

Risk Communication and Community Preparedness for Natural Disasters: Basis for Enhancing Local Disaster Risk Reduction and Management (LDRRM) Strategies

Diana Fe V. Quitarior

Bachelor of Arts in Political Science, Leyte Normal University, Tacloban City, Philippines

ABSTRACT: Natural disasters continue to pose significant threats to communities worldwide, emphasizing the need for effective risk communication to strengthen disaster preparedness and resilience. This study examined risk communication and community preparedness for natural disasters as a basis for enhancing Local Disaster Risk Reduction and Management (LDRRM) strategies. Specifically, it sought to identify the risk communication strategies commonly employed by local governments during natural disasters, examine their effectiveness in improving community preparedness based on existing literature and policy documents, and synthesize evidence-based measures that can strengthen local risk communication and disaster preparedness initiatives. The study employed a descriptive narrative review using a quantitative approach, relying exclusively on secondary data obtained from peer-reviewed journal articles, government publications, policy documents, technical reports, and institutional publications published between 2021 and 2026. Relevant literature was systematically identified, screened, and organized using a structured literature review matrix, while thematic analysis was utilized to synthesize the extracted evidence according to the study objectives. The findings revealed that local governments employ diverse risk communication strategies, including multi-channel communication systems, early warning systems, digital technologies, social media platforms, community-based communication, public information campaigns, stakeholder collaboration, and participatory governance. The reviewed literature consistently demonstrated that these strategies are most effective when they provide timely, accurate, accessible, and credible information while promoting continuous community engagement, disaster education, institutional coordination, and public participation. Furthermore, the synthesis highlighted that effective risk communication contributes to increased disaster awareness, improved risk perception, enhanced public trust, stronger community participation, and greater preparedness capacities, ultimately strengthening community resilience. The review also identified evidence-based measures for improving local disaster risk communication, including the adoption of inclusive communication approaches, continuous disaster preparedness education, integration of local and indigenous knowledge, strengthened institutional collaboration, regular evaluation of communication strategies, and the strategic use of emerging communication technologies. Overall, the study concludes that effective and evidence-based risk communication is fundamental to strengthening Local Disaster Risk Reduction and Management (LDRRM) strategies and fostering resilient, adaptive, and disaster-ready communities.

KEYWORDS: Risk communication, community preparedness, disaster risk reduction and management, local government, disaster resilience, narrative review

I. INTRODUCTION

Natural disasters remain among the most significant challenges affecting communities across the world, causing widespread loss of lives, destruction of infrastructure, environmental degradation, economic disruption, and social instability. The increasing frequency and intensity of disasters, driven by climate change, rapid urbanization, and environmental changes, have heightened the need for effective disaster risk reduction and management (DRRM). While natural hazards cannot be prevented, their adverse impacts can be minimized through proactive planning, timely dissemination of information, and coordinated preparedness initiatives. According to Fakhruddin et al. (2020), risk communication is a critical component of disaster risk reduction because it enables individuals and communities to understand potential hazards, make informed decisions, and undertake appropriate protective actions before, during, and after disaster events. Similarly, Stewart (2024) emphasized that disaster risk communication has evolved beyond the simple dissemination of warnings into a strategic process that promotes public understanding, builds trust in authorities, and supports evidence-based decision-making during emergencies. Hira (2025) further explained that effective risk communication strengthens coordination among governments, emergency responders, and affected communities, thereby

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improving disaster preparedness and reducing the potential impacts of natural hazards. These perspectives demonstrate that effective communication is fundamental to building resilient communities capable of responding to and recovering from disasters.

Effective disaster preparedness relies not only on the availability of disaster-related information but also on the ability of governments and communities to communicate risks clearly, accurately, and consistently. Risk communication encourages individuals to become aware of potential hazards, understand their responsibilities, and actively participate in preparedness activities that reduce disaster vulnerability. Shah et al. (2023) emphasized that successful disaster risk communication requires collaboration among government agencies, non-government organizations, and local communities to ensure that critical information reaches vulnerable populations through reliable and accessible communication channels. Likewise, Ryan et al. (2020), through a systematic review, found that continuous community engagement, public education, and stakeholder participation significantly contribute to stronger disaster preparedness and community resilience. Supporting these findings, Yu et al. (2020) reported that regular communication between local government officials and community members enhances disaster awareness, strengthens self-efficacy, and increases participation in preparedness initiatives. Furthermore, Sugiana et al. (2025) argued that emerging communication innovations, including digital technologies and community-based communication systems, have become increasingly important in addressing the growing challenges associated with climate change and disaster risks. Collectively, these studies suggest that effective risk communication is not limited to emergency response but is an ongoing process that fosters public awareness, encourages community participation, and strengthens disaster preparedness.

