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The role of local language in risk communication: a case study of disaster messaging in Eastern Indonesia

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ABSTRACT

Background: Disaster communication in multilingual regions of Eastern Indonesia faces challenges due to linguistic diversity and the dominance of national-standard messaging. **Objective:** This study aims to examine how the use of local languages and culturally embedded signs influences the effectiveness of disaster risk communication in selected high-risk communities. **Method:** A qualitative approach was employed using semiotic analysis, critical discourse analysis, thematic analysis, and ethnographic content analysis on visual, audio, interview, and community media data. **Results:** Findings show that disaster messages integrating local language, visual symbolism, and oral narratives significantly enhance clarity, urgency, and trust among recipients. Multimodal communication strategies rooted in cultural familiarity improve comprehension and trigger faster behavioral response during crises. Messages delivered through local media and everyday linguistic expressions are perceived as more legitimate and emotionally resonant than standardized formats. This suggests that localized disaster communication is not only more inclusive but more effective in fostering risk awareness and action. **Implications:** The study implies that disaster communication policy should institutionalize culturally and linguistically responsive practices to increase resilience and equity in at-risk populations. **Novelty:** This study offers a novel contribution by integrating multimodal discourse analysis with culturally grounded linguistic practices to demonstrate how localized communication frameworks enhance the effectiveness of disaster risk messaging in multilingual contexts.

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1. INTRODUCTION

In multilingual regions of Eastern Indonesia, risk communication plays a critical role in disaster preparedness and response. However, standardized disaster messages often fail to resonate with linguistically diverse local populations. This disconnection can be fatal, particularly in high-risk areas like Flores, Alor, and Lembata where natural disasters such as tsunamis, earthquakes, and volcanic eruptions are recurrent. Many local communities primarily understand local vernaculars such as Lamaholot, Sabu, or Kedang, rather than Bahasa Indonesia. When warnings are not linguistically accessible, evacuation compliance and comprehension decline dramatically. Given the region's geographical isolation and communication infrastructure gaps, the integration of local languages in disaster communication is not a cultural luxury but a life-saving necessity. Therefore, this research is crucial to understand how local languages, both verbal and

symbolic, are utilized in disaster messaging and how such practices can enhance or hinder effective risk communication at the grassroots level in Eastern Indonesia.

Previous studies on disaster risk communication have predominantly focused on institutional preparedness, message clarity, and media technology use [1], [2], [3]. In the Indonesian context, research often centers around national communication strategies and the effectiveness of early warning systems in Bahasa Indonesia [4], [5]. While these studies provide insights into system-level communication, they rarely address the linguistic and semiotic dimensions of risk communication, especially in multicultural and multilingual contexts. Some ethnolinguistic works acknowledge the role of local knowledge in environmental awareness [6], but few explore how local languages are operationalized within official disaster responses. Moreover, the intersection of visual semiotics, community radio, and oral traditions in disaster education remains underexplored. This research thus fills a critical gap by analyzing not just what is said, but *how* it is said—through local words, visual cues, and symbolic forms deeply embedded in Eastern Indonesian culture.

This study investigates how local languages and culturally grounded symbols contribute to disaster risk communication in Eastern Indonesia. The core research questions include: (1) How are local languages utilized in written, audio, and visual disaster messages? (2) What linguistic and semiotic strategies are employed in educational and emergency materials? (3) How do local residents perceive the credibility and effectiveness of messages delivered in their own language? (4) In what ways do cultural-linguistic factors mediate the reception and actionability of risk information? To address these questions, the study analyzes a corpus of written documentation, audio-visual materials, community radio broadcasts, and ethnographic interviews. By focusing on communicative practices in localized contexts, the research aims to uncover the discursive, thematic, and symbolic layers of disaster messaging that may either empower or marginalize vulnerable communities in their efforts to respond to environmental hazards.

