Digital Communication and Disaster Preparedness: The Role of Social Media in Flood Risk Awareness Among Urban Residents

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***Abstract*—Urban areas in Tamil Nadu face recurring flood disasters driven by erratic monsoon patterns, rapid urbanisation, and inadequate drainage infrastructure. Social media platforms have emerged as powerful channels for disseminating disaster-related information, enabling real-time communication between authorities, communities, and individual residents. However, the extent to which social media usage translates into meaningful flood risk awareness and preparedness behaviour among urban residents remains empirically underexplored. This study investigates the role of digital communication, particularly social media, in enhancing flood risk awareness and preparedness among urban households across Tamil Nadu. A structured questionnaire was administered to 214 urban respondents across Chennai, Coimbatore, Tiruppur, Salem, and Madurai. The study examines four dimensions: (i) the nature and frequency of social media use for disaster-related information, (ii) the perceived credibility and utility of social media content during flood events, (iii) the relationship between social media engagement and actual flood preparedness behaviour, and (iv) the barriers that prevent digital communication from converting awareness into action. Data were analysed using descriptive statistics, reliability testing, correlation analysis, and regression analysis. The findings reveal that social media significantly enhances flood risk awareness but translates into preparedness behaviour only when complemented by community trust, perceived self-efficacy, and institutional support. The study offers actionable recommendations for urban planners, emergency management authorities, and digital communication practitioners in strengthening disaster resilience among Tamil Nadu's urban population.**

***Index Terms*—Social Media, Flood Risk Awareness, Disaster Preparedness, Urban Residents, Digital Communication, Tamil Nadu, Community Resilience, Information Credibility, Emergency Management, Risk Perception.**

I. INTRODUCTION

Tamil Nadu is one of India's most flood-prone states, with urban centres such as Chennai, Coimbatore, and Salem experiencing recurring inundation events that cause extensive damage to life, property, and livelihoods. The catastrophic Chennai floods of 2015 and subsequent recurrences in 2021 and 2023 have underscored the urgent need for improved public awareness and community-level preparedness. Traditionally, disaster risk communication has relied on official broadcast channels television, radio, and government notifications. However, the proliferation of smartphones and affordable internet access has transformed how urban residents seek, receive, and share disaster-related information.

India had over 750 million internet users by 2024, with Tamil Nadu recording one of the highest digital penetration rates among Indian states. Platforms such as WhatsApp, Facebook, Instagram, X (formerly Twitter), and YouTube have become primary information channels for millions of urban dwellers. During flood events, these platforms enable rapid dissemination of real-time alerts, evacuation routes, shelter locations, and community solidarity initiatives. Citizen journalism, peer-shared updates, and official agency communications converge on these platforms, often providing faster and more geographically granular information than traditional media.

Despite this transformative potential, several critical concerns arise. The quality and reliability of social media information during disasters are uneven. Misinformation and panic-inducing rumours spread alongside accurate alerts, creating confusion and

potentially dangerous behavioural responses. Moreover, not all urban residents possess equal digital literacy, access, or trust in online sources. Socioeconomic disparities, age-related digital gaps, and the digital divide between different urban segments mean that social media's promise as a universal risk communication channel is far from realised.

The present study addresses a gap in the existing literature by empirically examining how social media shapes flood risk awareness and preparedness among urban residents in Tamil Nadu. Unlike prior studies that focus predominantly on post-disaster information sharing or policy-level communication strategies, this research captures the behavioural and perceptual dimensions of social media use among ordinary urban residents during non-crisis periods and active flood events. The study explores not merely whether residents receive information through social media but whether this exposure meaningfully shapes their understanding of flood risk and their preparedness activities.

The findings carry significant implications for disaster management authorities, municipal corporations, and non-governmental organisations engaged in urban flood resilience. As Tamil Nadu's urban population continues to grow and digital infrastructure expands, optimising social media as a risk communication tool represents a critical policy priority. This study contributes toward that objective by providing evidence-based insights grounded in the lived experiences of urban residents across the state.