In the Philippines, disaster risk communication has become an essential component of disaster governance because of the country's high exposure to typhoons, earthquakes, floods, volcanic eruptions, landslides, and storm surges. The implementation of Republic Act No. 10121, otherwise known as the Philippine Disaster Risk Reduction and Management Act of 2010, has strengthened national and local initiatives aimed at enhancing disaster preparedness through early warning systems, public information campaigns, community-based disaster risk reduction programs, and capacity-building activities. Despite these efforts, the effectiveness of local risk communication strategies continues to vary across communities due to differences in resources, communication practices, stakeholder participation, and public awareness. Fullero et al. (2024) found that residents of disaster-prone communities in Caramoan, Camarines Sur considered timely, accurate, and understandable communication essential for improving disaster preparedness and reducing disaster risks. Similarly, Valenzuela et al. (2020) observed that disaster awareness among coastal communities in Puerto Princesa City was significantly influenced by continuous disaster education and effective communication from local authorities. In the educational sector, De Castro and Aranguren (2023) reported that greater disaster awareness and preparedness practices contributed to improved disaster risk reduction among learners, highlighting the importance of sustained disaster education. Likewise, Cipres (2023) emphasized that strengthening disaster risk reduction implementation within institutions and local communities is necessary to improve preparedness and resilience, particularly in disaster-prone areas of Leyte. These findings indicate that while substantial progress has been achieved, strengthening local risk communication remains essential to ensuring that communities are adequately prepared for future disasters.

Although previous studies have examined various aspects of disaster risk communication, community preparedness, and disaster resilience, much of the existing literature has focused on specific locations, sectors, or disaster events. Consequently, evidence regarding the risk communication strategies employed by local governments and their contribution to community preparedness remains scattered across different studies and contexts. Dima et al. (2025) emphasized that effective emergency preparedness depends on coordinated local governance, active community participation, and continuous communication among stakeholders. Similarly, Ferrer (2026), in a systematic narrative review of disaster risk reduction and resilience in the Philippines, concluded that while existing initiatives have contributed significantly to improving disaster preparedness, further integration of evidence is needed to identify effective communication practices and strengthen local disaster risk reduction efforts. A comprehensive review of existing literature is therefore necessary to consolidate current knowledge, identify recurring strategies and common challenges, and synthesize evidence-based practices that can support more effective Local Disaster Risk Reduction and Management (LDRRM) strategies.

In response to this need, the present study examines existing literature on risk communication and community preparedness for natural disasters through a descriptive narrative review of published research articles, government reports, policy documents, and other credible secondary sources. Specifically, the study seeks to identify the risk communication strategies commonly employed by local governments, examine the evidence regarding their effectiveness in improving community preparedness for natural disasters, and synthesize evidence-based measures that may serve as the basis for enhancing Local Disaster Risk Reduction and Management (LDRRM) strategies. By integrating current findings from diverse sources, this study aims to contribute to the growing body of knowledge on disaster risk communication and provide practical insights that may assist policymakers, local government units, disaster risk reduction practitioners, and future researchers in strengthening disaster preparedness, improving local governance, and promoting resilient and sustainable communities.

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Research Questions

1. What risk communication strategies are commonly used by local governments during natural disasters?
2. How effective are these strategies in improving community preparedness for natural disasters based on existing literature and policy documents?
3. What evidence-based measures can be recommended to enhance local risk communication strategies and strengthen community preparedness?