Preliminary analysis suggests that disaster messages articulated in local languages significantly enhance cognitive recognition, emotional urgency, and behavioral compliance among residents in risk-prone regions. The research posits that linguistic familiarity not only bridges the comprehension gap but also reconfigures power dynamics between state authorities and local communities—transforming top-down mandates into collaborative risk dialogues. Furthermore, the deployment of culturally resonant phrases, indigenous metaphors, and community radio in vernacular languages contributes to inclusive risk education. These practices localize authority and embed safety instructions within everyday discourse. However, this linguistic adaptation is not uniformly institutionalized, and its absence in official disaster protocols presents a systemic barrier. Hence, the study argues that integrating local language strategies into formal disaster communication systems could significantly increase resilience and responsiveness. It also calls for policy reforms that legitimize and standardize local language use in risk communication as a form of linguistic justice and disaster equity in Indonesia's multicultural peripheries.

2. LITERATURE REVIEW

2.1. Risk communication: definitions and divergent understandings

Risk communication refers to the process of exchanging information, advice, and warnings among stakeholders regarding potential hazards and threats. According to David Leimstädtner (2023), it is not merely the transmission of technical data, but an interactive dialogue aimed at enabling informed decision-making [7]. The World Health Organization defines risk communication as the "real-time exchange of information" between experts and those facing risks. However, definitions vary across disciplines. In public health, it emphasizes behavioral change, while in disaster studies, it focuses on timely evacuation and compliance. Mathias Herzing (2021) highlights the complexity of communicating uncertainties and probabilities, which adds layers of interpretation depending on the social context [8]. Scholars also debate whether risk communication should be linear or dialogical. These varying conceptualizations reflect an evolving understanding of communication that must integrate cultural, linguistic, and emotional dimensions—particularly in multicultural and multilingual settings like Eastern Indonesia.

Risk communication can be understood through several interrelated dimensions: content clarity, trust, channel effectiveness, cultural relevance, and community engagement [9], [10]. First, clarity of content is central; messages must be easily understood by target audiences, especially under time pressure. Second, source credibility or trust plays a crucial role in whether people heed warnings. Third, channel efficiency—whether messages are transmitted through radio, SMS, posters, or interpersonal channels—affects reach and impact. Fourth, cultural and linguistic appropriateness determines how well messages resonate, particularly in ethnolinguistically diverse regions. Finally, two-way communication and local participation are emphasized in more participatory frameworks, where risk is co-managed through inclusive dialogue. These indicators show that effective risk communication extends beyond content delivery, demanding attention to social, linguistic, and technological interfaces between authorities and communities.

2.2. Local language use in disaster communication

Local language use in disaster communication refers to the employment of indigenous or vernacular languages to convey warnings, instructions, and educational content related to risk. Muti'ah Rihul Jannah (2026) argues that local languages carry cultural and epistemological significance, acting as vehicles of local knowledge and emotional proximity [11]. In the context of crisis messaging, Susannah V. Levi (2024) emphasizes that language is not a neutral tool but a carrier of social meaning—thus, messages in unfamiliar languages may be perceived as distant, abstract, or even threatening [12]. Others contend that monolingual disaster strategies often fail to account for linguistic minorities [2], [13]. However, debates exist around feasibility, translation accuracy, and resource allocation. Some scholars argue for standardized national languages to ensure consistency, while others advocate for localization to improve comprehension and trust. This tension reflects broader debates between top-down and bottom-up disaster governance, particularly in linguistically fragmented nations like Indonesia.

Local language use in risk communication can be analyzed through dimensions such as linguistic accessibility, cultural resonance, emotional impact, intergenerational transmission, and symbolic recognition [14]. First, accessibility relates to whether messages are cognitively and semantically comprehensible to recipients. Second, cultural resonance means aligning risk messages with local metaphors, idioms, and norms—thereby increasing uptake. Third, local language increases emotional salience and may evoke a sense of urgency or care that standardized language cannot convey. Fourth, using local language in school drills or community radio promotes intergenerational awareness of risk knowledge. Lastly, symbolic recognition—the acknowledgment of minority language rights—can increase trust in institutions and inclusivity in policy implementation. These dimensions underscore the need for disaster communication that is not only linguistically accurate but also socially embedded in local ecologies of meaning.

