

Community Awareness And Preparedness In Disaster Risk Communication: A Case Study Of PERMAI Community In Penang, Malaysia

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ABSTRACT

This study investigates community awareness and preparedness in disaster risk communication within the PERMAI community in Penang, Malaysia, a vulnerable Indonesian diaspora exposed to recurrent floods and landslides. Grounded in Risk Communication Theory, Social Capital Theory, Stakeholder Engagement Theory, and the Community-Based Disaster Risk Management (CBDRM) model, the research addresses how communication gaps and limited stakeholder engagement undermine disaster resilience. A qualitative approach was employed through in-depth interviews and focus group discussions to capture lived experiences and community perspectives.

Findings reveal that language barriers, legal insecurity, and limited access to official disaster information significantly hinder preparedness. The absence of a structured and culturally responsive communication system results in misinformation, weak risk perception, and ineffective response. Conversely, community-based strategies—such as peer-led education, participatory risk mapping, and the inclusion of migrant representatives in local planning—proved effective in strengthening social cohesion and building collective readiness. Furthermore, collaboration with stakeholders and tailored multilingual messaging enhanced engagement and trust.

This article contributes to communication and society studies by demonstrating how culturally grounded and participatory communication practices can strengthen disaster resilience among marginalized communities. It offers practical insights for policymakers, NGOs, and disaster management practitioners to design inclusive, localized, and trust-based communication strategies that integrate diaspora populations into national and local risk reduction frameworks.

Keywords: risk communication, community-based disaster management, stakeholder engagement, diaspora resilience.

1. INTRODUCTION

Given the increasing reliance on digital platforms for information-sharing, this study seeks to explore how online narratives and communication dynamics influence disaster preparedness within the PERMAI community. In today's interconnected world, digital media not only provides real-time updates but also shapes collective perceptions, frames social discourse, and influences behavioral responses. In migrant settings, online groups often function as primary arenas for crisis information seeking and sharing, where uncertainty and information insufficiency drive people to search, evaluate, and pass along updates to trusted ties—patterns captured by the CISS framework (Lee & Jin, 2019). However, when official messages are delayed, inconsistent, or not culturally/linguistically accessible, these same networks can amplify rumor and misinformation, eroding trust and impairing protective behaviors—an outcome repeatedly observed in CERC evaluations after major

disasters (Andrade et al., 2020). Similar to how online discourse has been found to shape political perceptions and social mobilization (Carr, 2012; Engdahl & Lidskog, 2012), digital platforms also play a critical role in constructing shared narratives around disaster risks, influencing community engagement, and fostering a culture of preparedness (Reynolds, 2014; Putra & Prasetyo, 2021). For marginalized or migrant groups with limited access to formal channels, digital networks therefore become decisive in determining the quality, credibility, and timeliness of disaster responses.

The selection of this research topic is driven by the urgent need to address disaster risk communication within the PERMAI community, an Indonesian diaspora group residing in Penang, Malaysia. This community faces layered vulnerabilities, including socio-economic precarity, legal insecurity, and linguistic barriers, which hinder effective integration into local disaster management systems. The study aims to investigate how structured risk communication models—that are timely, multilingual, and culturally responsive—can enhance resilience, strengthen social cohesion, and improve preparedness, particularly in migrant settings where communication gaps remain critical obstacles (Rahman & Yusof, 2022).

The geographical context further reinforces the importance of this study. The PERMAI community is strategically located in flood- and landslide-prone areas of Penang, placing them at the frontline of recurring disaster threats. This positioning makes PERMAI a relevant and practical case study for exploring the intersection of awareness, preparedness, and communication effectiveness in disaster risk management. Studying this community offers valuable empirical insights into how localized and culturally adapted strategies—such as peer-led education, participatory risk mapping, and inclusive planning with authorities—can improve resilience, strengthen trust, and foster better responses during emergencies (Lestari & Santoso, 2020). By doing so, the research contributes not only to theoretical discussions on communication and resilience but also to actionable frameworks for inclusive disaster preparedness in diaspora contexts.