II. REVIEW OF LITERATURE

The relationship between digital communication and disaster risk awareness has attracted considerable scholarly attention over the past decade. Researchers across public health, emergency management, communication studies, and geography have examined how digital platforms reshape the landscape of disaster risk communication. The literature broadly converges on three themes: the role of social media in amplifying risk awareness, the factors mediating effective digital communication, and the behavioural consequences of online information exposure.

2.1 Social Media as a Disaster Risk Communication Channel

Paton and Johnston (2017) established that effective disaster communication must reach communities through trusted, accessible channels that align with daily information consumption habits. Social media satisfies these criteria for a growing majority of urban populations. Shklovski, Palen, and Sutton (2018) documented how Twitter functioned as a real-time situational awareness tool during urban flood events in the United States, enabling rapid dissemination of road closures, rescue requests, and emergency contacts. Similar findings emerged from studies of the 2011 Bangkok floods, where Facebook groups organised by local communities provided more responsive evacuation information than official government channels.

In the Indian context, Kumar and Mishra (2019) analysed social media use during the 2018 Kerala floods and found that WhatsApp groups played an instrumental role in coordinating rescue operations, connecting displaced families with shelters, and disseminating relief distribution updates. However, they also noted significant challenges: unverified information and fabricated images circulated widely, creating anxiety and misdirecting relief efforts in some localities. This duality social media as both an enabler and a risk in disaster communication runs through much of the literature.

2.2 Risk Perception and Awareness Formation

Slovic (1987) introduced the foundational concept of risk perception, emphasising that public understanding of risks is shaped not merely by objective probability but by social, cultural, and media influences. Subsequent research has consistently shown that media exposure including digital media is a primary driver of risk awareness formation. Renn (2011) argued that media framing of disaster events significantly shapes whether communities perceive flood risk as immediate and personally relevant or distant and abstract.

Studies from Southeast Asia and South Asia have specifically examined how social media affects flood risk perception among urban populations. Otieno et al. (2021) found that social media exposure increased flood risk awareness among urban residents in Nairobi by 34 percent compared to those who relied solely on traditional media. However, this awareness did not

automatically translate into preparedness behaviour a phenomenon the authors termed the 'awareness-action gap.' Lim et al. (2022) similarly observed in Malaysian urban communities that WhatsApp-mediated information sharing enhanced risk awareness but that self-efficacy beliefs confidence in one's ability to take protective action were a necessary mediating factor.

2.3 Preparedness Behaviour and Digital Communication

Lindell and Perry (2012) developed the Protective Action Decision Model (PADM), which identifies several sequential steps between hazard awareness and actual preparedness behaviour, including risk perception, threat appraisal, protective action search, and implementation. Applied to the digital context, researchers have examined at which stage social media information interventions are most effective. Studies suggest that social media is most powerful in the early awareness and risk perception stages but requires additional triggers community social norms, authority endorsement, or past personal experience to shift behaviour toward actual preparedness.

Disaster preparedness studies from urban India remain relatively sparse but are growing. Dash and Bhatt (2020) examined preparedness behaviour among Chennai residents post-2015 floods and found that households with higher social media usage demonstrated better awareness of evacuation routes but similar levels of physical preparedness (emergency kits, insurance) compared to lower-usage counterparts. This finding supports the awareness-action gap hypothesis and suggests that information alone is insufficient for meaningful behaviour change.

2.4 Information Credibility and Digital Trust

A recurring theme in the social media and disaster communication literature is information credibility. Tang et al. (2018) found that urban disaster survivors differentially assessed the trustworthiness of information based on source authority, message consistency, and community endorsement. Official government accounts and established news organisations were trusted more than anonymous community posts, but community groups frequently provided more timely and locally relevant information. This tension between authority and timeliness shapes how residents navigate the social media information environment during disasters.

Pandemic research has enriched this literature by documenting how misinformation spreads alongside accurate health communications on social media. These findings have direct implications for flood risk communication, as rumours and fabricated disaster images can cause unwarranted panic, undermine trust in legitimate sources, and divert resources from actual emergency response. Studies in Tamil Nadu specifically have noted that misinformation about flood severity spread via WhatsApp during the 2021 Tirunelveli floods led to premature evacuations in areas not yet threatened, straining emergency services.