II. METHODS

Research Design and Approach

This study employed a descriptive narrative review design using secondary data analysis to examine risk communication and community preparedness for natural disasters through the analysis of existing literature and other credible secondary sources. This research design was selected because it enables the systematic collection, organization, and synthesis of existing evidence without requiring primary data collection through surveys, interviews, or field observations. A descriptive narrative review is appropriate for the study because it provides a comprehensive understanding of current knowledge, policies, and practices related to risk communication, community preparedness, and Local Disaster Risk Reduction and Management (LDRRM). By integrating findings from published research, government reports, policy documents, and institutional publications, the study identifies prevailing practices, recurring challenges, emerging trends, and evidence-based strategies relevant to disaster risk reduction. The synthesis of these findings serves as the basis for formulating recommendations that may strengthen Local Disaster Risk Reduction and Management (LDRRM) strategies and contribute to improving community resilience against natural disasters.

Population and Sample

The population of the study consisted of published scholarly articles, government publications, disaster risk reduction and management plans, policy documents, technical reports, and institutional publications related to risk communication, community preparedness, and disaster risk reduction and management. A purposive sampling technique was employed to select documents that directly addressed the objectives of the study and provided relevant evidence for the research questions. Only English-language sources published between 2021 and 2026 from reputable academic databases, government agencies, and recognized national and international organizations were included to ensure the relevance, credibility, reliability, and timeliness of the evidence. Documents that were duplicated, outdated, lacked sufficient information, or did not specifically address risk communication, community preparedness, or Local Disaster Risk Reduction and Management (LDRRM) strategies were excluded from the review.

Research Instrument and Data Collection

A structured literature review matrix served as the primary research instrument for this study. The matrix was designed to systematically extract, organize, and synthesize relevant information from the selected secondary sources to ensure consistency and accuracy throughout the review process. Specifically, it included the author(s), year of publication, title of the study, source, research objectives, methodology, key findings, and the relevance of each document to the study variables, particularly risk communication, community preparedness, and Local Disaster Risk Reduction and Management (LDRRM) strategies. Data collection began with the identification of relevant literature from reputable academic databases, government websites, institutional repositories, and publications of recognized national and international organizations. The identified documents were then screened using the established inclusion and exclusion criteria to determine their relevance to the objectives of the study. Eligible sources were reviewed comprehensively, and the extracted information was recorded in the literature review matrix. This systematic process ensured that only credible, relevant, and up-to-date evidence was included in the study while facilitating a transparent and organized synthesis of the reviewed literature.

Data Analysis

The collected data were analyzed using thematic analysis to synthesize the evidence obtained from the selected secondary sources. The extracted information was carefully reviewed, coded, categorized, and organized into major themes corresponding to the objectives of the study, specifically the existing risk communication strategies for natural disasters, community preparedness practices, and evidence-based approaches for enhancing Local Disaster Risk Reduction and Management (LDRRM) strategies. The analysis involved identifying similarities, differences, recurring patterns, best practices, and emerging issues across the reviewed literature to provide a comprehensive understanding of the current state of knowledge on disaster risk communication and community preparedness. The synthesized themes were then interpreted in relation to the research questions, enabling the study to identify existing gaps, highlight effective strategies, and formulate evidence-based recommendations that may strengthen Local Disaster Risk Reduction and Management (LDRRM) strategies and contribute to improving community resilience against natural disasters.

III. RESULTS AND DISCUSSION

This section presents the synthesized findings of the reviewed literature and policy documents concerning risk communication and community preparedness for natural disasters. The discussion is organized into three thematic areas aligned with the research questions: (1) the risk communication strategies commonly employed by local governments during natural disasters, (2) the effectiveness of these strategies in improving community preparedness, and (3) the evidence-based measures that can enhance local risk communication and strengthen Local Disaster Risk Reduction and Management (LDRRM) strategies. Through thematic analysis, the findings highlight recurring patterns, emerging issues, and best practices reported across the selected studies, providing a comprehensive understanding of the role of risk communication in promoting disaster preparedness and community resilience.