This research seeks to uncover the underlying factors that hinder effective disaster preparedness and social integration. By applying established problem-solving frameworks and stakeholder engagement strategies, the study aims to provide practical recommendations for improving disaster resilience in diaspora communities.

Based on the background of the research, this study aims to explore several core questions: What are the key social and safety challenges faced by the PERMAI community in Penang, Malaysia? How does the absence of a structured disaster risk communication system affect the community's preparedness and response capabilities? What role do stakeholder engagement and community-based approaches play in enhancing disaster resilience among diaspora communities? And finally, what are the most effective methods for fostering social cohesion and ensuring better integration into local disaster management frameworks?

The research will examine these questions by utilizing qualitative research methods, including in-depth interviews, focus group discussions, and thematic analysis of community experiences. These approaches will help uncover the real-life challenges faced by PERMAI members and identify potential solutions that align with the needs of the community.

To support the investigation, this research will be grounded in four key theoretical frameworks. Risk Communication Theory will provide insights into how individuals and communities perceive, process, and respond to risk-related information, guiding the analysis of disaster communication strategies within the PERMAI community. Social Capital Theory will help examine the role of trust, social networks, and relationships in enhancing community resilience, emphasizing the influence of social cohesion on collective preparedness and response. Stakeholder Engagement Theory will underscore the importance of involving various actors—such as local authorities, NGOs, and community leaders—in disaster risk management, aiding the assessment of how PERMAI can build stronger partnerships for emergency preparedness. Lastly, the Community-Based Disaster Risk Management (CBDRM) Model will focus on local, community-driven approaches, serving as a framework for identifying best practices in implementing grassroots disaster resilience initiatives within the PERMAI community.

This study is significant because it addresses a critical gap in disaster risk communication among diaspora communities. The findings will contribute to the development of culturally sensitive and community-led

disaster preparedness strategies that can be replicated in other expatriate communities facing similar challenges. Additionally, the research will provide evidence-based recommendations for policymakers and disaster management agencies to improve their engagement with migrant communities.

By exploring these aspects, the study will enhance the understanding of how disaster resilience can be strengthened through social cohesion, effective communication, and inclusive stakeholder collaboration. The results will help shape policies and community initiatives that empower the PERMAI community to respond proactively to disaster risks and build long-term resilience in their new environment.

Difference Between Disaster Communication and Risk Communication. Disaster communication refers to the exchange of information during or immediately after a disaster event. Its focus is on real-time updates, emergency warnings, instructions for safety, and coordination of response efforts. It is reactive in nature, aiming to minimize harm and manage crisis situations as they unfold. Risk communication, on the other hand, is a proactive approach. It involves the ongoing process of informing and educating communities about potential hazards and risks before a disaster occurs. The goal is to build awareness, promote preparedness, and encourage preventive action to reduce vulnerability and enhance resilience.

This research emphasizes risk communication, as it seeks to understand and improve the community's awareness and preparedness in dealing with potential disasters. By prioritizing proactive communication strategies, the study aims to strengthen the PERMAI community's ability to anticipate, interpret, and respond effectively to threats before they escalate into full-scale emergencies. Risk communication, in this sense, is not merely about transferring information but about cultivating trust, building social capital, and encouraging preventive actions that reduce vulnerability. Nevertheless, elements of disaster communication remain relevant, particularly in assessing how the community reacts during the onset of a disaster, manages real-time information flows, and coordinates collective responses.

From this perspective, the research is designed to address several interrelated questions. First, what are the key social and safety challenges faced by the PERMAI community in Penang, especially in relation to their migrant status, legal insecurity, and limited access to official disaster communication channels? Second, how does the absence of a structured and culturally responsive disaster risk communication system affect their awareness, risk perception, and preparedness? Third, in what ways can stakeholder engagement and participatory approaches—such as peer-led education, digital platforms, and inclusive planning—enhance trust, social cohesion, and overall disaster resilience? Finally, what are the most effective methods for integrating diaspora communities like PERMAI into broader disaster management frameworks at both local and national levels?

By articulating these questions, the study not only seeks to advance theoretical discussions on communication, participation, and resilience but also to provide practical guidance for policymakers, NGOs, and disaster practitioners in designing inclusive, localized, and culturally sensitive communication strategies.

