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Disaster preparedness module for resilience building among schoolchildren: A case study of floods in Kerala, India

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Abstract: Building resilience among schoolchildren in flood-prone Kerala, India, is essential due to the recurring and severe impacts of floods. The 2018 floods and subsequent events led to widespread displacement, prolonged school closures, and disruptions to children's emotional and social support systems. This study explores disaster preparedness characteristics, coping mechanisms, and essential psychosocial skills among children to develop a child-centred disaster preparedness module. Adopting a qualitative case study design, data were collected through four focus group discussions with 32 schoolchildren, and interviews with six parents and four school social workers. Thematic analysis was conducted manually using Braun and Clarke's six-step method, identifying themes considered as module section under three parts: disaster preparedness characteristics, including understanding flood hazards, articulation, support and collaboration; coping mechanisms, including emotional regulation, information management and exposure control, resilient behavior, and general health awareness; and psychosocial skills, including life skills, socio-spatial skills, cognitive skills, and skill-based preparedness. The proposed disaster preparedness module is intended for implemented in school curricula to enhance psychosocial readiness and confidence among children.

Keywords: coping mechanism; disaster preparedness; educational modul; psychosocial skill; resilience building

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Introduction

Natural disasters continue to cause widespread damage across the globe, with climate change contributing to their increasing frequency and severity. The consequences are not limited to physical destruction, but extend to profound emotional and social disruptions, particularly among vulnerable populations such as children (Berry et al., 2010; WHO, 2021). Children are disproportionately affected in disaster situations due to their developmental stage, their dependence on adult support systems, and socio-economic inequalities. These vulnerabilities often result in long-term psychosocial impacts, including anxiety, depression, and post-traumatic stress disorder (PTSD), especially when emotional needs remain unaddressed (Furr et al., 2010; Masten & Narayan, 2012). Therefore, any assistance and response should also include emotional and psychological components to help the children to cope and bounce back after flood disasters (Akhir et al., 2017).

In India, the floods in the state of Kerala are distinctive due to the recurrent rain and its frequency and intensity, and the interplay between riverine and urban flooding, which is largely influenced by the region's complex geography and heavy monsoon rainfall (Sherpa et al., 2020). Moreover, the floods cause extensive disruption to physical infrastructure and the social fabric, impacting education and children's emotional well-being (Bhadra, 2022). This context presents a compelling case for in-depth qualitative research on disaster preparedness among schoolchildren. Since 2018, Kerala has experienced a series of severe floods, particularly affecting districts such as Aluva and Northern Paravur in Ernakulam, situated along the Periyar River. These areas have been repeatedly subjected to riverine and urban flooding (Ali & George, 2022), resulting in physical displacement and interruptions to schooling, healthcare access, and significant psychosocial distress among children (Davies, 2024).

Pacheco et al. (2022) explored the role of educational interventions in enhancing resilience in children facing disasters, emphasizing the importance of psychosocial frameworks that address emotional well-being and coping mechanisms, which are often overlooked in traditional disaster preparedness programs. In addition, Bhadra (2022) reviewed community-based models focusing on psychosocial preparedness and emotional resilience, particularly in the aftermath of disasters, under-scoring the need for a supportive environment enabling children to manage trauma. Similarly, Krishna et al. (2022) highlight the importance of school-based interventions aimed at building disaster preparedness and psychosocial resilience in children, focusing on effective coping strategies to ensure their emotional recovery.

The main objective of this study is to develop an effective, context-specific educational module by first examining the three associated phases: the key characteristics of disaster preparedness among children; their coping mechanisms during flood events; and finally, identification of the essential psychosocial skills that support resilience. These three components form the foundation for the design of a comprehensive, child-centered module that not only enhances children's readiness for future disasters, but also strengthens their emotional and psychological capacity to recover and adapt.

The theoretical foundation of the study draws primarily on socio-ecological theory, which views resilience as a dynamic process shaped by environmental systems such as family, school, community, and society (Ungar, 2011). A child's positive response to adversity depends on the availability and strength of protective factors across these layers. In Kerala's flood context, resilience involves recovery, adaptation, and

development supported by strong social and emotional networks.

Complementing this, the theory of planned behavior (Ajzen, 1991) explains how attitudes, perceived control, and social norms shape intentions and behaviors. Applied to disaster preparedness, TPB clarifies how children's beliefs and perceived abilities influence their readiness. Integrating both theories offers a comprehensive framework linking external support and internal motivation in shaping children's resilience through education modules.

The conceptual framework of this study highlights how recurrent floods and social disparities create layered vulnerabilities for children in disaster settings. It centers on three key components for building resilience: disaster preparedness characteristics, coping mechanisms, and psychosocial skills. Preparedness involves understanding flood risks, clear communication, and collaborative support. Coping mechanisms include emotional regulation, information management, resilient behavior, and health awareness, while psychosocial skills cover life skills, socio-spatial awareness, cognitive abilities, and practical preparedness. These are influenced by external factors such as school systems and family or community engagement, which serve both as facilitators and protective buffers. Based on these themes, the study proposes a child-focused educational module within school curricula to enhance preparedness, emotional resilience, and adaptive capacity.

Previous studies highlight that school disaster preparedness education often emphasizes evacuation drills and safety protocols, but lacks structured integration of the psychosocial skills essential for resilience-building among children (Mathew et al., 2021). Although physical safety during disasters is a major concern, children are also highly vulnerable to long-term emotional distress, including anxiety, depression, and post-traumatic stress symptoms, following natural disasters such as floods (Mubarak et al., 2024; Singh et al., 2025). Furthermore, previous research has shown that psychosocial preparedness and emotional coping strategies remain under-represented in disaster education policies across South Asia (Hoffmann & Blecha, 2020). Akhir et al. (2019) also believe that coping strategy is one form of resiliency which protects flood victims (children) from experiencing any psychological distress.