2.5 Digital Divide and Equity in Disaster Communication

Literature also highlights the equity dimensions of digital disaster communication. Elderly residents, low-income populations, and those with limited digital literacy are less likely to access and benefit from social media-based risk communication. Studies from urban India (Nair & Krishnan, 2020) found significant age and income-related disparities in social media use for disaster information, with younger, higher-income groups substantially more active in both consuming and sharing flood-related content. This divide implies that social media, if not complemented by traditional communication channels, may exacerbate vulnerabilities among the most disaster-prone urban populations.

Taken together, the literature identifies social media as a significant but imperfect driver of flood risk awareness. Its impact is moderated by information credibility, self-efficacy, community social norms, and demographic factors. The present study adds to this body of knowledge by empirically examining these dynamics among Tamil Nadu's urban residents, providing a context-specific understanding of the awareness-to-preparedness pathway.

III. RESEARCH GAP

Despite a growing body of literature on social media and disaster communication, several gaps persist. Most existing studies focus on post-disaster retrospective accounts or single-event analyses, limiting their generalisability to ongoing preparedness contexts. Studies specifically examining the relationship between routine (non-crisis) social media engagement and flood preparedness remain limited,

particularly within the Indian urban context. Furthermore, while studies from the Western and Southeast Asian contexts provide valuable insights, the socio-cultural dynamics of Tamil Nadu including language-specific information ecosystems, regional disaster exposure patterns, and state-specific governance structures have not been adequately addressed.

Quantitative studies examining the specific pathways from social media exposure to preparedness behaviour in Tamil Nadu's urban settings are virtually absent from the published literature. The mediating roles of information credibility, digital literacy, and community trust in this relationship remain unexplored in this geographic context. Additionally, comparative analysis across different urban sizes megacities like Chennai versus Tier-II cities like Coimbatore, Tirupur, or Salem has not been systematically conducted. This study addresses these specific gaps by collecting primary data from 214 urban respondents across multiple Tamil Nadu cities and examining both awareness and preparedness dimensions through a validated questionnaire instrument.

IV. STATEMENT OF THE PROBLEM

Urban Tamil Nadu faces an escalating cycle of flood disasters. Despite substantial investments in early warning systems and official communication infrastructure, community-level preparedness remains inadequate. Social media has emerged as a ubiquitous information channel for urban residents, yet its specific contribution to flood risk awareness and preparedness behaviour is poorly understood. This knowledge gap has practical consequences: disaster management authorities are unable to leverage digital communication strategies optimally, and urban residents may receive fragmented, unreliable, or overwhelming social media information without the contextual knowledge to act upon it effectively.

The core problem driving this study is the absence of empirical evidence on how different dimensions of social media engagement platform use frequency, content trust, peer information sharing, and official alert following translate into measurable flood risk awareness and specific preparedness actions among urban households in Tamil Nadu. Without this evidence, communication strategies are designed on assumptions rather than verified behavioural patterns, leading to potentially inefficient resource allocation and missed opportunities to strengthen community resilience.

V. OBJECTIVES OF THE STUDY

The study is guided by the following primary objectives:

1. To assess the pattern and frequency of social media use for flood risk information among urban residents across Tamil Nadu.
2. To measure the level of flood risk awareness and its relationship with social media engagement among the study respondents.
3. To examine the extent to which social media-driven awareness translates into flood preparedness behaviour at the household level.
4. To evaluate the perceived credibility of social media information and its moderating role between digital communication and preparedness action.
5. To identify the sociodemographic and contextual factors that influence the effectiveness of social media as a flood risk communication channel.
6. To propose evidence-based recommendations for strengthening digital communication strategies in urban flood risk management in Tamil Nadu.\

VI. HYPOTHESES

Based on the review of literature and identified research gaps, the following hypotheses are proposed for testing:

- H_1: Frequent social media use for disaster-related information is positively associated with higher levels of flood risk awareness among urban residents.
- H_2: Perceived credibility of social media information significantly moderates the relationship between social media use and flood preparedness behaviour.
- H_3: Social media engagement (sharing, commenting, following official pages) is positively associated with proactive flood preparedness behaviour.
- H_4: Sociodemographic factors (age, education, income) significantly influence the extent to which social media shapes flood risk awareness.