2. METHOD

This study adopts a participatory qualitative research approach, incorporating action research elements to actively involve the PERMAI community in Penang, Malaysia. It emphasizes empowering participants and developing practical disaster risk communication strategies aligned with community-based disaster risk reduction frameworks. The unit of analysis includes individual community members, PERMAI groups, and relevant stakeholders such as local authorities and NGOs. Data collection is conducted through a multi-method approach, including semi-structured interviews, focus group discussions, participant observations, and collaborative workshops. Secondary data is gathered from policy documents, academic literature, media content, and past disaster reports. For analysis, the study employs thematic analysis to identify key patterns, content analysis for secondary sources, comparative analysis across participant groups, and triangulation to ensure the reliability and validity of findings.

To complement this methodological design, the research strictly adhered to ethical standards. Prior to each stage of data collection, participants were clearly informed about the purpose, scope, and procedures of the study, as well as their rights as voluntary contributors. Written and verbal informed consent was obtained, ensuring that participants understood their freedom to withdraw at any point without consequence. To safeguard anonymity, pseudonyms were used in transcripts and reports, while all identifiable information was removed from the

dataset. Access to raw data was restricted to the research team and securely stored to prevent unauthorized use. Considering the specific vulnerabilities of the PERMAI community as a diaspora group, particular attention was given to cultural sensitivity, language accessibility, and the minimization of potential risks during fieldwork. The study also emphasized reciprocity, ensuring that findings and practical recommendations would be shared back with the community to strengthen local disaster preparedness. Ethical clearance for this project was obtained through the internal review procedures of the affiliated university, thereby ensuring compliance with international standards of research ethics and local guidelines.

Previous Research Studies and Relevance

Key literature on disaster risk communication and preparedness in migrant and diaspora communities:

No.	Focus Area	Key Study & Source	Findings
1.	Risk Communication and Disaster Preparedness in Migrant Communities	Liu et al. (2021), International Journal of Disaster Risk Reduction	Localized, community-driven risk communication strategies are more effective than top-down approaches in migrant communities across Southeast Asia.
2.	Stakeholder Engagement in Disaster Risk Reduction	Patel & Rogers (2020), Journal of Risk Analysis	Proactive collaboration between government and NGOs enhances disaster preparedness, especially when diaspora communities are included in the planning process.
3.	Social Capital and Community Resilience	Aldrich (2019), Disasters Journal	Communities with strong social capital—shared culture, trust, and internal networks—show faster recovery and greater resilience during disaster events.
4.	Digital Risk Communication and Early Warning Systems	Zhang et al. (2022), Natural Hazards and Earth System Sciences	Mobile apps, social media, and multilingual alerts significantly improve early warning dissemination and response actions in migrant communities.
5.	Diaspora Engagement in Disaster Management	Wong & Tan (2023), Asian Journal of Disaster Management	Diaspora organizations effectively bridge communication gaps with local authorities and must be included in culturally adapted disaster preparedness programs.

This research presents a unique contribution to disaster risk communication by focusing on the Indonesian diaspora in Malaysia, specifically the PERMAI community in Penang. Unlike previous studies that broadly address migrant communities, this research highlights the distinct challenges and resilience strategies of Indonesian expatriates.

3. RESULTS AND DISCUSSION

To address the challenges faced by the PERMAI community in Penang, Malaysia, a structured problem-solving approach is essential. The community struggles with social cohesion and disaster preparedness, compounded by the fact that they are a diverse group of Indonesians living in a foreign country. Limited access to local safety systems and resources further exacerbates these issues. Therefore, a combination of strategic methods will be implemented to analyze and resolve these challenges.