2.3. Multimodal disaster messaging

Multimodal disaster messaging refers to the integration of textual, auditory, visual, and symbolic modes in delivering risk information. Drawing from Francesca Marino (2024) theory of multimodality, communication is not confined to linguistic texts but involves visual design, spatial arrangement, sound, and gesture [15]. In the context of disasters, this includes warning sirens, color-coded maps, pictograms, broadcasted messages, posters, and live simulations. Scholars argue that multimodal integration enhances accessibility, especially for populations with low literacy or limited language proficiency [16], [17], [18]. Furthermore, Barthes' (1977) semiotic analysis suggests that signs and images carry denotative and connotative meanings, which may be culturally interpreted [19]. Yet, challenges arise when visual symbols are not culturally standardized, leading to misinterpretation [20]. As such, multimodality offers an inclusive communication strategy—but its effectiveness depends on cultural contextualization, design consistency, and participatory message co-creation with the intended audience.

The effectiveness of multimodal messaging can be examined through several dimensions: redundancy, visual legibility, symbolic clarity, cultural appropriateness, and technological adaptability. Redundancy ensures that key messages are repeated across modes—e.g., a tsunami warning broadcasted via radio, displayed on banners, and illustrated in community murals. Visual legibility refers to the clarity of posters, color contrast, and font size—critical in emergency contexts. Symbolic clarity involves using images or icons (e.g., evacuation arrows or volcano graphics) that are intuitive across languages. Cultural appropriateness ensures that symbols or depictions do not conflict with local beliefs or customs, which can otherwise hinder trust [21]. Lastly, technological adaptability refers to the ability of a message to be disseminated across multiple platforms: from loudspeakers and radio to WhatsApp and village billboards. These elements reinforce the idea that disaster messaging must operate on multiple sensory and interpretive levels to be truly effective in diverse settings.

3. METHOD

The unit of analysis in this study comprises linguistic and semiotic elements embedded within various forms of disaster communication in Eastern Indonesia. Specifically, the research focuses on phrases, sentences, and symbolic expressions used in printed and audio warnings, disaster education materials, public comments, and community perceptions regarding local language use, as well as visual-verbal discourse in educational media. These elements are drawn from banners, posters, leaflets, videos, radio broadcasts, and direct speech in local languages such as Lamaholot, Sabu, Alor, Kedang, and Manggarai. The inclusion of both textual and visual data enables a holistic examination of how language operates within multimodal risk messages. Given the sociolinguistic diversity and disaster-prone nature of the region, analyzing these communicative components is essential to understanding the depth of community engagement and the cultural appropriateness of disaster risk communication. This approach allows the study to capture both literal and connotative meanings that shape public responses to emergencies.

This study employs a qualitative research design with a critical-ethnographic orientation to examine the contextual use of local language in disaster communication. A qualitative approach is appropriate because it enables an in-depth exploration of meaning-making processes, cultural narratives, and symbolic interpretations that quantitative methods may overlook. The critical-ethnographic lens, drawing from M Call-Cummings (2023), facilitates an interrogation of power relations, inclusion, and local agency in disaster messaging practices [22]. It further accommodates participatory observation and insider perspectives, recognizing that communication is embedded in lived experience and collective memory. The choice of this design is grounded in the need to uncover how linguistic strategies affect not only comprehension but also community trust, mobilization, and resilience. By examining discourses and practices within naturalistic settings, the study aims to identify both enabling and constraining factors in the use of indigenous languages for risk communication in Indonesia's peripheral regions.

The study gathers information from multiple credible and triangulated sources. Primary sources include official disaster communication materials obtained from local disaster management agencies (BPBD), community radio stations, and educational institutions. These encompass written texts (banners, posters, leaflets), audio recordings (evacuation announcements), and audiovisual content (simulation videos, YouTube disaster education media). Additional data come from semi-structured interviews with key informants, such as traditional leaders, teachers, affected residents, and disaster officers. The study also relies on secondary sources like academic reports (e.g., UGM master's theses), NGO documentation (e.g., SHEEP Indonesia, Plan Indonesia), and national-level repositories (BNPB and RRI). These sources are selected based on validity, accessibility, and representativeness across different islands and linguistic communities. This multi-source strategy not only enriches the data corpus but also ensures that findings are grounded in local realities while reflecting broader institutional dynamics surrounding risk communication [23].