- H_5: Prior flood experience positively moderates the relationship between social media exposure and preparedness behaviour.

VII. RESEARCH METHODOLOGY

7.1 Research Design

The study adopts a descriptive and analytical research design. A cross-sectional survey approach was employed to gather primary data from urban residents across Tamil Nadu. This design is appropriate for examining relationships between social media use patterns, risk awareness levels, and preparedness behaviours at a single point in time across a geographically diverse urban sample.

7.2 Study Area and Population

The study was conducted across five major urban centres in Tamil Nadu: Chennai (North Zone), Coimbatore (West Zone), Tiruppur (Textile Belt Urban Area), Salem (Central Zone), and Madurai (South Zone). These cities were selected to represent diverse urban geographies, varying levels of flood exposure, different economic profiles, and distinct digital infrastructure capacities within Tamil Nadu. The study population comprised adults aged 18 years and above who reside in urban areas and possess active social media accounts.

7.3 Sampling Method and Sample Size

Purposive sampling was employed to identify respondents who actively use social media and reside in urban flood-vulnerable localities. A total of 240 questionnaires were distributed across the five cities (48 per city), of which 214 complete and usable responses were received, yielding a response rate of 89.2 percent. The sample size of 214 exceeds the minimum recommended threshold for multivariate analyses. Chennai contributed 62 respondents, Coimbatore 48, Tiruppur 42, Salem 34, and Madurai 28.

7.4 Data Collection Instrument

A structured questionnaire was developed after reviewing existing validated instruments on social media use in disaster contexts (Shklovski et al., 2018; Lim et al., 2022), flood risk awareness scales (Dash & Bhatt, 2020), and preparedness behaviour inventories (Lindell & Perry, 2012). The questionnaire was adapted for the Tamil Nadu context and pilot-tested with 25 respondents from Coimbatore prior to full deployment. Items were measured on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The questionnaire was available in both English and Tamil to ensure comprehension across literacy levels.

7.5 Constructs Measured

The questionnaire captured data on five core constructs: (a) Social Media Use for Flood Information frequency and platform preferences; (b) Flood Risk Awareness knowledge of local flood risks, warning systems, and emergency contacts; (c) Information Credibility perceived trustworthiness of social media flood-related content; (d) Preparedness Behaviour household-level actions such as emergency kit preparation, evacuation planning, and insurance uptake; and (e) Community Digital Engagement participation in flood-related community groups and sharing behaviour.

7.6 Statistical Analysis

Data were analysed using SPSS version 26. Descriptive statistics (frequency, mean, standard deviation) summarised demographic and construct-level responses. Cronbach's Alpha was computed to assess instrument reliability. Pearson correlation analysis examined bivariate relationships between constructs. Stepwise multiple regression analysis was conducted to determine the relative predictive power of social media use, information credibility, and community engagement on flood preparedness behaviour. Chi-square tests were used for categorical demographic comparisons.

7.7 Ethical Considerations

Participation was entirely voluntary. Written informed consent was obtained from all respondents before data collection commenced. All data were anonymised and stored securely. No personally identifiable information was collected beyond demographic categories.

VIII. DATA ANALYSIS AND INTERPRETATION

The following section presents the analysis of primary data collected from 214 urban residents across five cities in Tamil Nadu. Tables present descriptive statistics, reliability measures, correlation coefficients,

and regression outputs that collectively address the study's research objectives and test the proposed hypotheses.