Strategy	Description	Key Actions	Expected Outcomes
1. Root Cause Analysis (RCA)	Identifies the underlying causes of social disconnection and disaster vulnerability, including socioeconomic disparities and limited interaction with local communities.	- Conduct socio-demographic profiling - Map social and cultural barriers - Analyze access gaps to resources and services	- Targeted interventions - Stronger social integration - Improved access to emergency support

2. Stakeholder Engagement Model	Promotes collaboration among PERMAI members, local authorities, and NGOs to build trust, share resources, and ensure inclusive disaster response.	<ul style="list-style-type: none"> - Establish stakeholder forums - Regular collaboration meetings - Formalize community representation in disaster planning 	<ul style="list-style-type: none"> - Strengthened community networks - Institutional support - Inclusion in local disaster response systems
3. Data-Driven Decision Making	Uses data from surveys, discussions, and feedback to guide strategic planning. Interventions are implemented in phases with ongoing monitoring and evaluation.	<ul style="list-style-type: none"> - Conduct baseline and follow-up assessments - Analyze trends in vulnerabilities and preparedness - Pilot programs and adjust based on feedback 	<ul style="list-style-type: none"> - Evidence-based solutions - Adaptive program implementation - Continuous improvement in preparedness
4. Capacity Building Approach	Focuses on training and empowerment to enhance disaster knowledge and response capabilities, with attention to language and cultural sensitivities.	<ul style="list-style-type: none"> - Tailored disaster preparedness training - First aid and emergency protocol workshops - Simulation drills - Develop Early Warning System (EWS) 	<ul style="list-style-type: none"> - Enhanced community skills - Increased self-reliance - Functional grassroots risk communication system

Moreover, cultural adaptation and psychological support services will be implemented to help members cope with trauma after disasters, ensuring a holistic response beyond physical preparedness. Additionally, economic resilience programs such as financial literacy workshops and skill-building initiatives will be introduced to provide affected individuals with the means to recover financially post-disaster.

The topic of disaster risk communication and resilience among diaspora communities has been an area of increasing interest in recent years. With the rise in global migration and the increasing frequency of natural disasters, scholars have investigated how communities living abroad adapt to new risk environments. Several models and frameworks have been developed to understand disaster preparedness, risk communication, and community engagement, particularly among minority and expatriate groups.

Existing research highlights the importance of risk communication strategies tailored to specific communities, considering linguistic, cultural, and socioeconomic factors. Studies have emphasized the role of local governance and stakeholder collaboration in fostering disaster resilience, particularly in host countries where migrants may not have direct access to official emergency resources. While significant work has been done in understanding disaster risk communication broadly, there remains a gap in research focusing on Indonesian diaspora communities, particularly those residing in Malaysia.

Key innovations of this study include a targeted focus on the Indonesian diaspora, addressing a significant research gap by examining disaster preparedness and risk communication within this expatriate community in Malaysia. The research also emphasizes the integration of cultural and technological approaches, combining culturally adapted practices with digital communication tools to strengthen community response during disasters. Furthermore, it introduces a community-led disaster communication model, advocating for participatory engagement in which community members actively contribute to the development of risk messages rather than being passive recipients. Finally, the study ensures empirical validation through simulations, implementing real-world disaster preparedness exercises to test and refine theoretical frameworks with practical, actionable outcomes.

By integrating these elements, the study advances disaster resilience strategies tailored to diaspora communities, offering practical insights for both policymakers and community leaders. This research aims to ensure that at least 70% of the references are sourced from peer-reviewed scientific journals, providing a strong academic foundation for the study. The findings will contribute to the broader discourse on disaster risk reduction, resilience-building, and migrant community engagement in disaster management.

To answer the research questions, the following are the findings that answer these questions using the theories mentioned previously, namely as follows.

Social and Safety Challenges in the PERMAI Community

The PERMAI community in Penang faces multilayered social and safety challenges rooted in their migrant status, economic vulnerability, and limited integration into local governance structures. Interviews revealed that language barriers, lack of legal documentation, and social stigma significantly reduce access to official disaster-related information and services. Many community members depend on informal networks and digital messaging platforms for updates during crises, leading to fragmented and sometimes inaccurate information. This aligns with Social Capital Theory, which emphasizes the role of trust, networks, and reciprocity. However, in the PERMAI context, bonding social capital (within-group trust) exists, while bridging capital (linkages to institutions) remains weak.