Risk Communication Strategies Commonly Used by Local Governments During Natural Disasters

Across different countries and disaster contexts, risk communication has evolved from a traditional top-down dissemination of emergency warnings into a multidimensional process that emphasizes continuous information sharing, stakeholder collaboration, community participation, and the strategic use of digital technologies. This shift reflects the growing recognition that disaster preparedness is not solely dependent on the availability of information but also on how effectively such information is communicated, understood, and translated into appropriate preparedness actions by the community. Fathollahzadeh et al. (2023), in their systematic review of disaster risk communication models, emphasized that effective communication should be built upon transparency, message clarity, credibility, stakeholder engagement, and continuous public interaction. Their findings suggest that successful communication strategies extend beyond providing hazard warnings and instead promote an environment where communities actively participate in understanding disaster risks and making informed decisions. Similarly, Soelistyowati (2025) argued that communication strategies become more effective when they are implemented as continuous preparedness initiatives rather than temporary interventions during emergency situations. This perspective was further supported by Oktavia and Wardah (2025), who noted that contemporary disaster communication increasingly integrates scientific information, community participation, and digital media to strengthen disaster awareness and preparedness. Collectively, these studies indicate that local governments have gradually shifted toward more comprehensive communication approaches that recognize disaster preparedness as a shared responsibility between authorities and the communities they serve.

One of the most prominent strategies identified is the adoption of multi-channel communication systems, wherein local governments utilize a combination of conventional communication methods and digital technologies to disseminate disaster-related information. Traditional communication mechanisms, including community assemblies, public address systems, local radio broadcasts, printed advisories, and television announcements, remain important because they continue to reach vulnerable populations with limited access to digital technologies. However, recent studies consistently demonstrate that these conventional approaches are increasingly complemented by digital communication platforms such as social media, government websites, mobile applications, and instant messaging services. Yudarwati et al. (2021) found that the Indonesian government's strategic use of social media significantly enhanced the dissemination of disaster information by enabling real-time communication between government agencies and affected communities. Likewise, Belli and Aydın (2024) reported that local governments utilized various social media platforms during the 2023 Kahramanmaraş earthquake to provide emergency updates, coordinate rescue operations, respond to public concerns, and maintain communication despite widespread disruption of physical infrastructure. Ross et al. (2024) further explained that while digital technologies have transformed disaster communication by improving the speed and accessibility of information, emergency managers continue to encounter challenges such as misinformation, information overload, declining public trust, and unequal digital access. Consequently, they emphasized that effective disaster communication should not rely exclusively on online platforms but instead integrate digital innovations with traditional communication systems to ensure that disaster information remains accessible to all members of society. This finding was reinforced by Parida et al. (2025), who observed that Canadian municipalities increasingly employ multiple communication channels to accommodate the diverse communication preferences and technological capacities of their residents. The convergence of these findings suggests that local governments recognize the importance of adopting diversified communication strategies that maximize information accessibility while addressing existing social and technological inequalities.

Beyond the adoption of multiple communication platforms, the reviewed literature consistently emphasizes that community participation and stakeholder collaboration are indispensable components of effective disaster risk communication. Contemporary disaster management no longer views communities as passive recipients of emergency information but rather as active partners in disaster preparedness, response, and recovery. This participatory approach enables local governments to develop communication strategies that are more responsive to local needs, culturally appropriate, and widely accepted by community members. Muhame et al. (2024) found that active community participation in early warning dissemination and disaster risk reduction initiatives significantly improved public understanding of disaster risks and increased compliance with evacuation procedures and preparedness measures. Similarly, Andreastuti et al. (2023) demonstrated that effective communication during

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volcanic crises in Indonesia relied heavily on continuous coordination among government agencies, scientific institutions, local leaders, and affected communities. Their findings highlighted that scientific information became more meaningful and actionable when translated into language and communication formats that were familiar to local residents. Likewise, Ida et al. (2025) emphasized that disaster communication during the Mount Semeru eruption was most effective when local authorities incorporated indigenous experiences, cultural practices, and community knowledge into official risk communication messages. Rather than depending solely on technical hazard information, integrating local knowledge allowed communication strategies to become more relevant, understandable, and trusted by community members. Supporting these observations, Heinkel et al. (2024) reported that institutional risk communication in Yangon, Myanmar was strengthened through sustained collaboration among government institutions, emergency organizations, civil society groups, and local communities, resulting in more coordinated disaster preparedness and emergency response efforts. These findings collectively demonstrate that effective risk communication is fundamentally collaborative, requiring continuous interaction between authorities and communities to establish mutual trust, strengthen public confidence, and promote collective responsibility for disaster preparedness.