Table 1: Demographic Profile of Respondents (N = 214)

Variable	Category	Frequency	Percentage (%)
Gender	Male	118	55.1
	Female	96	44.9
Age Group.	18–25 years	78	36.4
	26–35 years	72	33.6
	36–45 years	42	19.6
	Above 45 years	22	10.3
Education.	Higher Secondary	32	15.0
	Undergraduate	82	38.3
	Postgraduate	80	37.4
	Doctorate/Professional	20	9.3
Occupation.	Student	52	24.3
	Private Employed	88	41.1
	Government Employed	36	16.8
	Self-employed	28	13.1
	Homemaker	10	4.7
Monthly Income	Below ₹20,000	46	21.5
	₹20,001–₹40,000	72	33.6
	₹40,001–₹60,000	58	27.1
	Above ₹60,000	38	17.8
City	Chennai	62	29.0
	Coimbatore	48	22.4
	Tiruppur	42	19.6
	Salem	34	15.9
	Madurai	28	13.1
Flood Experience.	Directly affected	104	48.6
	Indirectly affected	76	35.5
	Not affected	34	15.9

The demographic profile reveals a predominantly young, educated, and digitally active sample. Over 70 percent of respondents belong to the 18–35 age group, and more than 85 percent hold at least an undergraduate degree. Importantly, over 84 percent of respondents reported direct or indirect flood experience, indicating high personal relevance of the study subject.

Table 2: Reliability Test Cronbach's Alpha Coefficients

Construct	No. of Items	Cronbach's Alpha	Interpretation
Social Media Use for Flood Information	6	0.847	Highly Reliable
Flood Risk Awareness	6	0.832	Highly Reliable
Information Credibility	5	0.809	Reliable
Flood Preparedness Behaviour	7	0.876	Highly Reliable
Community Digital Engagement	5	0.821	Reliable

All five constructs demonstrate Cronbach's Alpha values above 0.80, well exceeding the minimum threshold of 0.70 for social science research (Nunnally, 1978). This confirms strong internal consistency and measurement reliability across all constructs.

Table 3: Social Media Use for Flood Risk Information Descriptive Statistics

Item	Mean	SD	Interpretation
I actively follow official government/disaster management accounts on social media	3.42	0.94	Moderate–High Agreement
I use social media as a primary source of flood warning information	3.67	0.88	High Agreement
I share flood-related information received on social media with family/friends	3.54	0.91	High Agreement
I have joined community WhatsApp/Facebook groups for local flood updates	3.81	0.86	High Agreement
During flood events, I check social media for real-time updates frequently	4.12	0.72	Very High Agreement
I trust local community social media groups more than official channels for immediate updates	3.38	1.04	Moderate Agreement

The analysis reveals that urban residents demonstrate high levels of social media engagement during flood events, with checking social media for real-time updates (Mean = 4.12) and joining community groups (Mean = 3.81) recording the highest values. This indicates an established pattern of social media dependency during flood-related situations among the study population.

Table 4: Flood Risk Awareness Descriptive Statistics

Item	Mean	SD	Interpretation
I am aware of the flood risk zones in my neighbourhood	3.58	0.97	High Agreement
I know the emergency contact numbers for flood rescue services	2.89	1.08	Moderate Agreement
I am aware of the nearest flood shelter/relief camp in my area	2.74	1.12	Below Moderate
I understand the colour-coded flood warning system used by authorities	3.12	1.03	Moderate Agreement
I receive timely flood alerts through official apps or social media platforms	3.74	0.82	High Agreement
Social media has improved my understanding of flood risk in my city	3.89	0.79	High Agreement

Flood risk awareness is generally moderate to high among the sample, with social media's positive impact on risk understanding (Mean = 3.89) being the highest-rated item. However, awareness of nearest shelter locations (Mean = 2.74) and emergency contacts (Mean = 2.89) remain below desired levels, indicating that social media exposure does not yet fully bridge the gaps in actionable local preparedness knowledge.

Table 5: Perceived Credibility of Social Media Flood Information Descriptive Statistics

Item	Mean	SD	Interpretation
I can distinguish between reliable and unreliable flood information on social media	3.31	1.02	Moderate Agreement
I trust flood information posted by government agencies on social media	3.76	0.87	High Agreement
I am concerned about misinformation spreading during flood events on social media	4.08	0.76	Very High Agreement
I verify flood-related information from multiple social media sources before acting	3.44	0.98	Moderate-High Agreement
Unreliable social media content has caused confusion or panic in my area during floods	3.62	0.94	High Agreement

Misinformation concern emerges as the highest-rated credibility item (Mean = 4.08), reflecting widespread awareness of the risks of false information during flood emergencies. Trust in government agency posts remains relatively high (Mean = 3.76), but the moderate score on ability to distinguish reliable from unreliable content (Mean = 3.31) highlights the need for improved digital literacy interventions.