Despite Kerala's high literacy rates, robust social infrastructure, and active civil society participation, existing interventions of disaster preparedness education primarily focus on physical safety measures, such as evacuation drills and awareness programs, yet often neglect the essential components of emotional resilience, coping strategies, and psychosocial competencies necessary for sustained adaptation and recovery (Grotberg, 2001; Pinto et al., 2021). By focusing on the physical and emotional aspects of disaster preparedness, this research aims to fill the gap in existing programs and enhance children's resilience through a holistic approach incorporating these essential psychosocial competencies. The study aims to address the identified gap by proposing a holistic Disaster Preparedness Education Module for Resilience Building, specifically tailored for schoolchildren living in flood-prone areas.

Methods

Research Design

The research adopts a qualitative case study design to develop a disaster preparedness education module aimed at enhancing resilience among schoolchildren affected by recurrent floods in Ernakulam, Kerala. Qualitative case studies are well-suited for examining lived experiences, social processes, and meaning-making, particularly when the research involves vulnerable populations such as children in disaster-prone

environments (Baxter & Jack, 2015; González-Pasarín et al., 2023). This design allows for a detailed investigation of disaster preparedness patterns, coping mechanisms, and psychosocial skill development, drawing on rich narratives from key stakeholders, including school social workers and parents. Through the triangulation of multiple data sources, the study achieves depth and credibility in understanding how resilience is constructed and supported across educational and family systems (Lucas et al., 2022; Patton, 2015). Therefore, the qualitative case study design aligns with the research's exploratory nature and provides a rigorous and flexible framework for developing a context-specific, child-centered disaster preparedness education module.

Location of the Study

The study focuses on four provinces of Ernakulam district, Kerala, India. These regions are frequently mapped as flood-vulnerable areas in Ernakulam. The Gadgil Committee, formed in 2011, examined the ecological vulnerability of the Western Ghats, with a specific focus on Kerala. The Committee found that Ernakulam is one of the most affected regions. Binila and Maheswari (2021) found that major flood-affected areas in Ernakulam included Aluva, Kunnathunad, Muvattupuzha, and Northern Paravur, as many houses were inundated near the Periyar River. Government schools from each of the four locations were selected for the study, as children in these regions encounter specific challenges and stressors.

Sampling Method and Selection Criteria for Informants

A purposive sampling method was employed to enhance the accuracy and reliability of the study by selecting participants directly relevant to its objectives. The study involved three key informant groups from flood-prone areas of Ernakulam district, Kerala: schoolchildren, their parents, and school social workers.

Schoolchildren formed the core focus of the study, as it aimed to explore their lived experiences, psychosocial skills, and coping strategies in the context of repeated flood events. Parents were included to offer complementary perspectives on their children's coping mechanisms and the support provided within the family environment. Finally, school social workers were selected for their professional expertise in understanding children's psychosocial responses and the institutional support available in schools. By triangulating data from these three groups, the study gained a holistic understanding necessary for developing an effective, child-centered disaster preparedness model tailored to the specific needs of flood-affected regions.

The inclusion criteria for the schoolchildren required them to be between 13 and 15 years old, enrolled in public upper primary schools within the flood-affected areas of Ernakulam, and to have first-hand flood experience. Children from private schools, those outside Ernakulam, and lower elementary students were excluded to ensure a relevant and focused sample.

School social workers included in the study were required to have professional certification, at least three years of continuous service in the same school, and direct involvement with the selected students. Those with less than three years' experience, or those from other schools, were excluded to maintain expertise and consistency.

Parents eligible for participation were residents of Ernakulam who had experienced floods first-hand and were parents of the sampled children. Those without flood experience, from other regions, or parents of non-selected children were excluded to ensure the data reflected the direct impact of floods on the family and child's experiences.

Data Collection Techniques

The study adopted a qualitative research design and utilized focus group discussions (FGDs)

with the schoolchildren and semi-structured interviews with the parents and school social workers to collect in-depth data on children's resilience-building in the context of floods. FGDs offered a safe space for children to share experiences and emotions, allowing observation of peer interactions and collective insights into disaster preparedness and psychosocial growth (Liamputtong, 2023; Patton, 2015). A structured question guide was used for the FGDs to steer the discussions, covering key areas such as emotional responses, preparedness behaviors, and support systems. The semi-structured interviews with the parents and school social workers offered flexibility to explore individual viewpoints while addressing core themes including emotional regulation and adaptive coping strategies. To ensure data validity, the study employed data source triangulation by collecting information from multiple informant groups—children, parents, and school social workers—enabling the cross-verification of findings and enhancing the credibility of the results (Creswell & Poth, 2024).

Data Collection Procedure

This qualitative study utilized multiple data collection methods to explore the components of the disaster preparedness module for resilience building. The research focused on four flood-prone areas: Aluva, Kunnathunadu, Muvattupuzha, and Northern Paravur. Thirty-two schoolchildren participated in the FGDs, which fostered a supportive environment for sharing experiences and coping strategies. The FGDs with the schoolchildren were conducted in the regional language Malayalam to ensure comfort and clarity of expression, and the recorded dialogues were later translated into English for analysis. They were conducted in four sessions of forty-five minutes. The questions were designed to facilitate open dialogue and emotional reflection, while guiding the conversation toward three core domains aligned with the study objectives: the characteristics of disaster preparedness, coping mechanisms, and psychosocial skills.

The initial set of questions includes What usually happens in your area during heavy rains?" and "How did you and your family prepare for the flood?", which encouraged participants to recall early warning signs and their preparedness behaviors. The responses led to derived themes related to hazard recognition and family-level communication. Follow-up questions such as "What kinds of things did you talk about with your friends or family before or during the flood?", "Did you express your fear or anxiety to anyone?", "Was there anyone who helped or guided you during the flood? What did they do?" and "Did you feel prepared to face the flood? Why or why not?" helped to explore insights into their understanding of preparedness, the nature of their articulation, and the role of communication, guidance, and social collaboration in their responses.