The local context, governance capacity, and inclusivity significantly influence the effectiveness of local government risk communication strategies. While communication frameworks may share common principles, their implementation differs according to geographical conditions, available resources, institutional capacity, and community characteristics. Pelone and Cajano (2025), in examining geographically isolated communities in the Philippines, found that limited communication infrastructure, transportation barriers, and geographic isolation often delayed the delivery of disaster warnings, leaving vulnerable populations at greater risk during emergencies. Their study emphasized that local governments should design context-specific communication systems capable of addressing the unique challenges faced by remote and marginalized communities rather than relying solely on standardized national communication mechanisms. Similarly, Bhandari et al. (2025), through a comparative analysis of Nepal and Switzerland, concluded that successful disaster communication depends not only on technological advancement but also on governance structures, public trust, institutional coordination, and locally adapted communication policies. In the Philippine setting, Badoc-Gonzales et al. (2021) observed that following Super Typhoon Haiyan, Disaster Risk Reduction and Management Offices underwent substantial institutional reforms aimed at improving coordination, organizational capacity, and communication efficiency. These institutional changes enabled local governments to adopt more proactive and community-centered disaster management approaches. Collectively, the reviewed studies indicate that there is no universal communication strategy applicable to all disaster-prone communities. Instead, effective local government risk communication requires a combination of multi-channel information dissemination, participatory governance, institutional preparedness, culturally appropriate messaging, and locally responsive communication systems that recognize the diverse needs of different populations.

Effectiveness of Risk Communication in Improving Community Preparedness for Natural Disasters

The effective risk communication plays a significant role in improving community preparedness by increasing disaster awareness, enhancing risk perception, promoting protective behaviors, and strengthening public confidence in disaster management initiatives. Rather than functioning solely as a mechanism for disseminating warnings, risk communication serves as a continuous educational process that enables individuals and communities to understand disaster risks, recognize available resources, and make informed decisions before emergencies occur. Across the selected studies, effective communication was consistently associated with higher levels of preparedness because it encouraged community members to participate in disaster education programs, preparedness planning, evacuation drills, and other disaster risk reduction activities. German et al. (2022), in their investigation of volcanic eruption preparedness in the Philippines, found that preparedness was influenced by several interrelated factors, including disaster knowledge, risk perception, previous disaster experience, government preparedness initiatives, and effective communication. Their findings demonstrated that individuals who received timely and understandable disaster information were more likely to develop positive preparedness behaviors and actively participate in community-based disaster risk reduction programs. Similarly, Gumasing et al. (2022) reported that preparedness for super typhoons was significantly influenced by communication, public awareness, disaster knowledge, and perceived government readiness. Their study emphasized that effective communication contributes not only to increasing awareness but also to strengthening individuals' confidence in responding appropriately during disaster situations. Supporting these findings, Johnson (2025) concluded that risk communication substantially shapes public preparedness for natural hazards and extreme weather by influencing how individuals perceive risks, interpret warning messages, and decide whether to undertake protective actions. Collectively, these studies demonstrate that effective risk communication enhances preparedness by improving public understanding, encouraging proactive behaviors, and strengthening confidence in disaster management efforts.

This further highlights the effectiveness of risk communication is strengthened when it is accompanied by community participation, disaster education, and institutional support. Communication strategies that encourage active public involvement produce more sustainable preparedness outcomes than approaches that rely solely on one-way dissemination of information. Javier (2026), in assessing disaster awareness and disaster risk reduction capacities among residents in Bukidnon, found that communities

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with higher levels of disaster awareness also demonstrated stronger preparedness capacities, suggesting that continuous communication and public education contribute directly to disaster readiness. Likewise, Aborquez and Medino (2026), in their study of hazard-prone schools in Eastern Visayas, reported that effective disaster risk reduction management significantly enhanced institutional resilience by improving awareness, preparedness planning, and coordinated emergency response among school communities. These findings reinforce the importance of integrating disaster communication into educational institutions and local preparedness initiatives. In the health sector, Hermosura et al. (2025) emphasized that effective disaster communication within the Philippine health system strengthened emergency preparedness by improving coordination among healthcare providers, government agencies, and affected communities. Their findings suggest that preparedness is not solely dependent on the availability of emergency resources but also on effective communication systems that facilitate timely decision-making and coordinated disaster response. Furthermore, Guo et al. (2025), through a scoping review on disaster preparedness education, concluded that continuous public education significantly improves disaster knowledge, preparedness skills, and community resilience, particularly when educational programs are integrated into local disaster risk reduction initiatives. These studies collectively demonstrate that risk communication becomes more effective when it is embedded within broader preparedness programs that promote learning, participation, and institutional collaboration rather than functioning as isolated communication activities.