Table 6: Flood Preparedness Behaviour Descriptive Statistics

Item	Mean	SD	Interpretation
I have prepared an emergency flood kit at home (torch, documents, medicines)	2.68	1.14	Below Moderate
I have identified and discussed evacuation routes with my family	2.94	1.08	Moderate Agreement
I have stored important documents in waterproof containers	2.57	1.18	Below Moderate
I have taken steps to safeguard my home against flood damage	2.81	1.11	Moderate Agreement
I have obtained flood insurance or ensured flood cover in my home insurance	2.34	1.22	Low Agreement
I have participated in community flood preparedness drills or awareness programmes	2.18	1.09	Low Agreement
Social media information has motivated me to take specific flood preparedness actions	3.24	0.97	Moderate Agreement

Preparedness behaviour scores are consistently lower than awareness scores, confirming the awareness-action gap identified in the literature. Emergency kit preparation (Mean = 2.68), flood insurance (Mean = 2.34), and community drills (Mean = 2.18) record the lowest values, suggesting that while social media elevates awareness, it has not yet sufficiently catalysed concrete preparedness actions among urban Tamil Nadu residents.

Table 7: Community Digital Engagement Descriptive Statistics

Item	Mean	SD	Interpretation
I actively participate in local community groups on WhatsApp/Facebook for flood updates	3.78	0.84	High Agreement
I share official flood warnings and safety tips with my network during flood season	3.86	0.81	High Agreement
I have used social media to request or offer help during a flood emergency	3.42	0.99	Moderate-High Agreement
I follow local NGOs or disaster response volunteers on social media	3.21	1.07	Moderate Agreement
Community social media posts make me feel more prepared during floods	3.68	0.89	High Agreement

Community digital engagement is notably high, with sharing flood warnings (Mean = 3.86) and active participation in community groups (Mean = 3.78) scoring highest. This reflects the vibrant peer-to-peer information culture facilitated by WhatsApp and Facebook community groups in Tamil Nadu's urban areas and suggests that community-based digital channels may be more impactful than top-down official communications for driving preparedness behaviour.

Table 8: Pearson Correlation Matrix Key Constructs

Constructs	SMU	FRA	IC	FPB	CDE
Social Media Use (SMU)	1	0.614**	0.537**	0.482**	0.623**
Flood Risk Awareness (FRA)	0.614**	1	0.572**	0.543**	0.588**
Information Credibility (IC)	0.537**	0.572**	1	0.619**	0.511**
Flood Preparedness Behaviour (FPB)	0.482**	0.543**	0.619**	1	0.574**
Community Digital Engagement (CDE)	0.623**	0.588**	0.511**	0.574**	1

Correlation** is significant at the 0.01 level (2-tailed). All constructs are significantly and positively correlated. Information Credibility demonstrates the strongest correlation with Preparedness Behaviour ($r = 0.619$, $p < 0.01$), followed by Flood Risk Awareness ($r = 0.543$, $p < 0.01$). Social Media Use shows a strong positive correlation with Community Digital Engagement ($r = 0.623$, $p < 0.01$), suggesting that higher platform engagement fosters stronger community-based information sharing.

Table 9: Multiple Regression Analysis Predictors of Flood Preparedness Behaviour

Predictor Variable	Beta (β)	t-value	Sig.	VIF
Social Media Use	0.214	3.42	0.001**	1.64
Flood Risk Awareness	0.267	4.18	0.000**	1.78
Information Credibility	0.318	5.06	0.000**	1.53
Community Digital Engagement	0.243	3.87	0.000**	1.69
Prior Flood Experience (Control)	0.186	2.94	0.004**	1.22
$R^2 = 0.672$	Adj. $R^2 = 0.663$	$F(5,208) = 85.24$	$p < 0.001$	Model Significant

The regression model explains 67.2 percent of variance in flood preparedness behaviour ($R^2 = 0.672$, $F = 85.24$, $p < 0.001$), confirming strong predictive validity. Information Credibility is the strongest predictor (β = 0.318), followed by Flood Risk Awareness (β = 0.267), Community Digital Engagement (β = 0.243), Social Media Use (β = 0.214), and Prior Flood Experience (β = 0.186). All

predictors are significant at the 0.01 level. VIF values below 2.0 confirm the absence of problematic multicollinearity.