Data collection was conducted through four primary techniques: document analysis, audiovisual retrieval, semi-structured interviews, and participant observation. Document analysis involved the systematic collection and cataloging of disaster-related printed materials from BPBD offices and schools in Flores Timur, Alor, Lembata, and Sabu Raijua. Audiovisual data were gathered from official YouTube accounts, community radio broadcasts, and BPBD audio archives. Semi-structured interviews with 10–15 participants were conducted in situ, using flexible guiding questions to explore perceptions of message effectiveness and cultural appropriateness. Participant observation was carried out during school disaster drills and community simulations, with field notes emphasizing language use, reactions, and contextual adaptations. Ethical procedures, including informed consent and confidentiality, were applied throughout. The collection process spanned three months and aimed to capture both static artifacts (e.g., posters) and dynamic performances (e.g., radio announcements), ensuring a rich, context-sensitive understanding of local language use in real-life disaster communication scenarios.

The analysis involved four stages: data familiarization, coding, categorization, and interpretation using multiple analytic lenses. First, all textual and audiovisual data were transcribed and translated when necessary. Next, data were coded using both inductive and deductive strategies [24]. For linguistic and textual data, Critical Discourse Analysis (CDA) following Fairclough's (1995) framework was applied to uncover ideologies, power dynamics, and inclusivity in the messaging [25]. Visual and audio elements were examined through Semiotic Analysis, focusing on denotative and connotative meanings [26], [26]. Interview transcripts were analyzed using Thematic Analysis, allowing patterns and themes to emerge regarding local perceptions of risk communication [27]. Lastly, Ethnographic Content Analysis (K Buckler, EL Gilmore) was used to relate findings to their sociocultural context. These combined methods ensure a layered, culturally grounded interpretation of how local language and symbols function in disaster messaging, offering both analytical rigor and contextual sensitivity.

4. RESULTS

4.1. Semiotic analysis: interpreting linguistic and visual risk messaging

Semiotic inventory of disaster media materials are posisble to analyze with six representatives. As shown in Table 1, each combines linguistic text, visual symbols, and cultural signs that together construct meaning beyond literal interpretation, responding to the realities and beliefs of local audiences in disaster-prone zones.

The materials analyzed demonstrate a consistent multimodal pattern: combinations of local language, culturally resonant imagery, and accessible symbols aim to optimize risk communication. Three dominant trends emerge. First, integration of indigenous language—such as Lamaholot, Sabu, Kedang, and Alor—forms a bridge between government intention and community cognition. Second, visual design elements (e.g., exclamation icons, flood symbols, running figures) are universally legible but paired with region-specific messages, enhancing cultural proximity. Third, auditory components—siren, traditional gongs, and recorded voice in local dialects—add affective intensity and ceremonial familiarity, especially in oral-tradition communities like Sabu and Alor. These media simultaneously warn, educate, and persuade, utilizing

local semiotic systems rather than relying solely on bureaucratic or scientific language. As SM Sunnatovna (2025) suggested, meaning is constructed at both denotative (literal) and connotative (symbolic, emotional) levels [28]. Thus, these patterns illustrate how multimodal signs are assembled to ensure linguistic clarity and cultural resonance in high-stress moments of disaster.

