Positive Coping and Community Resilience in Disaster Management for Flooding in Malaysia

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Abstract

Background: Flood disasters increase the risk of both direct health impacts like trauma, injuries, and infectious diseases, as well as indirect impacts such as displacement-related and mental health problems. Disasters, though devastating, can have their adverse effects mitigated. A pivotal aspect in disaster management is community resilience, which is instrumental for sustainable recovery and growth. Individuals' readiness to take preparedness measures that increase community resilience might be influenced by their coping mechanisms. This study assessed the association between positive coping and community resilience among affected communities in Shah Alam, Malaysia. Methods: We conducted a cross-sectional study and recruited participants by using purposive sampling. The participants were required to self-report their sociodemographic profile, coping, and community resilience. Coping was assessed using the Brief-Coping Orientation to Problems Experienced scale, and community resilience was assessed using the Communities Advancing Resilience Toolkit survey. Multivariable logistic regression was performed. Results: The findings demonstrated that problem-focused coping was the strongest predictor for community resilience in all domains. Participants with low problem- and emotion-focused coping were associated with low community resilience. Conclusion: A strong sense of social responsibility fosters more resilient communities. It is imperative to craft holistic community health programs, embedding both social responsibility and resilience, to proactively mitigate and manage disaster risks. As such, the adoption of comprehensive community resilience frameworks should be prioritized within health and disaster management blueprints.

Keywords: Health Risks, Community resilience; Coping strategies; Disaster risk management; Flood; Sustainable community

Significance | Recognizing the significance of coping mechanisms in fostering community resilience is essential for reducing the effects of flooding and enhancing health risks and disaster preparedness in Malaysia.

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1. Introduction

Flooding is devastating in every aspect. Floods can have a direct and indirect impact on people's health (French et al., 2019). Other than causing social disruption and casualty loss, flood disasters also pose significant health risks including acute health impacts, such as trauma, injuries, drowning, hypothermia, chemical hazards, and infectious diseases (water- and vector-borne diseases, such as cholera, typhoid, or malaria); and long-term health impacts like mental health problems (French et al., 2019). Especially for mental health, it can be challenging to intervene the distressing experiences

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that most individuals experience temporarily or over extended periods of time following disasters. This highlights the importance to lessen the negative effects of stressors on flood victims. Since a prompt and sustainable implementation of emergency preparedness, response, and recovery strategies can mitigate the extent of the financial losses, human costs, and health impacts associated with floods, resilience building has become more important than ever.

In Southeast Asia, tropical storm severity is increasing due to climate change and global warming (Center for Excellence in Disaster Management & Humanitarian Assistance, 2022). Alongside geographical factor, some rivers in Malaysia have major channels that feed into the South China Sea, which greatly increase the risk of flooding due to the increase in the annual monsoon season, duration, and intensity of heavy rainfall ((Center for Excellence in Disaster Management & Humanitarian Assistance, 2022). In Malaysia, floods typically happen from November to March annually during the monsoon season, invariably cause significant damage and casualties (Center for Excellence in Disaster Management & Humanitarian Assistance, 2022). Floods are the most common natural disaster in Malaysia. 75% of all natural disasters that occurred in Malaysia from 1998 to 2018 were floods, which affected over 770,000 people, claimed 148 lives, and led to RM5.82 billion (US$1.4 billion) in economic losses (Center for Excellence in Disaster Management & Humanitarian Assistance, 2022). In December 2021, Malaysia was hit by a worst flash flood in decades due to a tropical depression TWENTYNINE (International Federation of Red Cross And Red Crescent Societies, 2022). At that time, Selangor was the worst hit state, contributed to about half of Malaysia's recorded economic losses (International Federation of Red Cross And Red Crescent Societies, 2022). Therefore, it is crucial to better prepare for disaster risk reduction, one key approach being the building of community resilience among flood victims in Selangor, Malaysia.

