilience against misinformation by enhancing their ability to discern false information (30). Similarly, Mavrodieva & Shaw state that media literacy programs encourage the public to adopt a more conscious and analytical approach to misinformation (31). A study by Sjuchro et al., demonstrates that media literacy plays a pivotal role in enabling communities to act responsibly during disasters, helping the public avoid social media misinformation traps (32). Providing education on how to distinguish reliable news sources during disasters is essential. Such programs can help individuals critically evaluate information during crises and prevent the uncontrolled spread of false information. By enhancing public media literacy, implementing transparent communication strategies, and strengthening misinformation detection mechanisms, disaster response efforts can effectively mitigate misinformation's impact and ensure access to accurate health information.

Rapid and Transparent Information Sharing

Information sharing is one of the most critical components of crisis management during disasters. Rapid and transparent information flow prevents the spread of misinformation, ensures public access to reliable sources, and facilitates crisis management processes. Official health institutions must provide consistent, transparent, and credible information during crises to strengthen public trust in authoritative sources. Research highlights that misinformation spreads fastest during crises, making health communication strategies crucially dependent on speed, clarity, and consistency (33).

The exchange of information among disaster management teams directly influences decision-making processes, and delays in information flow can lead to failures in disaster response operations. Information-sharing deficiencies hinder effective

coordination among emergency response teams, resulting in inefficient resource allocation. Jayawardene et al., found that poor-quality data shared during disaster management creates uncertainty in decision-making, thereby reducing the effectiveness of response operations. Establishing a well-structured information-sharing network among disaster management teams ensures more logical and coordinated decision-making processes (34). Ise et al., examined Japan's Shared Information Platform for Disaster Management (SIP4D) and demonstrated how this system facilitates information exchange across different levels of disaster response teams, improving overall intervention processes (35). Additionally, Tan & Hao emphasized that enhancing information-sharing networks and developing digital solutions is essential to optimize data exchange in disaster management. The study further suggested that ensuring data security and integrating information-sharing platforms across all emergency response units is critical for disaster resilience (36). Moreover, Iwasaki et al., recommended the use of Geographic Information Systems (GIS) and Digital Whiteboards (DWB) as effective tools for enhancing coordination and optimizing data visualization in disaster response efforts (37). These technologies provide real-time data insights, allowing emergency teams to make informed decisions rapidly. By implementing secure, integrated, and technology-driven information-sharing solutions, disaster management teams can enhance situational awareness, optimize crisis response, and minimize the negative impact of misinformation during disasters.

Combating Misinformation on Social Media and Digital Platforms

Social media platforms serve as powerful tools for disaster management by enabling real-time communication and public engagement during crises. However, they also facilitate the rapid spread of misinformation, which can mislead the public, disrupt emergency response efforts, and undermine trust in official sources. To mitigate misinformation, stronger control mechanisms must be implemented on social media platforms. Algorithms and monitoring systems should be employed to detect and prevent the dissemination of misleading content. While social media is an effective tool for crisis communication, enhanced regulation and oversight mechanisms are necessary to prevent misinformation from spreading unchecked (38). Singh et al., emphasized the importance of social media platforms developing verification tools and AI-driven content filtering systems to combat misinformation. Platforms such as Twitter, Facebook, and Instagram must update their content moderation policies to limit the spread of false information. Additionally, real-time verification mechanisms should be implemented to flag misleading content and alert users to potential misinformation (39).

Public responses to misinformation vary across different demographic and socio-cultural groups, necessitating tailored communication strategies. Mason et al., highlighted the need for specialized communication strategies to address the needs of vulnerable populations during crises (22). To empower individuals exposed to misinformation, platforms should develop user-friendly fact-checking systems that enable rapid verification of questionable information. Furthermore, governments must strengthen their health communication efforts by establishing immediate response mechanisms to correct misinformation in real-time (40). By enhancing social media regulation, implementing advanced misinformation detection tools, and developing targeted communication strategies, misinformation can be effectively mitigated, ensuring that the public receives accurate and reliable information during crises.

Strengthening Verification Mechanisms

Strengthening verification mechanisms is crucial in preventing the spread of misinformation during disasters. False information, particularly on social media and digital platforms, can spread rapidly, negatively impacting crisis management efforts. Therefore, enhancing information verification processes is a critical strategy for ensuring public access to reliable information and maintaining public trust. Mishra et al., introduced DIVVA (Disaster Information Verification and Validation Application), a system designed to verify information disseminated on social media during natural disasters. This system utilizes government sources and AI-powered data analysis to assess the accuracy of information, demonstrating its effectiveness as a solution against misinformation (41).