Table 1. Semiotic inventory of disaster media materials

Media Type	Text/Audio/Visual Element	Local Language	Region	Denotative Meaning	Connotative Interpretation
Banner (Printed)	"Lako mai lia-lia! Tsunami lae bene!" + image of wave & child running	Lamaholot	Flores Timur	Urge to evacuate quickly	Innocence, vulnerability, moral responsibility
Poster (Printed)	"Hau ke mi!" + exclamation sign + dual Bahasa Sabu and Indonesian text	Sabu	Sabu Raijua	Be alert! Emergency warning	Cultural respect, inclusive governance
Leaflet (Printed)	"Mi reba peto" + traditional home on elevated land	Alor	Alor	Go to higher ground	Collective memory, ancestral wisdom
Audio Message	Siren + command in Bahasa Sabu + traditional gong	Sabu	Sabu Raijua	Tsunami approaching; evacuate now	Alarm through traditional authority
Video (YouTube BNPB)	Visual of family evacuation + dialogue in Lamaholot + subtitle in Bahasa Indonesia	Lamaholot	Adonara, Lembata	Step-by-step evacuation tutorial	Empathy, familial solidarity, realism
Simulation Recording	Community leader guides drill in Bahasa Kedang, supported by signage & loudspeaker	Kedang	Lembata	Mobilization based on local instructions	Trust in local authority, cultural legitimacy

This semiotic pattern reflects a strategic cultural-linguistic localization of state authority in disaster communication. The connotative layers reveal that messages are not only designed to instruct behavior but also to invoke memory, trust, and identity. For instance, *"Mi reba peto"* does not merely suggest movement to higher ground—it summons ancestral logic rooted in indigenous environmental knowledge. The sound of traditional gongs, when synchronized with evacuation commands, triggers both alarm and ritual consciousness, making it more likely for community members to react instinctively. This aligns with the argument by AA Shah, A Khan, et al., (2015) that risk messages are more effective when grounded in social familiarity [29]. Moreover, the combination of visual and verbal signs co-produces meaning, ensuring messages are seen, heard, and felt. This is especially important in remote Indonesian regions with high linguistic diversity and limited internet access. In sum, the semiotic strategy situates the disaster message as not only a government directive, but as a culturally embedded collective call to action.

4.2. Critical discourse analysis: power, language, and risk messaging

The verbal discourses from written, audio, and broadcast media illustrates how power, urgency, and social identity are linguistically constructed. Table 2 reveals a continuum of top-down institutional authority and localized participatory tones, which operate across different communication channels.

The discourse across various platforms reveals three dominant rhetorical strategies: imperative modality, collectivist appeals, and intergenerational legitimation. First, imperative verbs (e.g., "Run," "Siapkan keluarga," "Jangan tunggu guru") dominate nearly all texts and audio, signaling urgency and command. This is typical in crisis communication where action must follow swiftly. However, the source of authority varies. In school drills or community radio, instructions are often delivered by local figures using familiar phrasing, fostering horizontal trust. Second, a strong collectivist frame is evident—phrases like "bersama kita kuat" or "dengarkan aba-aba" position survival as a shared responsibility, resonating with Indonesian communal culture (*gotong royong*). Third, references to elders or traditional wisdom ("ingat nasihat orang tua") serve to embed state instructions within moral and cultural narratives, lending them legitimacy. These patterns align with Fairclough's (1995) view of discourse as a site of power negotiation, where language reflects and reproduces both institutional control and grassroots agency [25].

Table 2. Linguistic patterns and discursive authority

Document/Media Type	Sample Discourse (Verbatim)	Language	Region	Discursive Feature	Institutional Source
Disaster Leaflet	"Mi reba peto – Selamatkan dirimu, ingat nasihat orang tua."	Bahasa Alor	Alor	Intergenerational moral imperative	BPBD Kabupaten Alor
Radio Broadcast (RSA FM)	"Saudara-saudara, gempa kuat mungkin disusul tsunami. Dengarkan aba-aba. Jangan panik."	Bahasa Abui	Alor	Collective urgency, imperative tone	LPP RSA FM Alor
Poster (Bilingual)	"Bahaya Banjir – Hau ke mi! Ayo siaga, bersama kita kuat."	Bahasa Sabu + BI	Sabu Raijua	Unity framing; state–community cohesion	SHEEP Indonesia + BPBD
School Drill Commentary	"Anak-anak, kalau dengar 'lae bene' langsung ke bukit. Jangan tunggu guru."	Bahasa Lamaholot	Flores Timur	Informal authority, peer-to-peer logic	INOVASI + Dinas Pendidikan
RRI Pro 1 Kupang Segment	"Waspada cuaca ekstrem. Hujan deras bisa sebabkan banjir. Siapkan keluarga. Info resmi RRI."	Bahasa Dawan	Kupang	Government voice, formal warning modality	RRI.go.id
Simulation Audio (BPBD)	"Lako mai lia-lia! Tsunami lae bene!" (Run now! A tsunami is coming!)	Bahasa Lamaholot	Lembata	Command-based framing, emotional urgency	BPBD Flores Timur