The second domain explored children's coping mechanisms, which explored through following protocol questions: "How did you feel during the flood? What helped you feel better?" "When you were scared or worried, what did you do to calm yourself down?" "How did you find out what was happening during the flood? Was the information helpful?" "Can you describe a time when you had to make a quick decision or solve a problem during the flood?" "Did you or anyone in your family get sick or feel unwell? What did you do to stay healthy?" These questions enabled exploration of emotional expression, resilience, and information management. The responses to questions on health and hygiene practices during the flood shed light on children's physical resilience and adaptive behaviors under stress.

The final domain addressed the development of psychosocial skills and practical preparedness. Reflective prompts such as "What is something important you learned because of the flood?", "Did the flood change the way you think or make

decisions?", "Did you solve any problems you faced during the flood?" and "Did you get any ideas for protecting your belongings?" helped to uncover the development of life skills and personal agency. Spatial awareness and skill-based preparedness were explored through questions such: "Were you able to understand the layout of your home—such as the front yard, backyard, well, or garden—while the water was rising?", and "Were you able to swim or help others during the flood?" Peer support and social competence emerged through prompts such as "Can you share a moment when you helped someone, or someone helped you?" and "If your school were to prepare for future floods, what do you think should be included?"

Additionally, semi-structured interviews were conducted with four school social workers and six parents, which offered insights into how these adults supported the children's resilience-building efforts. The semi-structured interviews were guided by a set of protocol questions designed to explore disaster preparedness, children's coping mechanisms, and psychosocial skills. For the parents, the questions focused on their awareness of the school's disaster education efforts, their child's understanding and emotional responses to disasters, family-level preparedness plans, and their role in fostering resilience through communication and home-based practices. The parents were also asked about their expectations for school programs and community involvement in strengthening disaster readiness. The interviews with the school social workers explored the existence and effectiveness of school-level disaster preparedness plans, crisis response protocols, student support services, and staff training. Through this interactive, narrative-driven process, the responses were thematically coded and developed eleven themes categorized under the three major parts. These points developed part and sections of the disaster preparedness module for resilience building.

Data Analysis

In the research, thematic analysis was employed as the primary method for analyzing the qualitative data collected from the schoolchildren, parents, and school social workers in the flood-affected areas of Ernakulam, Kerala. The approach followed the six-phase framework proposed by Braun and Clarke (2023), which was adapted to suit the context and objectives of the study. The analysis began with the data familiarization phase, in which the FGDs and semi-structured interviews conducted in Malayalam were transcribed and translated into English. The transcripts were thoroughly read and reread to immerse the researcher in the data and to understand the participants lived experiences. Following this, initial codes were generated manually by identifying meaningful data segments related to disaster preparedness, coping strategies, psychosocial skills, and support systems. These codes were then grouped to form preliminary themes by identifying patterns across informant groups. In the review phase, the themes were refined and checked against both the coded data and the full dataset to ensure coherence and relevance. Subsequently, each theme was clearly defined and named to capture its core idea, with sub-themes developed where appropriate to reflect nuanced insights. The final stage involved selecting representative quotes and organizing the themes into three major domains that guided the development of a disaster preparedness module for resilience building among schoolchildren.

Results

Informant Demography

Demographic data were collected from schoolchildren, parents, and school social workers in flood-affected areas of Ernakulam district, Kerala. Thirty-two schoolchildren (16 boys and 16 girls), aged 13–15, from grades 8 to 10 in public schools across four flood-prone locations, Aluva,

Kunnathunadu, Muvattupuzha, and Northern Paravur, were involved. Selection was based on their direct experience with previous floods to ensure relevance to disaster preparedness and resilience-building. This balanced demographic ensured varied age, gender, and educational representation.

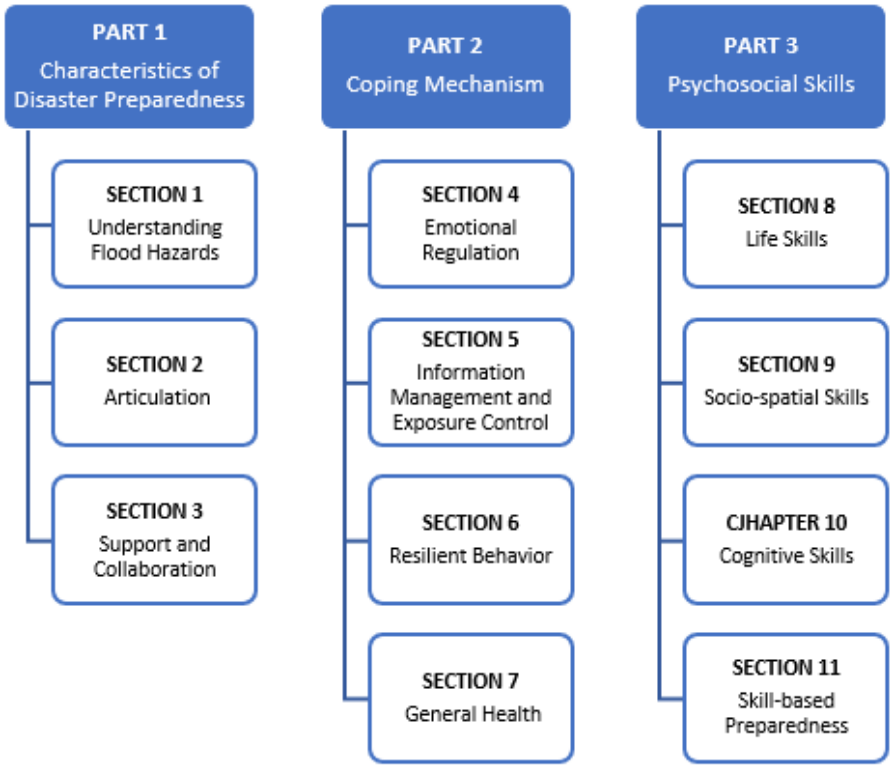
Six parents, three mothers and three fathers, from diverse socio-economic backgrounds, were interviewed to provide additional perspectives. Their occupations included homemaker, sales-woman, accountant, teacher, and fisherman, reflecting financial and social diversity. All resided in Ernakulam, had children enrolled in the selected schools, and had first-hand flood experience or engagement in related activities. They were physically healthy and actively involved in school affairs, ensuring meaningful participation.