The PERMAI community, primarily consisting of Indonesian migrant workers and their families in Penang, Malaysia, faces compounded social vulnerabilities and safety risks. Key challenges include:

Challenge	Description
Language Barriers	Limited proficiency in Bahasa Malaysia or English hinders understanding of official disaster communications and public service announcements.
Documentation and Legal Status	Irregular migration status discourages engagement with formal institutions due to fear of legal consequences or deportation.
Isolation and Stigma	Cultural differences and marginalization lead to self-segregation, limiting integration with the broader community and access to disaster preparedness programs.
Economic Constraints	Low-income levels prevent investment in disaster-related resources such as insurance, emergency supplies, and safety infrastructure.

According to Social Capital Theory, while strong bonding capital (close-knit internal ties) exists within the PERMAI community, bridging and linking capital (relationships with other groups and institutions) are weak. This imbalance results in a self-reliant yet disconnected community, unprepared for system-level coordination during disaster events.

Impact of Unstructured Disaster Risk Communication

The absence of a structured and culturally responsive disaster risk communication system was found to severely limit the PERMAI community’s preparedness and response. Respondents noted confusion during flood warnings, limited participation in drills, and inconsistent message delivery from authorities. From the lens of Risk Communication Theory, the lack of clear, timely, and credible messages results in low risk perception, minimal action, and increased vulnerability. Moreover, the community's reliance on peer-to-peer information sharing without verification mechanisms further amplifies misinformation during emergencies.

The study found that the lack of a structured disaster risk communication (DRC) system severely undermines the community's ability to respond effectively to natural disasters such as flash floods or landslides. Key observations include:

Issue	Description
Information Gaps	Absence of multilingual and culturally adapted communication leads to misunderstanding or disregard of warnings and preparedness messages.
Misinformation Spread	Lack of verified information sources allows rumors and false news to spread rapidly through informal digital channels, causing confusion or panic.
Delayed Response	Inadequate early warning systems and lack of coordinated evacuation plans result in slow or inappropriate emergency responses.

From the perspective of Risk Communication Theory, effective disaster communication must include clarity, credibility, timeliness, and audience segmentation. The current approach by local agencies often assumes uniform understanding across diverse populations, ignoring the PERMAI community’s specific needs. This top-down model fails to foster trust or behavioral change.

Role of Stakeholder Engagement and Community-Based Approaches

Stakeholder engagement is currently minimal and ad hoc. NGOs and local authorities have initiated some outreach, but these efforts often fail to sustain long-term trust or active participation. Stakeholder Engagement Theory underscores the need for inclusive, iterative dialogues with marginalized communities. Findings support that when stakeholders—such as municipal agencies, community leaders, and NGOs—collaborate meaningfully with PERMAI residents, the community demonstrates higher receptiveness and participation in disaster preparedness activities. Engagement strategies that included participatory workshops and localized early warning messages showed promising outcomes. Simultaneously, the CBDRM Model highlights the potential for community-driven solutions. Focus group data revealed that when disaster education and risk mapping were co-developed with PERMAI members, participants reported a stronger sense of agency and improved household readiness.

The study revealed that stakeholder engagement with the PERMAI community has been sporadic and largely symbolic, with minimal long-term collaboration. However, case examples from NGOs and faith-based organizations showed that when community members are actively involved in the design and delivery of disaster preparedness initiatives, outcomes improve significantly. Examples of positive engagement include joint simulation drills led by NGOs and community leaders, participatory disaster mapping and local hazard identification activities, and community forums to co-create emergency plans.

Based on Stakeholder Engagement Theory, such collaboration must go beyond consultation and into shared decision-making and power redistribution. Engagement is most successful when it is consistent and relationship-based (not event-based), uses local leaders as liaisons and knowledge holders and builds trust through transparency and follow-through. Similarly, the Community-Based Disaster Risk Management (CBDRM) model advocates for community ownership of risk reduction. When PERMAI members felt they had a voice, they were more likely to engage, spread awareness, and sustain disaster risk reduction (DRR) practices.

Fostering Social Cohesion and Integration into Disaster Management Frameworks

To enhance integration and cohesion, findings suggest prioritizing multilingual communication, culturally sensitive training, and inclusion of migrant representatives in local disaster planning bodies. Strategies such as peer-led education programs and simulation exercises tailored to community context have been effective. These findings reinforce Social Capital Theory and CBDRM, demonstrating that shared experiences and participatory processes build trust and collective identity, ultimately improving community resilience.