Resilience is defined as "the ability or capacity to build back better after a disaster (Chong et al., 2018). A resilient community has the ability to transform the environment through deliberate, collective action, and requires the community to cope effectively with and learn from adversity (Pfefferbaum et al., 2015). According to previous studies, sociodemographic characteristics, including age, gender, education level, and income, play a role in community resilience (J. Sambu & Mhongo, 2019; Drzewiecki et al., 2020). A study conducted in Kenya found that older individuals are associated with higher resilience compared to younger people (J. Sambu & Mhongo, 2019). In fact, older adults had experienced more traumatic events and developed better coping abilities to adjust and accept adversities, which is related to positive re-integration (J. Sambu & Mhongo, 2019). In terms of gender differences, women generally exhibit higher resilience than men (J. Sambu & Mhongo, 2019). For instance, women tend to utilize familial and community protective factors to get help and resources, which is crucial for building flood resilience. Furthermore, socioeconomic status (SES) is related to resilience. A study conducted in West Indies suggested that adults with professional degrees are more likely to be resilient than individuals who only completed primary grades education (Drzewiecki et al., 2020). Income also greatly influences a person's exposure to risks and the ability to recover from losses after flooding. It is well recognized that lower income group has a lower health information seeking behavior, which might influence the resilience level (Marzo et al., 2022).

Besides sociodemographic factors, coping is another crucial factor that influences resilience. According to the Lazarus and Folkman (1984), coping is defined as the "constantly changing cognitive and behavioral efforts necessary to manage to master, reduce or tolerate a troubled person-environment relationship" (Lazarus & Folkman, 1991). In other words, coping is about the way to manage or overcome problems and difficulties. Coping strategies can be adaptive (positive coping) or maladaptive (negative coping) (Carver et al., 1989). According to Carver, Scheier, and Weintraub (1989), maladaptive behavior hinders the ability of individuals to adapt to certain situations and prevents them from effectively dealing with life pressures (Carver et al., 1989). Due to the fact that maladaptive coping strategy does not assist individuals to cope with their problems in the long term, this type of coping strategy is not productive. In fact, by using positive coping strategies, individuals can solve problems, handle emotional stress, and overcome the adversities better, thus, enhancing their resilience to flooding (Md Akhir et al., 2019). As flooding can pose substantial social and mental health problems that may continue over extended periods of time, coping is essential to develop resilience.

As mentioned earlier, Selangor was the worst hit state for one of the most severe floods that occurred in Malaysia in 2021. This call for the needs to strengthen disaster risk reduction initiatives by building community resilience. Currently, literature regarding community resilience in Malaysia is still limited (Md Akhir et al., 2019; Irasanti et al., 2023). No studies have been done to assess coping strategies that could help in building community resilience towards flooding in Selangor. The nearest studies were only conducted in Kelantan, Malaysia (Md Akhir et al., 2019). Previous findings highlight the need to delve deeper into community resilience levels in Selangor, and to identify coping strategies that could foster greater resilience. Therefore, this study aimed to assess the association between positive coping and community resilience among flood victims in Selangor, Malaysia.

2. Materials and Methods

2.1. Participants

Participants were required to self-report their sociodemographic characteristics including age, gender, ethnicity, marital status, household monthly income, education level, employment status, coping strategies and community resilience. Purposive sampling was applied for sample selection. The sample size was calculated using a single population mean calculator – Statulator (accessed on 8 May 2023) (Dhand & Khatkar, 2014). Assuming the expected population community resilience standard deviation score to be 0.63 (Mohamad et al., 2021), 5% desired precision, 95% confidence level, the study required a sample size of 613. An additional 20% possible non-response rate was also accounted for, necessitating a minimum sample size of 736. The inclusion criteria of the study were participants that are residing in Malaysia, mentally fit and literate in English or Malay. Participants residing in flood free community areas were excluded from the study.

2.2. Design and procedure

This cross-sectional study was conducted from June to July 2023 in Malaysia using a quantitative-based approach. To gather data, a validated self-administered, anonymous paper survey was distributed. The paper survey permitted only one response per individual. Prior to data cleaning, Microsoft Excel was used to do double data entry, comparison of entries and discrepancy reconciliation. Data confidentiality was safeguarded using data encryption.

2.3. Study variables and tools

This study utilized a validated questionnaire consisted of 37 items and 3 sections: Section A – sociodemographic characteristics (7 items), Section B – coping strategies (Brief-COPE, adapted from Carver, 1997, 6 items), and Section C – community resilience (Community Advancing Resilience Toolkit (CART), adapted from Pfefferbaum et al., 2015, 24 items) (Pfefferbaum et al., 2015; Carver, 1997):

Sociodemographic characteristics: Seven sociodemographic factors were included in this study: age, gender, marital status, ethnicity, education level, household monthly income, and employment status.