The interplay of national-standard Indonesian and local vernaculars in disaster communication reveals a negotiation of discursive authority. Messages delivered solely in Bahasa Indonesia (e.g., RRI Kupang) exhibit formal institutional control, consistent with state-centric communication paradigms. Yet, this risks alienating non-fluent or culturally distant audiences. In contrast, locally produced materials and broadcasts (e.g., RSA FM Alor, school drills) demonstrate a discursive decentralization, where power is localized through language familiarity and socio-cultural proximity. This aligns with van Dijk's (1993) assertion that access to discourse equates to access to power [30]. Where local language is absent, communities may perceive messages as "external" or less trustworthy. Moreover, integrating cultural phrases not only enhances semantic understanding but also legitimizes indigenous knowledge as part of disaster governance. Thus, CDA exposes not just the linguistic patterns, but the ideological currents—the tension between state-driven control and community-based resilience—embedded in how disaster risks are verbalized and enacted.

4.3. Local narratives and risk engagement through community media

The community voices, school observations, and local media scripts shows how local languages and cultural cues inform understanding, behavior, and trust in risk communication. These sources form the empirical foundation for the thematic categories described in Table 3.

From the above data, three central themes emerged: (1) linguistic familiarity as a trust builder, (2) community media as an informal education platform, and (3) cultural narratives as predictive frameworks. First, the repeated emphasis on mother tongue use—by both teachers and radio hosts—indicates that residents perceive messages as more authentic and urgent when delivered in their native language. Second, community radio functions as a decentralized but powerful medium, bridging gaps between state warnings and local comprehension. As it is embedded in daily routines and uses vernacular speech, it often succeeds in explaining risk more clearly than official announcements. Third, many participants recall ancestral sayings or symbolic understandings (e.g., storm = sea level rise), which provide culturally embedded early warning systems. These themes collectively highlight that risk communication is not only linguistic but also deeply narrative-driven, with localized storytelling shaping how people interpret danger and decide to act.

Table 3. Themes from interviews and community radio

Data Source	Extracted Quote/Theme	Speaker Type	Region	Emerging Theme
Interview (Warga Terdampak)	"Saya baru paham kalau sirene artinya tsunami setelah dengar dari radio kampung."	Female villager	Lembata	Media literacy & informal learning
Radio RSA FM (Abui)	"Kalau ada gempa, jangan tunggu-tunggu. Lari ke bukit. Dengarkan suara gong."	Broadcaster (community)	Alor	Traditional alarm + call to action
Interview (Guru SD)	"Anak-anak lebih nurut kalau saya pakai bahasa ibu. Mereka langsung paham dan tanggap."	Elementary teacher	Ile Ape, Lembata	Language intimacy fosters response
Radio Citra Manggarai	"Bapak-ibu, hujan lebat rawan banjir, simpan barang penting, pakai bahasa Manggarai ya."	Presenter (radio local)	Ruteng, Manggarai	Cultural anchoring of warning
Interview (Tokoh Adat)	"Dulu leluhur kita bilang kalau angin besar datang, air laut akan naik. Sekarang terbukti."	Community elder	Desa Pledo, Alor	Indigenous knowledge = early warning
School Observation	"Siswa lebih aktif tanya kalau simulasi pakai bahasa sehari-hari."	Field note	Adonara, Lembata	Familiarity increases engagement