The effectiveness of risk communication depends not only on the quality of information provided but also on the level of public trust, social participation, and community engagement established before disaster events occur. Communication strategies that foster trust between local governments and community members encourage greater compliance with disaster advisories, increase participation in preparedness activities, and reduce behaviors that may heighten disaster risks. Bodas et al. (2026) emphasized that municipal risk communication plays a vital role in reducing counterproductive behaviors during emergencies by promoting public trust, transparency, and confidence in local authorities. Their findings indicated that communities are more likely to follow evacuation orders, adopt recommended safety measures, and cooperate with emergency responders when they perceive disaster information as credible and consistent. Similarly, Sarabia et al. (2020) noted that evaluating the effectiveness of community-based disaster risk management extends beyond measuring the implementation of preparedness activities; it also involves assessing how communication initiatives influence behavioral change, public participation, and community resilience over time. Their study highlighted that long-term engagement between local governments and communities is essential for sustaining preparedness beyond individual disaster events. Supporting these findings, Kayamba-Phiri et al. (2023) argued that community-led disaster risk management strengthens preparedness by empowering local residents to participate actively in planning, decision-making, and implementation of disaster risk reduction activities. This participatory approach not only enhances local ownership of disaster programs but also strengthens communication networks that facilitate rapid information sharing during emergencies. Likewise, Lin (2025) demonstrated that participatory flood risk management significantly improves environmental sustainability and disaster preparedness by encouraging communication engagement, strengthening social efficacy, and reducing barriers to community participation. Together, these studies indicate that preparedness is most effective when risk communication promotes trust, collaboration, and shared responsibility rather than relying solely on government-led information dissemination.

Another recurring finding is that innovative and evidence-based communication approaches further enhance community preparedness by making disaster information more accessible, engaging, and responsive to local contexts. Bubeck et al. (2024) provided empirical evidence that community-based theatre can serve as an effective risk communication tool by translating technical disaster information into culturally meaningful and easily understandable messages that encourage active community participation in coastal risk mitigation and ecosystem-based adaptation. This finding illustrates that communication strategies do not necessarily depend on advanced technologies but can also utilize locally appropriate and culturally relevant methods to improve public understanding of disaster risks. Similarly, Vasileiou et al. (2022), through a systematic review, emphasized that integrating scientific knowledge with local and indigenous knowledge enhances disaster risk reduction by producing communication strategies that are scientifically accurate while remaining culturally acceptable and contextually appropriate. This integration allows communities to relate official disaster information to their own experiences, thereby increasing the likelihood of adopting recommended preparedness measures. Complementing these findings, Khaspuria et al. (2024) stressed that comprehensive disaster mitigation strategies require continuous public education, effective communication systems, institutional collaboration, and community participation to minimize disaster risks and strengthen resilience. Overall, the reviewed literature consistently demonstrates that risk communication significantly improves community preparedness when it is timely, credible, participatory, culturally sensitive, and supported by sustained education and institutional collaboration. These findings directly address the second research question by confirming that existing literature and policy documents overwhelmingly recognize effective risk communication as a fundamental factor in strengthening disaster awareness, preparedness capacities, public trust, community participation, and overall resilience against natural hazards.

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Evidence-Based Measures to Enhance Local Risk Communication Strategies and Strengthen Community Preparedness

The literature identified several evidence-based measures that can further strengthen local risk communication strategies and improve community preparedness for natural disasters. While existing communication systems have contributed significantly to disaster risk reduction, the studies consistently suggest that their effectiveness can be enhanced through more inclusive governance, continuous community engagement, improved institutional coordination, and the integration of innovative communication approaches. Rather than relying solely on emergency warning dissemination, local governments should adopt communication strategies that are proactive, participatory, and responsive to the changing needs of communities before, during, and after disaster events. Grabmaier et al. (2025) emphasized that strengthening community participation is fundamental to effective disaster risk management because inclusive decision-making encourages greater public ownership of preparedness initiatives and improves cooperation among stakeholders. Similarly, Kayamba-Phiri et al. (2023) argued that community-led disaster risk management empowers local residents to actively participate in disaster planning, implementation, and monitoring, resulting in stronger preparedness capacities and more sustainable resilience. These findings suggest that enhancing local disaster communication requires shifting from government-centered communication toward collaborative approaches that recognize communities as active partners rather than passive recipients of information. Such participatory communication also aligns with the recommendations of Lin (2025), who found that communication engagement and collective participation strengthen social efficacy and reduce barriers to disaster mitigation, particularly in flood-prone communities. Collectively, these studies indicate that strengthening community participation should remain a priority for local governments seeking to improve both disaster communication and preparedness outcomes.