Coping strategies: Individual responses to cope with stressors were measured using a 28-item Brief-Coping Orientation to Problems Experienced (Brief-COPE) scale (Carver, 1997). The scale consists of 14 facets that can be classified into three subscales: problem-focused, emotion-focused, and avoidant coping style (Carver, 1997; Poulus et al., 2020). This study only adapted questions related to positive coping that are found in both problem-focused and emotion-focused subscales. The problem-focused positive coping is characterized by 4 facets: active coping, planning, positive reframing, and the use of instrumental support. The emotion-focused positive coping also has 4 facets: acceptance, humor, religion, and use of emotional support. The Brief-COPE has good psychometric properties (Carver, 1997; Poulus et al., 2020). In the current study, the authors selected 8 items (one item from each facet). After piloted on a sample of 30, two items in the facets of religion and acceptance with internal consistency, α <0.7 were removed. The final internal consistency of the scale was good, α =0.72. Expert validation was performed, the final CVI was 94%. The face validity index (FVI) was 76.6%. Meaningful classification was developed for both subscales. A score of > 12 (problem-focused subscale) and > 6 (emotion-focused subscale) represents high engagement in coping.

Community resilience: The community resilience was assessed using a 24-item Community Advancing Resilience Toolkit (CART) (Pfefferbaum et al., 2015). The questionnaire consists of 5 domains: connection and caring (5 items), resources (5 items), transformative potential (6 items), disaster management (4 items), and information and communication (4 items). The toolkit has proven good psychometric properties (Pfefferbaum et al., 2015). In the current study, the internal consistency for all domains were good: connection and caring (α =0.797), resources (α =0.785), transformative potential (α =0.892), disaster management (α =0.842), and information and communication (α =0.852). The final CVI was 91.4%. Meaningful classification was used to categorize all domains. A score of > 15 (connection and caring domain), > 15 (resources domain), > 18 (transformative potential domain), > 12 (disaster management domain), and > 12 (information and communication domain) represents high resilience in the respective domain.

The questionnaire is available in both Malay and English versions. The Malaysian adaptation of the Brief-COPE is available in Malay version and has been psychometrically tested and proven good reliability and validity (Yusoff, 2011). For the CART, back-to-back translation was done by three independent translators who are native Malay speakers with expertise in our research area. To ensure that the translated questionnaire was culturally relevant to our target population, the questionnaire was reviewed by a focus group of local experts in our research area for cultural appropriateness and provided feedback. The authors incorporated their suggestions and further refined the translated questionnaire.

2.4. Data analysis

Statistical analyses were performed using Statistical Package for Social Sciences (SPSS) statistical software version 26.0. Descriptive statistics were used to describe the sociodemographic data, coping strategies, and community resilience level. A univariable logistic regression analysis was performed to identify factors associated with the community resilience of the participants. Any subscale with a p-value of less than 0.25 (p <0.25) were included into the multivariable logistic regression model. Adjusted odds ratio (AOR) with 95% confidence interval (CI) were presented, and a value of p <0.05 was considered statistically significant.

2.5. Ethical considerations

Ethical approval was obtained from the Ethics Committee of Management and Science University (Ethics Code: EA-L1-01-IMS-2023-06-0008). Informed consent was obtained from all respondents before distributing the questionnaire.

3. Results

A total of 1378 respondents participated the survey. Demographic characteristics of the respondents are presented in Table 1. Among the total of 1378 respondents, 53.6% were younger than 25 years, 62.7% were female, 55.2% were Bumiputra, 75% were unmarried, 81.3% had tertiary degree, 62.9% were low-income group and 48.5% were employed (Table 1).

The respondents' coping is presented in Figure 1. In general, higher level of problem-focused coping were applied in both genders compared to emotion-focused coping. 53.7% of males and 54.6% of females were reported to have high problem-focused coping skills. While 39.9% of males and 45.1% of females shown high level of emotion-focused coping skills (Figure 1).

For resilience on different subscales, more than half of the respondents reported having low community resilience in all domains: connection and caring (57.5%), resources (66%), transformative potential (64.9%), disaster management (65.8%), and information and communication (61.5%) (data is not presented).