Four school social workers from the same schools attended by the participating children were also interviewed. All were full-time, certified professionals with at least three years of continuous service in their current schools. They were actively employed during the data collection and directly involved in supporting the children who participated in the FGDs.

Figure 1 below illustrates the study's structure, outlining the three major parts: characteristics of disaster preparedness, coping mechanisms, and psychosocial skills, along with their respective sections.

Figure 1

Disaster Preparedness Module for Building Resilience



Source: Personal Document.

Figure 1 outlines a disaster preparedness module for building resilience, emphasizing three key components: characteristics of disaster preparedness, coping mechanisms, and psychosocial skills. These elements collectively aim to provide children with the knowledge, strategies, and emotional support required to navigate and recover from disaster situations effectively.

The thematic analysis in the study followed Braun and Clarke's six-phase framework (2023) and was structured to align with three components of the disaster preparedness education module: Characteristics of Disaster Preparedness (Part 1), Coping Mechanisms (Part 2), and Psychosocial Skills (Part 3). The first phase involved familiarizing with the data, the FGSs and interviews conducted in the regional Malayalam language, with the script translated into English. The transcriptions were repeatedly read to familiarize the reader with the information. This immersion allowed for an initial understanding of the children's lived experiences and adult perspectives on flood preparedness. In the second phase, initial codes were generated to identify meaningful units of data. For example, statements by the children such as *"I didn't understand the warnings on the TV*" (FGD2) were coded as a lack of hazard awareness, while quotes from the parents, such as "*We all helped each other escape*" (P4) were coded as community collaboration. These codes were collated across the data sets to reflect recurring patterns.

During the third phase, searching for themes, related codes were collated into potential themes. Then, in the fourth phase, the themes were reviewed to ensure they were supported by adequate and coherent data across the participants, with particular attention paid to triangulating the children's voices with the parental and school social worker insights. The fifth phase involved defining and naming the final themes and sub-themes clearly, ensuring that they reflected the essence of the participants' experiences and learning needs. Finally, in the sixth phase, the themes were integrated into the results and module structure, supported by direct participant quotes that illustrated the significance of each theme.

Part 1: Characteristics of Disaster Preparedness

This part of the module was designed for the context of Ernakulam, Kerala, a region that faces frequent floods. It aims to equip children with skills that prepare them for immediate disaster scenarios and build a foundation to learn about disaster contexts, develop emotional resilience, and engage in social interactions that contribute to their personal growth and positive community impact. Part 1 includes the following sections:

Section 1: Understanding Flood Hazards

During the focus group discussions and interviews, the informants expressed their understanding of flood hazards. The following representative quotes are discussed below:

> "We learned how to listen for weather warnings and what they mean. Now, I can tell my friends and family when a storm is coming and what we should do to stay safe" (FGD3).
>
> "They regularly remind us to check our emergency kit and are always the first to suggest practising our evacuation plan. It's reassuring to see them so knowledgeable and proactive" (P3).
>
> "Implementing preparedness education in our school has fostered a sense of community and shared responsibility among the school-children" (SSW4).

These responses illustrate that preparedness education fosters responsibility, awareness, and proactive behavior among children. FGD3 highlights that teaching children how to interpret weather warnings increases their confidence and ability to help their families and peers. Parent 3 supports this by demonstrating how preparedness education translates into real-life application, in which children actively remind their families to check emergency kits and practice drills. SSW4

reinforces the collective impact of preparedness education, emphasizing that schools play a central role in building a culture of shared responsibility. These perspectives confirm that proactive education ensures children are not just recipients of information, but active participants in their safety and that of their communities.

It is clear from the quotes that it is paramount that children explore causes such as heavy rainfall, river overflow, and poor drainage alongside the effects on communities, including waterborne diseases, injuries, and food shortages. Interactive sessions with visual aids and group discussions help simplify complex concepts, making learning engaging and relatable. Connecting lessons to their lives and community, the section equips children with awareness and foundational preparedness skills, fostering informed and cautious approaches to flood scenarios.

Therefore, it is essential that children acquire fundamental scientific knowledge about flood disasters, including their causes, associated risks, and impacts on the community. As such, the first section should focus on providing a comprehensive understanding of floods and related phenomena. The researcher suggests visual learning, group discussion, and interactive group work can be included as activities under this section to help them understand floods effectively.

Section 2: Articulation

The perspectives of the informants highlighting the importance of articulation are presented below through selected quotes:

> "I feel safer knowing our school social worker and teachers teach us what to do in a flood. The games and stories they use make it easier for us to remember the safety steps" (FGD3).

> "I'm grateful that my child's school uses stories and activities to teach about floods. It reassures me to know that the information is presented in a way they can understand and remember" (P5).

> "Training as per their grade and expression is essential when discussing the flood and its impact with schoolchildren. By adapting our language and approach to their developmental level, I ensure that they can understand and cope with the situation effectively" (SSW1).

The perspectives from the children, parents, and school social workers underscore the importance of age-appropriate learning in disaster preparedness. Interactive methods such as games and storytelling (FGD3) enhance engagement, while Parent 5 highlights the school's role in making content relatable. SSW1 stresses the importance of tailoring communication to children's cognitive levels, confirming that well-articulated, age-specific strategies improve understanding and reduce fear.

Based on the information gathered, the module included the section as it helps children develop skills to express feelings, emotions, and thoughts during and after disasters such as floods. To support the articulation of feelings among children during disaster experiences, the researcher suggests a variety of expressive activities such as emotion journals, role-playing, and art-based methods. These activities help children recognize, express, and regulate their emotions, fostering emotional clarity and empathy in a safe and supportive environment. Articulation supports mental health by enabling children to release stress, communicate needs, and build emotional resilience.