To combat misinformation in real time, governments should establish verification teams dedicated to identifying and correcting false information during disasters. Official verification websites and mobile applications should be

launched during crises to provide fact-checked updates. A study on the Turkey-Syria earthquakes highlighted that the lack of state-supported verification mechanisms contributed to the rapid spread of misinformation (42). The research further emphasized the inadequacy of governments and news agencies in disseminating accurate information during crises. Additionally, social media platforms should encourage users to participate in the verification process by developing incentive-based mechanisms. Cisternas & Vásquez suggested that social media platforms implement reward systems to motivate users to verify and report misinformation (43). Furthermore, social media platforms should automatically flag misleading content and notify users accordingly. An analysis of the 2017 Mexico earthquake demonstrated that individuals developed their own verification processes and filtering techniques to combat misinformation in the absence of formal verification mechanisms (44). These findings underscore the importance of equipping the public with accessible verification tools and integrating automated misinformation detection systems into social media platforms. By enhancing verification mechanisms, deploying AI-driven fact-checking tools, and fostering public engagement in misinformation detection, disaster response efforts can ensure that accurate, transparent, and timely information prevails over misinformation.

Targeted Communication Strategies for Specific Audiences

During disasters, communication strategies should be tailored to effectively reach different segments of society. Factors such as age, socio-economic status, geographic location, education level, and access to information directly impact the effectiveness of disaster communication methods. Therefore, disaster management efforts must incorporate customized messaging approaches for different age groups and social demographics (45). Gibson et al., highlighted that elderly individuals are often overlooked in disaster communication efforts, emphasizing the need for more accessible communication channels for this group (46). For example, printed materials, television announcements, and dedicated telephone hotlines should be established for older populations, while social media and mobile applications should be leveraged to reach younger audiences (47).

Additionally, disaster communication strategies must accommodate linguistic and cultural diversity. A study on Caribbean health institutions' crisis communication demonstrated that multi-lingual and culturally sensitive messaging is essential for effective disaster response (22). Partnering with local leaders, religious figures, and community representatives can significantly enhance outreach efforts, ensuring that disaster information reaches a broader audience. A study conducted in the Philippines found that community-based disaster messaging through local leaders was more effective than official government announcements. To maximize outreach, a balanced communication strategy that incorporates both digital and traditional media is necessary. Research suggests that, despite the rise of social media, traditional media remains widely accessible and should be integrated into disaster communication strategies. Additionally, real-time response and feedback mechanisms should be implemented to address public concerns and questions instantly. Solihin et al., found that disaster communication strategies incorporating two-way communication models tend to build greater public trust and engagement. By adopting audience-specific communication strategies, utilizing both traditional and digital media, and ensuring interactive two-way communication, disaster response efforts can improve public awareness, enhance preparedness, and reduce misinformation during crises (48).

CONCLUSION

Misinformation disrupts the flow of information during disasters, leading to confusion, unsafe behaviors, and growing mistrust in authorities. This study shows that combating misinformation requires not only rapid and transparent communication but also strong pre-crisis preparation. Establishing reliable communication channels in advance forms the foundation for building societal resilience against misinformation.

Strengthening verification systems and improving media literacy are particularly important in limiting the spread of false information. Health communication strategies must therefore adopt a holistic approach that combines transparent information sharing, fact-checking mechanisms, and collaboration with media organizations and digital platforms. By ensuring that accurate and credible information reaches the public in a timely manner, crisis management processes can become more effective and trustworthy.

Ultimately, the findings emphasize that transparent, consistent, and rapid communication is a cornerstone of disaster preparedness and response. Building a society that is resilient to misinformation requires sustained efforts to promote media literacy, foster collaboration among health authorities and communication platforms, and maintain public trust. These steps are essential not only for effective crisis management but also for protecting public health and strengthening long-term disaster resilience.

Recommendations

- Authorities should collaborate with social media platforms to develop more effective strategies for reducing misinformation. For instance, supervised learning algorithms can be utilized to automatically detect and flag false information.
- Media literacy education programs should be implemented in schools and community centers. By improving public media literacy, individuals can become more resistant to misinformation, learn to identify false information, and avoid spreading it.
- Early detection and verification systems should be developed to prevent the spread of misinformation. Machine learning and AI-based technologies can be utilized to detect and monitor false information in real time.
- Official institutions should provide transparent and real-time updates via social media and news channels, ensuring the public receives accurate and timely information.
- Public awareness campaigns should be expanded to educate people on how to recognize and counter misinformation effectively.
- Disaster management efforts should involve local media organizations to ensure communities have access to accurate and verified information.
- Technology should be leveraged to establish emergency communication networks, ensuring that critical information reaches affected populations efficiently.
- Health communication strategies should be developed in advance of disasters to educate the public, while during disasters, authorities should share fast, transparent, and continuously updated information.
- Experts should actively engage with the public during disasters to answer questions and prevent the spread of misinformation.
- Coordination mechanisms between healthcare institutions and disaster response teams should be strengthened. These entities should actively disseminate accurate information on social media platforms.
- Local governments should collaborate with community and religious leaders to ensure the rapid spread of accurate information within affected communities.

By implementing these strategies, public trust in accurate information sources can be strengthened, misinformation can be effectively mitigated, and disaster communication efforts can become more efficient and impactful.

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