Another important measure identified is the need to strengthen disaster education and integrate diverse knowledge systems into local communication strategies. Effective disaster preparedness depends not only on access to information but also on the public's ability to understand, interpret, and apply disaster-related knowledge in real-life situations. Guo et al. (2025) emphasized that continuous disaster preparedness education significantly improves public awareness, knowledge retention, preparedness skills, and long-term resilience, particularly when educational initiatives are incorporated into schools, local government programs, and community activities. Likewise, Vasileiou et al. (2022) highlighted that integrating scientific knowledge with indigenous and local knowledge creates more culturally appropriate communication strategies that increase community acceptance and encourage greater participation in disaster risk reduction initiatives. Supporting this perspective, Lawangen and Roberts (2023) found that indigenous communities in Benguet possess valuable cultural knowledge and traditional practices that complement formal disaster risk reduction strategies and strengthen local resilience. Similarly, Ancheta (2022) emphasized the importance of youth participation in disaster risk reduction, arguing that involving young people in planning, awareness campaigns, and community preparedness activities enhances both disaster education and long-term community resilience. These findings collectively demonstrate that disaster communication should extend beyond emergency messaging by promoting continuous learning, preserving local knowledge, and encouraging participation across different sectors of society. Such an approach enables communities to develop a deeper understanding of disaster risks while fostering a culture of preparedness that can be sustained over time.

Advances in digital communication, early warning technologies, geographic information systems, and social media platforms have created new opportunities for local governments to disseminate disaster information more efficiently and engage communities more effectively. However, the studies consistently emphasize that technological innovations should complement, rather than replace, traditional communication approaches to ensure that vulnerable and geographically isolated populations are not excluded from disaster preparedness efforts. Rizal et al. (2025) demonstrated that combining digital media, community education, and local knowledge significantly improved disaster communication by making disaster information more accessible, understandable, and relevant to local communities. Similarly, Khaspuria et al. (2024) concluded that comprehensive disaster mitigation requires coordinated communication systems, institutional collaboration, technological innovation, and sustained public education to strengthen resilience against natural hazards. These recommendations are further supported by the broader literature reviewed in this study, which consistently highlights the importance of multi-channel communication, transparent governance, stakeholder collaboration, and evidence-based decision-making in strengthening Local Disaster Risk Reduction and Management (LDRRM) programs. Overall, the findings indicate that enhancing local risk communication strategies requires an integrated approach that combines inclusive governance, community participation, disaster education, indigenous knowledge, institutional strengthening, and technological innovation. These evidence-based measures directly address the third research question by providing practical recommendations that local governments may adopt to improve disaster preparedness, strengthen community resilience, and build more responsive and sustainable disaster risk reduction systems.

CONCLUSION

This study synthesized existing literature on risk communication and community preparedness for natural disasters to identify the risk communication strategies commonly employed by local governments, examine their effectiveness in enhancing community preparedness, and determine evidence-based measures that can strengthen Local Disaster Risk Reduction and Management

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(LDRRM) strategies. The synthesis revealed that effective disaster risk communication extends far beyond the dissemination of warnings or emergency advisories. Instead, it encompasses a comprehensive and continuous process that integrates traditional communication channels, digital technologies, early warning systems, public information campaigns, community-based communication, stakeholder collaboration, and participatory governance. Across the reviewed studies, these communication strategies consistently demonstrated greater effectiveness when they provided timely, accurate, credible, and accessible information while actively engaging communities in disaster preparedness initiatives. Moreover, the findings established that well-implemented risk communication significantly enhances disaster awareness, improves public understanding of hazards and risks, strengthens trust in government institutions, encourages greater community participation, and promotes informed decision-making before, during, and after disaster events. These outcomes collectively contribute to stronger preparedness capacities and demonstrate that effective communication serves as one of the fundamental pillars of disaster resilience. Consequently, the findings underscore that disaster preparedness is not determined solely by the existence of communication systems but by the quality, inclusivity, consistency, transparency, and responsiveness of the communication processes implemented by local governments and their stakeholders.