Section 3: Support and Collaboration

Support and collaboration are important needs for everyone during difficult situations. The following selected quotes illustrate the informants' views on the importance of support and collaboration in disaster preparedness:

> "I volunteer with local disaster response organizations. Being part of such groups helps me stay informed and ready to assist the community during emergencies" (FGD 2).

> "We received assistance through various relief programs, including access to counselling

services and educational support, which helped my child cope with the emotional and educational challenges posed by the flood" (P1).

"I saw a child clinging to his mother after the flood, terrified and confused. With family reassurance and community support, he slowly regained confidence, showing how collective care strengthens children's resilience" (SSW2).

The responses from the schoolchildren, parents, and school social workers highlight the interconnected role of family and community support in disaster preparedness. FGD2 emphasizes the proactive role children can take in community resilience, suggesting that engagement with local disaster response groups enhances both their knowledge and readiness. Parent 1 underscores the importance of structured relief programs, indicating that psychosocial and educational support are critical components of post-disaster recovery. Finally, as exemplified by SSW2, school social workers play a key role in reinforcing emotional resilience, ensuring that children receive immediate reassurance and long-term emotional security.

This section emphasizes teamwork, mutual aid, and community connections during disasters. It teaches children that resilience is enhanced through collaboration, sharing resources, and supporting one another. To this end, the section includes activities that foster empathy, communication, and shared responsibility, helping children understand the importance of giving and receiving support.

Part 2 - Coping Mechanisms

Part 2 of the disaster preparedness education module emphasizes experiential learning, which strengthens coping mechanisms by translating theoretical knowledge into practical skills, thus increasing resilience. During the gathering of information, the informants were asked about their coping mechanism concerns. Part 2 includes the section below.

Section 4: Emotional Regulation

The following perspectives from the schoolchildren, parents, and social workers highlight their experiences and insights related to emotional regulation during disaster situations. Training to manage anxiety and emotions was emphasized as essential by all three groups.

"I felt scared and anxious, especially at night. With my counsellor's support, I've learned calming techniques like breathing exercises and discussing my fears, which helped me regain control of my emotions" (FGD3).

"Initially, our child was quite shaken by the flood situation, experiencing heightened anxiety for the first few weeks. We noticed gradual improvements as we focused on providing a safe and comforting environment" (P2).

"Acknowledging the fears and concerns of children, providing reassurance, and fostering a sense of safety and security through discussion" (SSW1).

These perspectives underscore the importance of professional support, family care, and proactive communication in fostering emotional regulation. Together, they illustrate the critical need for a coordinated effort to enhance resilience and well-being in disaster-affected children.

Emotional regulation involves managing intense emotions during prolonged stress or overwhelming situations. Including this as a section helps children recognise, understand, and manage their emotions, especially during high-stress scenarios such as disasters. To enhance emotional regulation among children during disasters, the researcher recommends activities such as breathing and mindfulness exercises, using an emotion wheel to identify and manage feelings, and engaging in emotion-matching games.

Section 5: Information Management and Exposure Control

Children learn to approach challenges confidently and focus on recovery. The quotes

below reflect the informants' views on the critical role of information management and exposure control from their experience:

> "After the flood, we were taught how to find reliable information about what was happening. Knowing which sources to trust helped me feel less scared and more in control" (FGD4).
>
> "Please watch what media my kids are exposed to. Restrict their exposure to images that are graphic or upsetting, as these could heighten their anxiety" (P1).
>
> "We supposed teaching students how to find reliable information and manage their media consumption is crucial" (SSW2).

The above quotes express the notion that empowering children with the skills to discern reliable information sources and regulate media exposure is crucial for managing emotional responses. Advocating educational initiatives focused on information management highlights the significance of equipping individuals with tools to navigate media content responsibly in times of crisis.

This information management and exposure control section is essential in the module because it equips children with the ability to understand, filter, and respond to information during disaster situations. To strengthen their capacity, the researcher suggests storytelling with resilient role models; creating a collective "Hope Tree," journaling with a growth mindset; participating in symbolic rebuilding projects; and engaging in resilience challenges that promote problem-solving and adaptive thinking.

Section 6: Resilient Behavior

In the face of adversity, resilient children may demonstrate flexibility in their response, such as staying calm amidst chaos or seeking help when needed. By addressing setbacks constructively, children develop resilience and the ability to thrive despite adversity.

> "My family and neighbours worked together to rebuild our homes and move valuables to higher ground before the flood" (FGD2).
>
> "Coping with post-traumatic behavior was a significant challenge for our family after the flood. Our children experienced flashbacks, nightmares, and heightened anxiety, reminding us of the importance of long-term support and understanding" (P3).
>
> "The essence of psychological rehabilitation lies not only in treating psychological distress but also in instilling hope, restoring dignity, and nurturing a sense of empowerment in individuals who are navigating their way through challenging circumstances" (SSW1).

These quotes highlight the essential role of community and family collaboration in both physical recovery and emotional resilience following a flood. When children faced significant post-traumatic symptoms, the need for sustained psychological support and empathy was emphasized by parents. School social workers further stressed that effective psychological rehabilitation must go beyond immediate relief to restore hope, dignity, and empowerment.

This section will equip children with adaptive skills to manage challenges, thus fostering optimism, confidence, and a focus on disaster recovery. Suggested activities include creating a "Hope Tree," growth mindset journaling, storytelling, resilience challenges, and rebuilding projects.

Section 7: General Health Awareness Programs

Rebuilding physical health is a critical theme that addresses the physical consequences of floods on children. Some related quotes are given below:

> "I didn't have any major health issues, but I felt constantly fatigued. The stress and disruption made it hard to get enough rest" (FGD3).
>
> "My kid developed a fever and body aches, possibly due to exposure to contaminated water. It took some time to recover fully" (P2).

> "We relied on food donations, but they were often not enough or not nutritious. I worried constantly about my kids' health" (SSW2).