The thematic analysis reveals that narratives rooted in local language and everyday interaction significantly influence how risk messages are internalized and acted upon. T DeGloma (2024) argues that themes are not just patterns in data but structures of meaning shaped by sociocultural contexts [31]. In this case, messages conveyed via local dialects—especially through informal but trusted platforms like school drills and radio broadcasts—are interpreted as more credible than unfamiliar institutional messages. This credibility arises from narrative proximity: the idea that speakers share the same linguistic, moral, and experiential world as their audience. Additionally, cultural frames such as myths, proverbs, and oral histories provide an epistemological scaffold for understanding environmental hazards. Rather than dismissing these as folklore, integrating them into disaster communication enhances affective engagement and cognitive anchoring. Therefore, local language is not merely a medium, but a mode of risk knowledge production, transforming passive listeners into active risk actors through relatable, meaningful narratives.

5. DISCUSSION

The use of local language and culturally resonant visual signs in disaster communication has clear functional value: it significantly enhances message salience, trust, and behavioral responsiveness in high-risk communities. As shown in banners, videos, and audio recordings, combining linguistic familiarity with symbolic imagery (such as waves, gongs, or local idioms) makes warnings cognitively and emotionally engaging. This integration is especially effective in regions with low literacy or multilingual diversity, where monolingual national messaging risks being misunderstood. Studies by Anna Rostomyan (2023) & Neya Global (2025) support this finding, asserting that risk communication must be socially and symbolically embedded to be effective [9], [10]. Thus, these multimodal strategies not only bridge linguistic gaps but also democratize access to life-saving information. The implication is clear: localized semiotic design is not a stylistic choice but a public safety imperative. Its absence or dysfunction could mean misunderstanding, panic, or delay during disaster response.

The success of semiotic integration in Eastern Indonesia's risk communication stems from a deeply rooted cultural semiotic system that links visual and verbal forms of meaning-making. Local communities often rely on oral traditions, visual metaphors, and symbolic cues to interpret environmental threats. As Susannah V. Levi (2024) explains, meaning is never neutral—it is encoded through culturally specific codes that resonate with shared experiences and belief systems [12]. The prevalence of images like traditional homes on hills, the use of gongs, and familiar phrases like *"Mi reba peto"* reflects a semiotic structure grounded in collective memory and ancestral knowledge. This structure is reinforced by repeated exposure to such codes in ritual, religion, and daily life. Hence, multimodal messaging is effective because it activates pre-existing frameworks of understanding, transforming abstract state messages into embodied cultural alerts. Without such semiotic grounding, messages risk being perceived as foreign or disconnected from local lived realities.

The linguistic framing of risk messages also reveals important implications regarding authority, inclusion, and institutional legitimacy. When state messages are delivered exclusively in formal Bahasa

Indonesia, especially via RRI or government posters, they often create perceived distance and reduce compliance—particularly in communities with limited exposure to national language media. On the other hand, when local dialects are used in radio, school drills, or public broadcasts, the communication appears more legitimate, relational, and persuasive. This confirms Fairclough's (1995) argument that discourse is a vehicle of power—but power that can either marginalize or empower [25]. The implication is that linguistic inclusivity is not just ethical but also strategic [32], [33]. Failing to adapt language to community contexts creates a discursive dysfunction, wherein life-saving messages may be ignored, delayed, or misinterpreted. Conversely, embracing community vernaculars in public risk communication fosters both message ownership and responsive action.

The underlying reason behind the discursive divide lies in the structural hierarchy of language authority in Indonesia's bureaucratic and media systems. Bahasa Indonesia, while unifying at the national level, is institutionally prioritized, often at the cost of local languages that carry deeper cognitive and affective resonance within peripheral communities. Van Dijk (1993) argues that discourse access equates to social access to power, and those excluded linguistically are often disenfranchised politically [30]. The top-down model of risk communication reflects broader postcolonial legacies where centralized governance suppresses vernacular epistemologies. In contrast, community media (e.g., RSA FM, school drills) subvert this model by re-centering authority in local voice and knowledge. The structure, therefore, is not only linguistic but also political—governing who speaks, who is heard, and whose language is validated in times of crisis. The effectiveness of local discourse thus lies in its ability to reclaim and redistribute communicative power.