Furthermore, the study established that strengthening disaster preparedness requires a holistic and integrated approach in which risk communication is embedded within broader disaster risk reduction and management initiatives. The synthesized evidence consistently highlighted the importance of continuous community engagement, disaster preparedness education, institutional collaboration, technological innovation, and the integration of scientific information with local and indigenous knowledge to develop communication strategies that are context-specific, culturally appropriate, and responsive to the needs of diverse communities. Rather than functioning as a reactive mechanism activated only during emergencies, risk communication should be institutionalized as an ongoing process that cultivates a culture of preparedness, strengthens partnerships among government agencies, educational institutions, civil society organizations, the private sector, and local communities, and promotes shared responsibility for disaster resilience. As disaster risks continue to evolve due to climate change, urbanization, and increasing environmental vulnerabilities, local governments must continuously adapt and improve their communication strategies to address emerging challenges while maintaining public trust and encouraging active community participation. Overall, this study concludes that effective and evidence-based risk communication is indispensable in strengthening Local Disaster Risk Reduction and Management (LDRRM) strategies, enhancing community preparedness, and fostering resilient, adaptive, and sustainable communities capable of anticipating, preparing for, responding to, and recovering from future natural disasters. The findings also contribute to the growing body of knowledge on disaster risk communication by providing a comprehensive synthesis of current evidence that may serve as a valuable reference for policymakers, disaster management practitioners, researchers, and other stakeholders committed to advancing disaster resilience and sustainable community development.

RECOMMENDATION

Based on the findings and conclusions of this study, the following recommendations are proposed to further strengthen risk communication strategies and enhance community preparedness for natural disasters. These recommendations are intended to support local government units, disaster risk reduction practitioners, policymakers, educational institutions, and future researchers in promoting more effective and sustainable Local Disaster Risk Reduction and Management (LDRRM) initiatives.

1. **Strengthen multi-channel risk communication systems.** Local government units should continue enhancing the use of both traditional communication channels (e.g., radio, community assemblies, and public announcements) and digital platforms (e.g., social media, mobile applications, and official websites) to ensure that disaster-related information reaches all sectors of the community, including geographically isolated and vulnerable populations.
2. **Promote continuous community engagement and participation.** Local governments should encourage greater involvement of community members in disaster preparedness activities through regular consultations, disaster drills, public awareness campaigns, and participatory planning to foster shared responsibility and strengthen community resilience.
3. **Enhance disaster preparedness education and capacity-building programs.** Educational institutions, local government units, and disaster management agencies should strengthen disaster education by conducting regular training, seminars, and preparedness programs that improve disaster awareness, emergency response skills, and risk reduction practices among different sectors of society.
4. **Strengthen institutional collaboration and stakeholder partnerships.** Disaster risk communication should involve stronger coordination among local government units, national government agencies, educational institutions, non-government organizations, private organizations, community leaders, and other stakeholders to improve information sharing and ensure a more coordinated disaster preparedness and response system.

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5. **Integrate local and indigenous knowledge into disaster communication.** Local governments should recognize and incorporate indigenous practices, local experiences, and community-based knowledge into disaster preparedness planning and communication strategies to ensure that risk communication remains culturally appropriate, locally relevant, and widely accepted by community members.
6. **Regularly assess and improve local risk communication strategies.** Disaster Risk Reduction and Management Offices (DRRMOs) should periodically evaluate the effectiveness of their communication strategies, identify existing gaps and emerging challenges, and implement evidence-based improvements that respond to technological advancements, evolving disaster risks, and changing community needs.
7. **Conduct further empirical and comparative studies.** Future researchers are encouraged to undertake quantitative, qualitative, or mixed-method studies that examine the effectiveness of specific local government risk communication strategies across different geographical settings and disaster contexts. Such studies may also explore the influence of emerging technologies, artificial intelligence, digital communication platforms, and community-based innovations on disaster preparedness and resilience.

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