To foster stronger social cohesion and integrate the PERMAI community into Penang’s disaster management framework, the following practices emerged as effective:

Strategy	Description
Culturally Sensitive Communication	Delivering messages in Indonesian and using culturally relevant values (e.g., family, religion) increased message acceptance and understanding.
Peer-to-Peer Education	Training community members as "disaster ambassadors" helped spread accurate information, strengthen internal trust, and encourage active participation.
Inclusion in Municipal Planning	Involving PERMAI representatives in official emergency planning meetings reduced communication gaps and improved mutual understanding with local authorities.
Shared Spaces and Events	Participation in public drills, community clean-ups, and resilience events fostered inter-community trust and reduced social stigma and isolation.

Through the lens of Social Capital Theory, these practices strengthen bridging capital, enhancing ties between the PERMAI group and wider civil society. Meanwhile, the CBDRM model supports these efforts by promoting bottom-up planning and inclusive frameworks that respect local knowledge and encourage sustainability. To ensure the effectiveness of the proposed solutions, a continuous monitoring and evaluation (M&E) framework will be established regular assessments to measure progress and impact, community feedback

sessions to integrate local insights into ongoing interventions, and comparative analysis between pre-intervention and post-intervention conditions to gauge overall improvement. By implementing this structured problem-solving framework, the PERMAI community will be better prepared to address social and disaster-related challenges, creating a more resilient and cohesive community in Penang, Malaysia.

4. CONCLUSION

The research illustrates that disaster preparedness in diaspora communities such as PERMAI is highly contingent upon three interconnected factors: the quality of communication, the strength of community networks, and the degree of institutional inclusion. The evidence demonstrates that resilience cannot be achieved solely through top-down dissemination of information; rather, it requires a structured, participatory, and culturally responsive approach. By integrating the perspectives of Risk Communication Theory, Social Capital Theory, Stakeholder Engagement Theory, and the Community-Based Disaster Risk Management (CBDRM) model, this study confirms that disaster risk reduction is most effective when rooted in dialogue, trust, and shared ownership of knowledge and practices.

The case of PERMAI reveals critical challenges that constrain preparedness: language barriers, legal and documentation vulnerabilities, and limited institutional access. These issues systematically reduce the community's ability to participate in formal disaster management mechanisms. In the absence of a structured and inclusive communication framework, misinformation spreads easily, risk perception remains low, and emergency responses become fragmented. Such conditions heighten vulnerabilities and perpetuate cycles of exclusion.

Yet, the findings also highlight the transformative potential of participatory and community-based approaches. When diaspora communities are included in planning processes, engaged in peer-led risk education, and supported by multilingual communication tailored to their context, both social cohesion and institutional trust improve significantly. These practices not only strengthen bonding ties within the community but also build bridging capital with local institutions—an essential condition for sustainable resilience. This confirms that disaster preparedness is not merely a technical process but a communicative practice that must be inclusive, localized, and sensitive to cultural realities.

Theoretically, this study enriches communication and society scholarship by demonstrating how risk communication in marginalized diaspora settings differs from mainstream community-based approaches. Practically, it offers scalable insights for policymakers, practitioners, and local authorities. Inclusive disaster risk communication must move beyond treating migrant groups as passive recipients of information; they should instead be empowered as active agents in risk reduction, capable of contributing knowledge, shaping messages, and participating in decision-making.

Future Research Directions

While this study has provided valuable insights, it is limited to a single case study of the PERMAI community in Penang. Future research may adopt comparative approaches across different diaspora groups in Southeast Asia to examine how cultural, political, and institutional contexts shape disaster communication practices. Longitudinal studies could further investigate how community-based strategies evolve over time and whether trust and resilience gains are sustainable. In addition, integrating digital ethnography and social media analytics would offer a deeper understanding of how online platforms mediate risk communication among migrant populations. Lastly, cross-disciplinary collaborations—combining communication studies, disaster management, and migration research—could advance more holistic frameworks for addressing disaster preparedness in increasingly multicultural and transnational societies.

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