These quotes reflect the physical health challenges faced by children and families during and after floods. Although some children did not experience severe illnesses, ongoing stress, inadequate rest, and exposure to unsafe conditions contributed to fatigue and minor health complications such as fever and body aches. Additionally, concerns over insufficient and nutritionally inadequate food supplies highlight the broader implications of disaster-related disruptions to children's overall well-being and recovery.

This part of the module focuses on helping children recover and maintain physical health after flood-induced stress, emphasizing habits that promote well-being, strengthen immunity, and aid recovery. Suggested activities include body scan exercises to release physical tension; safe nutrition workshops for identifying nutrient-dense and non-perishable foods; education on water safety and hydration; emergency hygiene practices; healthy meal planning with fresh ingredients; and re-establishing sleep routines for physical and mental recovery.

Part 3 - Psychosocial Skills

Psychosocial skills play a significant role in fostering resilience among flood-affected children. By embedding such skills in educational programs, the study aims to empower children with lifelong abilities to face adversity constructively and to maintain well-being during times of crisis. Part 3 consists of the following chapters.

Section 8: Life Skills

Life skills are essential abilities that help individuals effectively manage everyday challenges and demands. As part of the CBSE syllabus in India, life skills education is included as an additional subject. However, it is not part of the state syllabus followed by the selected sample of students. Some related quotes from the informants are given below:

> "I used my problem-solving skills to quickly move our important documents and emergency kit to the attic. It made me realize how important it is to stay calm and think ahead during a crisis" (FGD3).

> "We shared updates about road closures, evacuation orders, and available resources, helping each other stay informed and safe" (P1).

> "We have to encourage critical thinking more from a young age, it equips children with the skills to handle unforeseen challenges confidently and effectively. Current training is insufficient" (SSW2).

These quotes emphasized the critical role of cognitive and problem-solving skills in effective disaster response and resilience. The ability to remain calm, prioritize actions, and make quick decisions—such as safeguarding essential items—demonstrates the practical value of preparedness and adaptive thinking during emergencies. Additionally, sharing real-time information among community members reflects the importance of collaborative decision-making and situational awareness. School social workers further advocate the integration of critical thinking skills into early education, noting that disaster training programs often lack the depth needed to prepare children for complex, unpredictable situations.

Life skills training is fundamental to equipping children with adaptive and functional capabilities, particularly in flood-prone areas. Suggested activities include critical and creative thinking exercises through hypothetical flood scenarios; effective communication drills via role play; team-based problem-solving workshops; empathy-building role play as victims or rescuers; and practical survival skills training such as building shelters and signaling for help.

Section 9: Cognitive Skills Development

Cognitive skills help children assess situations logically and act promptly, ensuring their safety and that of others. This can be depicted through some of the quotes from the informants:

> "Being able to assess the immediate needs of the community, identify obstacles, and devise practical solutions for shelter, food, medical aid, and other essentials is essential for an effective response" (FGD3.2).

> "My child talked about how they remembered the safety tips we discussed during family meetings. It's reassuring to see them apply that knowledge during real-life emergencies, showing the importance of memory and recall in staying safe" (P3).

> "I emphasize to all children the importance of planning and prioritizing tasks after a flood. This level of organization can significantly help them regain control and stability in a chaotic situation" (SSW4)

These quotes illustrate the role of cognitive thinking in disaster preparedness and response. One student's reflection (FGD3.2) highlights problem-solving and critical thinking, essential cognitive processes for assessing needs and finding practical solutions under pressure. At the same time, the parent's comment (P3) emphasizes memory and recall, key components of cognitive functioning, as the child applies learned safety strategies during a real-life emergency. The school social worker's input (SSW4) underlines planning, task prioritization, and organizational thinking, which are vital aspects of executive functioning.

The insights of the informants demonstrate that cognitive skills need to be developed among children to help them cope with future disasters, with suggested activities including risk assessment simulations to identify hazards, memory and recall exercises for emergency preparedness, and planning and organization projects such as designing evacuation plans and resource lists.

Section 10: Socio-Spatial Skills

Socio-spatial skills involve using social and spatial information effectively during floods. They include understanding flood risk areas, locating shelters, identifying vulnerable individuals, and coordinating community efforts.

> "Everything seemed the same to me. I could not connect the ecology of my place. This made me feel fear since an open well is there beside of my house. I couldn't spot it during the flood time" (FGD3).

> "We hadn't really thought about emergency plans or mapped out escape routes in our neighbourhood. When floodwaters started rising, we felt completely lost and didn't know where to go, a terrifying experience, especially with young children to look after"(P3).

> "When schoolchildren learn to navigate their physical and social environments effectively, they develop confidence in their abilities to address challenges and support each other, both during emergencies and in everyday life. We have to focus on it" (SSW4).

These quotes illustrate the critical need for awareness and preparedness in flood situations. The student expresses her fear stemming from a lack of familiarity with her surroundings, particularly concerning the open well near her house, which poses a significant risk during floods. Likewise, the parent describes the panic and confusion experienced when floodwaters began to rise, emphasizing the lack of emergency plans and escape routes in her neighbourhood, especially concerning the safety of young children. The school social worker highpoints the importance of teaching children to navigate both their physical and social environments.

It is clear from the informants' words that socio-spatial related skills enhance their ability to identify safe zones, access resources, and engage with digital tools for disaster management. The section should therefore be included in the module, with activities such as community

resource mapping to identify shelters and aid centers, house mapping to plan safe zones and evacuation paths, and digital literacy training to use emergency apps and alerts. In addition, proactiveness drills teach early action during risk, while practical skills-based preparedness is fostered through first aid basics, evacuation simulations, resourceful thinking workshops using household items for survival, and practicing alert systems such as whistles and flashlights for effective communication during emergencies.

Section 11: Skills-based Preparedness

Skills-based preparedness training focuses on practical abilities such as first aid, evacuation procedures, and survival tactics, empowering children to act effectively during floods.