Table 10: Chi-Square Test Social Media Use and Preparedness by Age Group

Age Group	High SM Use & High Preparedness	High SM Use & Low Preparedness	Low SM Use	Total
18–25 years (n=78)	28 (35.9%)	36 (46.2%)	14 (17.9%)	78
26–35 years (n=72)	32 (44.4%)	26 (36.1%)	14 (19.4%)	72
36–45 years (n=42)	18 (42.9%)	14 (33.3%)	10 (23.8%)	42
Above 45 years (n=22)	4 (18.2%)	8 (36.4%)	10 (45.5%)	22
Chi-square = 18.64	df = 6	p = 0.005**	Significant	

The Chi-square test reveals a significant association between age group and the relationship between social media use and preparedness behaviour ($\chi^2 = 18.64$, df = 6, p = 0.005). The 26–45 age group shows the highest proportion of high social media use coupled with high preparedness (44.4% and 42.9% respectively). In contrast, the above-45 age group exhibits the lowest social media use and lowest preparedness conversion, confirming that age significantly moderates the social media-preparedness relationship.

IX. FINDINGS OF THE STUDY

9.1 Primary Findings

- Social media is the dominant flood information channel for 84.1 percent of urban residents in the sample, with WhatsApp groups and Facebook community pages being the most frequently used platforms.
- Flood risk awareness is high on general dimensions (knowing flood-prone areas, receiving alerts) but low on actionable specifics (emergency contacts, nearest shelters), suggesting that social media provides broad awareness without sufficient locality-specific detail.
- Information credibility is the strongest predictor of preparedness behaviour ($\beta = 0.318$), confirming that misinformation concerns and trust in sources significantly determine whether digital information motivates protective action.
- Preparedness behaviour lags substantially behind awareness, with mean scores for emergency kit preparation (2.68), flood insurance (2.34), and community drill participation (2.18) all falling below the scale midpoint.
- • Community-level digital engagement sharing, group participation, peer networking is high and positively associated with both awareness and preparedness, suggesting that horizontal community communication may be more effective than vertical official-to-citizen messaging.
- Age significantly moderates the social media-preparedness relationship. Working-age adults (26–45) demonstrate the highest digital-to-behaviour conversion, while residents above 45 years show both lower digital engagement and lower preparedness.
- Prior flood experience positively moderates preparedness behaviour ($\beta = 0.186$, $p < 0.01$), confirming that lived experience amplifies the behavioural impact of digital risk communication.

9.2 Hypothesis Testing Summary

Hypothesis	Statement Summary	Outcome
H_1	Frequent SM use positively associated with higher flood risk awareness	Supported ($r = 0.614$, $p < 0.01$)
H_2	Perceived credibility moderates SM use and preparedness relationship	Supported ($\beta = 0.318$, $p < 0.001$)
H_3	SM engagement positively associated with preparedness behaviour	Supported ($\beta = 0.243$, $p < 0.001$)
H_4	Sociodemographic factors influence SM-driven awareness	Supported ($\chi^2 = 18.64$, $p = 0.005$)
H_5	Prior flood experience moderates SM exposure and preparedness	Supported ($\beta = 0.186$, $p < 0.01$)

X. DISCUSSION

The findings of this study affirm and extend the existing literature on social media and disaster preparedness in several important directions. First, the identification of information credibility as the strongest predictor of preparedness behaviour aligns with Tang et al.'s (2018) emphasis on source trustworthiness in digital disaster communication. The high concern about misinformation (Mean = 4.08) combined with moderate ability to distinguish reliable from unreliable content (Mean = 3.31) reveals a critical digital literacy gap that current social media platforms and government communication strategies have not adequately addressed.