The emergence of local narratives from interviews and radio segments shows that risk understanding is socially constructed through storytelling, not just information transmission. Participants revealed that ancestral warnings, radio advice in local languages, and teacher explanations in mother tongue increased clarity, trust, and emotional readiness. This demonstrates the functional role of narrative familiarity in shaping preparedness. In the Extended Parallel Process Model (EPPM), perception of threat must be matched with perceived efficacy—narratives that reflect local experience help meet both. Therefore, narrative disconnection results in dysfunction: communities may hear a warning but not believe it or feel it is "for others." Meanwhile, media and interpersonal messaging that mirror daily speech and cultural idioms increase engagement, risk ownership, and community-led action. The implication here is critical: integrating localized, culturally competent narratives into formal communication systems makes risk communication not just heard but internalized.

Narrative effectiveness is structurally tied to the epistemological frameworks of local knowledge. In many parts of Eastern Indonesia, risk is not understood through statistical forecasts or scientific data, but through experiential heuristics and intergenerational wisdom. These knowledge structures rely heavily on narrative, metaphor, and oral transmission. Thematic analysis reveals that phrases like "run when the gong sounds" or "follow elder wisdom" are not just linguistic habits but cognitive shortcuts embedded in lived environments. As argued by R Heersmink (2023), in oral societies, memory, identity, and action are encoded in narrative, not abstract data [34]. This contrasts sharply with bureaucratic communication models that rely on impersonal, standardized formats. The structural gap between institutional and community epistemologies explains why formal messaging often fails while narrative-driven, community media succeeds. Thus, narrative resonance is not a soft supplement to technical information—it is a foundational cognitive infrastructure upon which effective disaster responsiveness is built.

6. CONCLUSION

This study reveals that local language use and culturally embedded messaging significantly enhance the clarity, trust, and responsiveness of disaster communication in multilingual and high-risk communities. The core insight is that disaster messages are not merely informational artifacts but social texts shaped by cultural codes, symbolic systems, and community narratives. By integrating semiotic, critical discourse, and thematic analyses, this research offers a multidimensional framework that captures both the form and function of localized risk communication. It challenges dominant paradigms that prioritize national-standard language and top-down messaging, offering instead a grounded model of inclusive, culturally resonant communication. Methodologically, the study contributes by triangulating visual, linguistic, and ethnographic data, while conceptually, it redefines key variables—such as "message effectiveness" and "risk perception"—within culturally specific epistemologies. Thus, this research expands the scientific understanding of communication beyond transmission models, positioning language not only as a medium but as a mediator of safety, agency, and survival.

Despite its contributions, the study is limited in scope by its regional focus on Eastern Indonesia and its qualitative methodology. While rich in contextual detail, the findings may not be generalizable across all Indonesian provinces or applicable to urban, more digitally connected populations. Additionally, the study did not quantitatively measure message effectiveness or behavioral outcomes, leaving a gap in empirical

validation. Future research should incorporate mixed methods approaches to assess the measurable impact of localized language strategies on disaster response outcomes. Moreover, comparative studies across different ethnic groups and digital platforms could deepen understanding of how vernacular communication adapts in hybrid online–offline environments. It is also recommended that longitudinal studies explore how community-based communication strategies evolve in response to climate change and new disaster risks. Expanding this line of inquiry will help inform more inclusive, linguistically diverse, and culturally intelligent disaster communication policies nationwide.

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AUTHOR CONTRIBUTIONS STATEMENT

Umma Fathimah Sabilah Faradis: conceptualization (lead), investigation (lead), formal analysis (lead), writing – original draft (lead), writing – review and editing (lead).

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

ETHICAL APPROVAL

This research related to human use has been complied with all the relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration and has been approved by the authors' institutional review board or equivalent committee.

DATA AVAILABILITY

Data availability is not applicable to this article as no new data were created or analyzed in this study.

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