> "Swimming is definitely an important skill during floods. It can be a life-saving skill, especially when dealing with rising water levels. But I am not good at swimming" (FGD1).

> "Skills such as bandaging wounds, performing CPR, and addressing minor injuries can make a significant difference in emergency situations" (P1).

> "Digital literacy is not just about using technology; it's about understanding how to use it responsibly and effectively. Our schoolchildren need to be equipped with the skills to discern credible information from misinformation, especially in times of crisis" (SSW3)

These statements highlight the diverse skill sets necessary for effective disaster preparedness and response. While physical survival skills such as swimming and basic first aid are crucial during emergencies, digital literacy is also needed to navigate information accurately in crisis situations. Equipping children with both practical skills ensures they are better prepared to respond safely and responsibly during disasters.

Section 11 highlights the importance of skills-based preparedness training to equip children with practical life-saving abilities such as first aid, evacuation, and survival tactics during floods. Suggested activities include community and house mapping, digital literacy, proactiveness drills, first aid training, evacuation simulations, resourcefulness workshops, and safety alert practices.

Role of School Social Workers and Counsellors in Implementing the Module

School social workers and counsellors play a key role in disaster preparedness education, equipping students with skills to manage both physical and emotional challenges. In Kerala, every school has either a social worker or psychologist to support students' mental health. Their expertise helps deliver age-appropriate lessons on emergency procedures, emotional regulation, and community safety. While there is an argument for disaster training to be provided directly by government agencies such as the disaster risk reduction wing, school-based professionals are uniquely positioned to tailor content to students' developmental levels. They also offer a safe space for children to express their fears, enhancing trust and emotional engagement.

Collaboration with local emergency responders such as fire departments, police, and medical personnel strengthens disaster education. These professionals can clarify their roles in crises, lead safety drills, and contribute real-world scenarios to the curriculum, giving students practical exposure to evacuation and communication strategies.

Mental health professionals, such as therapists, are also vital in addressing the emotional aftermath of disasters. They teach coping strategies such as mindfulness, relaxation, and positive self-talk, while offering ongoing therapeutic support to rebuild children's sense of safety and confidence. Their involvement fosters long-term emotional resilience. Together, school staff, emergency responders, and mental health professionals form a collaborative framework that

prepares children not only for immediate disaster response, but also for sustained emotional recovery and resilience.

Discussion

The study proposes a disaster preparedness module aimed at building resilience among schoolchildren in flood-prone areas of Kerala, India. Employing a qualitative case study approach, focus group discussions and interviews revealed key components of children's disaster preparedness, coping mechanisms, and psychosocial skills. The findings informed the development of a holistic educational module integrating both physical and psychosocial preparedness.

The discussion of the characteristics of disaster preparedness explores the essential traits, behaviors, and capacities that enable children to anticipate, respond to, and recover effectively from flood-related emergencies. Kirmayer et al. (2009) emphasize psychoeducational interventions that enhance children's cognitive and emotional resilience, enabling them to manage anxiety and stress during emergencies, as it is important to empower this vulnerable group to ensure social and developmental equality in all aspects of their lives (Aizan et al., 2019). Understanding flood hazards is fundamental, with interactive visual learning methods such as maps and role-playing shown to improve situational awareness and retention (Peek et al., 2018). Shah et al. (2020) demonstrated that educating children on flood risks significantly enhances their preparedness, while Cicero et al. (2024) further highlight communication strategies that empower children to articulate their needs and comprehend safety protocols across various settings.

The discussion on coping mechanisms highlights the significance of equipping children with emotional regulation and problem-focused strategies to manage flood-related stress and trauma effectively. Drawing from recent evidence and global frameworks, this section emphasizes participatory, school-based, and health-informed interventions that foster resilience and adaptive functioning during disasters. Healthy coping mechanisms and emotional regulation are critical. Activities such as journaling and role-playing provide safe outlets for expressing fears, thus reducing stress (Masten & Barnes, 2018). Krummenacher et al. (2024) stress the importance of teaching problem-focused coping strategies, fostering social support networks, and using participatory learning methods. Techniques such as mindfulness and deep breathing help children remain calm, improve decision-making, and reduce panic during emergencies (Pant, 2023). Additional interventions including art therapy, disaster drills, mindfulness training, and community engagement support emotional recovery post-disaster (González-Pasarín et al., 2023; McDonald, 2022). Gender-specific coping preferences, such as boys favoring physical activity and girls seeking social support, underline the need for nuanced, inclusive approaches (Begum et al., 2025).

International frameworks such as UNICEF's Child-Centered Disaster Risk Reduction (CCDRR) and the Resilient Children/Resilient Communities (RCRC) initiative advocate school-based, participatory models that are context-sensitive and culturally grounded (Cvetković et al., 2024). Managing information exposure to prevent misinformation is vital; teaching children to evaluate sources and differentiate facts from rumors empowers them to navigate crises confidently (Houston et al., 2015). Resilience-building exercises, such as sharing success stories and growth mindset journaling, encourage children to view challenges as opportunities for growth (Bonanno et al., 2015). Chen et al. (2025) showed that resilience training positively influences disaster preparedness behaviors in children and adolescents.

The United Nations Office for Disaster Risk Reduction (UNDRR, 2011) emphasizes the shift in

education from disaster response to prevention. Incorporating disaster risk reduction into school curricula can strengthen life skills and community resilience. Liu et al. (2025) demonstrated that awareness of spatial zones and evacuation routes improves children's understanding of safe and resilient behavior during disasters.

Health preparedness is also essential. A systematic review by Abebe et al. (2025) outlined the impacts of floods on healthcare facilities and the importance of robust preparedness plans for continuity of care. In addition, Noor et al. (2022) found that a Health Belief Model-Based Intervention (HEBI) significantly improved health-related flood preparedness among Malaysian communities. Carías et al. (2022) reported increased acute illnesses and mental health issues among urban poor populations post-flood in Indonesia, underscoring the need for targeted health strategies, while Fothergill and Peek (2015) emphasized that teaching hygiene, nutrition, and hydration practices helps children maintain well-being during floods. These findings align with the experiential learning framework embedded in the proposed module.