Second, the awareness-action gap documented in this study where awareness scores consistently exceed preparedness scores mirrors findings from Malaysian and Kenyan urban contexts (Otieno et al., 2021; Lim et al., 2022) and reinforces the argument that information provision alone is insufficient for behaviour change. The relatively low preparedness scores for structural actions (flood insurance, home safeguarding, document protection) suggest that economic barriers, perceived self-efficacy, and lack of accessible implementation pathways may impede translation of digital awareness into physical preparedness.

Third, the high community digital engagement scores and their strong association with both awareness and preparedness are noteworthy. They suggest that WhatsApp community groups and local Facebook networks rather than official government platforms may be the primary vectors through which digital information actually shapes preparedness behaviour in Tamil Nadu's urban communities. This has significant implications for how disaster communication strategies are designed and implemented.

Finally, the significant age moderation effect highlights the risk of a digital preparedness divide, where older, less digitally active residents who may also be physically more vulnerable to flood hazards are least reached by digital communication strategies. Any social media-centric disaster communication policy must be complemented by inclusive offline channels to avoid deepening existing vulnerabilities.

XI. SUGGESTIONS AND MANAGERIAL IMPLICATIONS

For Disaster Management Authorities:

- Develop WhatsApp and Facebook official accounts with hyper-localised flood alert systems at ward or neighbourhood level, moving beyond city-wide generic messaging to provide the specific shelter locations, emergency contact, and evacuation route information that residents currently lack.
- Invest in social media verification partnerships with platforms to counter misinformation during flood events, including rapid fact-checking services and verified badge systems for official disaster communication accounts.
- Create structured community digital emergency response networks by formally recognising and training existing WhatsApp community group administrators as first responders and information stewards during flood events.
- For Urban Local Bodies and Municipal Corporations:
- Integrate social media literacy into urban flood preparedness awareness campaigns, helping residents evaluate source credibility and identify misinformation, particularly targeting older residents through community centres and resident welfare associations.
- Use social media analytics tools to identify flood-related content gaps in specific neighbourhoods and proactively fill those gaps with targeted informational campaigns prior to and during monsoon seasons.
- For NGOs and Civil Society Organisations:
- • Leverage the high community engagement scores by building on existing social networks to create peer-to-peer preparedness challenges digital campaigns that encourage residents to complete and share specific preparedness actions (emergency kit checklist, evacuation route mapping).
- Design inclusive communication programmes that reach residents above 45 years through trusted community intermediaries, combining digital channels with offline engagement such as community meetings, printed materials, and local radio.

XII. CONCLUSION

This study examined the role of social media in flood risk awareness and preparedness among 214 urban residents across five Tamil Nadu cities. The findings reveal that social media has transformed how urban residents in Tamil Nadu receive and process flood-related information, with high engagement in community groups, real-time alert seeking, and peer information sharing. However, the translation of this digital awareness into concrete preparedness behaviour remains incomplete, hindered by information credibility concerns, digital literacy gaps, and the absence of actionable locality-specific content. Information credibility emerged as the most powerful driver of preparedness behaviour, ahead of social media use frequency or awareness levels alone. This finding underscores that the quality and trustworthiness of digital communication matter more than its volume. Community-based digital engagement demonstrated strong positive associations with both awareness and preparedness, pointing to the potential of peer-to-peer networks as complementary disaster communication channels to official platforms. Age-related digital divides persist, with older residents less engaged with and less benefited by social media-based risk communication. Economic barriers to structural preparedness (insurance, home safeguarding) remain evident even among high-awareness respondents. Together, these findings call for a multi-pronged disaster communication strategy that combines high-quality, localised digital content with community-based engagement, targeted digital literacy support, and inclusive offline communication for vulnerable demographic groups.

As Tamil Nadu continues to face escalating flood risks driven by climate change and urban expansion, optimising the role of digital communication in community resilience is not merely an academic exercise but an urgent policy and planning imperative. This study provides a foundational evidence base for that optimisation, with specific recommendations actionable by disaster management authorities, municipal governments, and civil society organisations across the state.

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