This discussion on psychosocial skills aligns with existing studies that highlight how children's emotional, social, cognitive, and behavioral capacities foster resilience in flood-affected environments. Previous research emphasizes life skills such as empathy, communication, critical thinking, and self-regulation as foundational competencies that enable adaptive coping and facilitate recovery during and after disaster events. By connecting these findings, the study reinforces the crucial role of these psychosocial skills in supporting children's resilience in flood contexts. Recent research highlights the necessity of tailoring disaster education to children's cognitive and emotional development (Johnson et al., 2014). Life skills such as decision-making and critical thinking emerged strongly, echoing Nunn et al. (2019), Tipler et al. (2017), and Shao et al. (2021). One study reported that current disaster education inadequately fosters these competencies and advocated inquiry-based learning and reflective exercises (Permana et al., 2022). The proposed module addresses these gaps by enabling students to develop essential life skills to navigate unpredictable, high-stress situations.

Cognitive development through preparedness training shows that understanding safety behavior, emotional understanding, and adaptive adjustment strategies can improve children's resilience to earthquakes (Daskal et al., 2022; Raccanello et al., 2023). Skill-based mental health training post-disaster enhanced individual and community response and recovery capabilities (Wade et al., 2013, 2014). Another skill mentioned in one study about socio-spatial skill, which is critical for effective flood preparedness and resilience. Spatial inequalities strongly influence community vulnerability, particularly in urban flood-prone areas (Kephart et al., 2024; Pappalardo & La Rosa, 2023). Forrest et al. (2020) highlighted spatial disparities affecting flood resilience in Arnhem, the Netherlands, emphasizing the need to integrate spatial awareness in planning. In addition, Chen et al. (2025) used flood simulations and social media analysis in Nanjing, China, revealing unequal neighborhood responses, and reinforcing the role of socio-spatial skills in empowering communities. Abid et al. (2022) showed that stronger socio-spatial connections in Malaysian communities correlated with higher flood resilience, supported by knowledge sharing and coordinated action, while Wolff et al. (2021) illustrated how participatory flood monitoring in informal settlements fostered spatial awareness and community agency, enabling residents to engage actively in disaster risk reduction. Collectively, these studies confirm that skills such as spatial mapping, risk perception, and social connectivity are pivotal in flood preparedness.

Fostering a sense of agency and competence requires disaster preparedness to reflect the population's specific environmental, social, and cultural realities. Norris et al. (2008) argue that tailored approaches are most effective. This study, conducted in the flood-affected Ernakulam district of Kerala, supports this view by developing a region-specific module incorporating local risk factors, cultural practices, and community knowledge.

The theoretical foundation primarily draws on socio-ecological theory, which posits that resilience emerges from dynamic interactions among individual, familial, school, and community systems (Ungar, 2011). This perspective aligns with the study findings emphasizing collaborative support networks involving parents, educators, and community members. Complementing this, the theory of planned behavior (TPB). This framework offers insight into children's disaster-related behaviors—such as evacuation readiness, risk assessment, and peer collaboration—by examining the influence of attitudes, perceived behavioral control, and subjective norms. By integrating the Theory of Planned Behavior (TPB) with the socio-ecological model, the module holistically addresses disaster preparedness characteristics and fosters resilience-building among children.

Grounded in empirical insights from the children, parents, and school social workers, the module bridges theoretical constructs with practical, community-informed strategies. Its novelty lies in applying these frameworks in the flood-prone Kerala context, offering a replicable, adaptable module in school curricula in similarly vulnerable regions.

Limitations of the study include its qualitative approach, relying on a limited number of participants from the Ernakulam district, potentially restricting the generalizability of the findings to other regions with different geographic and socio-cultural contexts. Additionally, purposive sampling excluded important perspectives from other key stakeholders, such as teachers, government disaster personnel, and healthcare workers, which may have narrowed the scope of the insights.

The study offers key implications for theory, practice, and policy related to disaster preparedness education in flood-prone regions such as Kerala. It highlights the need for a comprehensive education module that empowers children to manage both immediate and long-term disaster impacts. The study also advances theoretical understanding by integrating the socio-ecological model and theory of planned behavior to frame resilience as a combination of behavioral, emotional, and systemic capacities.

Practically, the findings underscore the value of a structured, multi-dimensional preparedness module that promotes hazard awareness, emotional regulation, communication skills, and life skills. This will equip children with the ability to respond calmly and effectively during emergencies, while fostering a culture of safety in schools and communities.

Policy-wise, the study calls for collaboration between education, social welfare, and disaster management departments to embed resilience education into school curricula. It advocates the inclusion of trained school social workers and the implementation of monitoring tools to assess and enhance intervention outcomes.

Conclusion

The integration of disaster preparedness education relies on the combined efforts of school social workers or counsellors, emergency responders, and mental health professionals. Together, they can deliver a comprehensive program that equips children with the practical skills, emotional resilience, and community awareness needed to face disasters effectively. By

fostering a supportive learning environment, engaging with real-world expertise, and addressing psychological needs, this approach ensures children are well-prepared to respond to emergencies and build long-term resilience.[]

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Informed Consent Statement

Informed consent was obtained from all informants involved in the study. Ethical approval was also obtained from the ethics committee at Universiti Kebangsaan Malaysia with reference number JEP-2023-497.

Conflicts of Interest

None declared.

Author Contribution Statement

Niseetha Parveen Mubarak: Conceptualization; Data Curation; Formal Analysis; Investigation; Methodology; Writing Original Draft; Writing, Review & Editing. **Noremy Md. Akhir:** Data Curation; Funding Acquisition; Methodology; Project Administration; Resources; Validation; Writing, Review & Editing. **Mohd Suhaimi Mohamad:** Data Curation; Resources; Validation; Writing, Review & Editing.

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