Table 2 presents the association between demographic characteristics of the respondents, coping strategies, and community resilience among the respondents. Respondents' employment was positively associated with low community resilience in terms of connection and caring (AOR= 1.48, 95% CI: 1.11, 1.96), resources (AOR= 1.51, 95% CI: 1.16, 1.97), transformative potential (AOR= 1.48, 95% CI: 1.14, 1.91), and disaster management resilience (AOR= 1.39, 95% CI: 1.07, 1.81) compared to the unemployed respondents (Table 2).

In terms of coping and community resilience, the association was strongest between problem-focused, emotion-focused coping and connection and caring subscale of community resilience. Respondents with low level of problem-focused coping (AOR: 4.24, 95%CI: 3.23, 5.57) and emotion-focused coping (AOR: 2.91, 95%CI: 2.24, 3.78) were 4.24 times and 2.93 times more likely to have low connection and caring community resilience, respectively (Table 2).

For other community resilience subscales, respondents with low problem-focused coping were associated with low community resilience in terms of resources (AOR: 1.50, 95% CI: 1.15, 1.95), transformative potential (AOR: 1.62, 95% CI: 1.25, 2.11), disaster management resilience (AOR: 1.54, 95%CI: 1.18, 2.00), and information and communication subscale (AOR: 1.50, 95% CI: 1.16, 1.93) compared to the respondents with high problem-focused coping skills. Similarly, except for the disaster management subscale, respondents with low emotion-focused coping were associated with low community resilience in terms of resources (AOR: 1.59, 95% CI: 1.23, 2.07), transformative potential (AOR: 1.30, 95% CI: 1.01, 1.69), and information and communication subscale (AOR: 1.30, 95% CI: 1.01, 1.67) compared to the respondents with high emotion-focused coping skills (Table 2).

4. Discussion

As the Earth's climate change and global warming continues, flooding becomes increasingly common and poses huge repercussions on human health. Coping is necessary to build resilience as flooding can cause serious health impacts ranging from acute consequences to long-term impacts like mental health issues, that could persist for an extended period. To the best of our knowledge, this is the first study conducted in Malaysia which explores positive coping and its relationship with community resilience among flood victims in Selangor, Malaysia. The mean age of the participants was 28.5 (10.5) years, which helps explain why over half (54%) of the flood victims preferred to practice problem-focused coping rather than emotion-focused coping. The study found that, aside from sociodemographic factors, positive coping was associated with community resilience. In all domains, those exhibiting low problem-focused coping were linked to low community resilience. Participants with low emotion-focused coping were associated with low community resilience in terms of connection and caring, resources, transformative potential, and information and communication, compared to the participants with high emotion-focused coping skills.

Our study found that more than half of the respondents reported having low community resilience in all domains. As far as our knowledge, many countries have adopted the United Nations' 2030 Agenda for Sustainable Development Goals (SDGs), in which resilience has been incorporated as a component of sustainability. Previous study findings even suggested that young adults especially university students have adequate knowledge regarding SDGs (Ghazi et al., 2020). However, the current study with low resilience levels in most young adults has sparked the need for the assessment of resilience, as it might be due to not-well-emphasized resilience components in SDG interventions implemented in Malaysia. Another known fact is regarding the ability in emotional regulation and problem-solving. A study conducted in the United Kingdom found that older adults were more resilient than young adults in emotion-related self-regulation and had more experience in problem-solving (Gooding et al., 2012). These findings further highlight the importance of maintaining resilience-related coping skills in different psychological processes across the lifespan.

The results of this study demonstrate a significant preference among both male and female participants for problem-focused coping strategies over emotion-focused coping strategies. Another reason for the widespread usage of problem-focused coping

Table 1. Demographic characteristics of the respondents (n=1378)

Variable	n (%)
Age group	
<25	738 (53.6)
≥25	640 (46.4)
Gender	
Male	514 (37.3)
Female	864 (62.7)
Race	
Bumiputra	761 (55.2)
Non-bumiputra	617 (44.8)
Marital status	
Married	345 (25.0)
Unmarried*	1033 (75.0)
Education	
Basic education level (primary and secondary education)	258 (18.7)
Higher education level (tertiary education)	1120 (81.3)
Household income (monthly)	
Low (Bottom 40, RM2500 – RM4850)	867 (62.9)
Middle (Middle 40, RM4851 – RM10970)	359 (26.1)
High (Top 20, >RM10971)	152 (11.0)
Employment	
Employed	669 (48.5)
Unemployed	709 (51.5)

*Unmarried including never married, divorced, widowed, and single parent

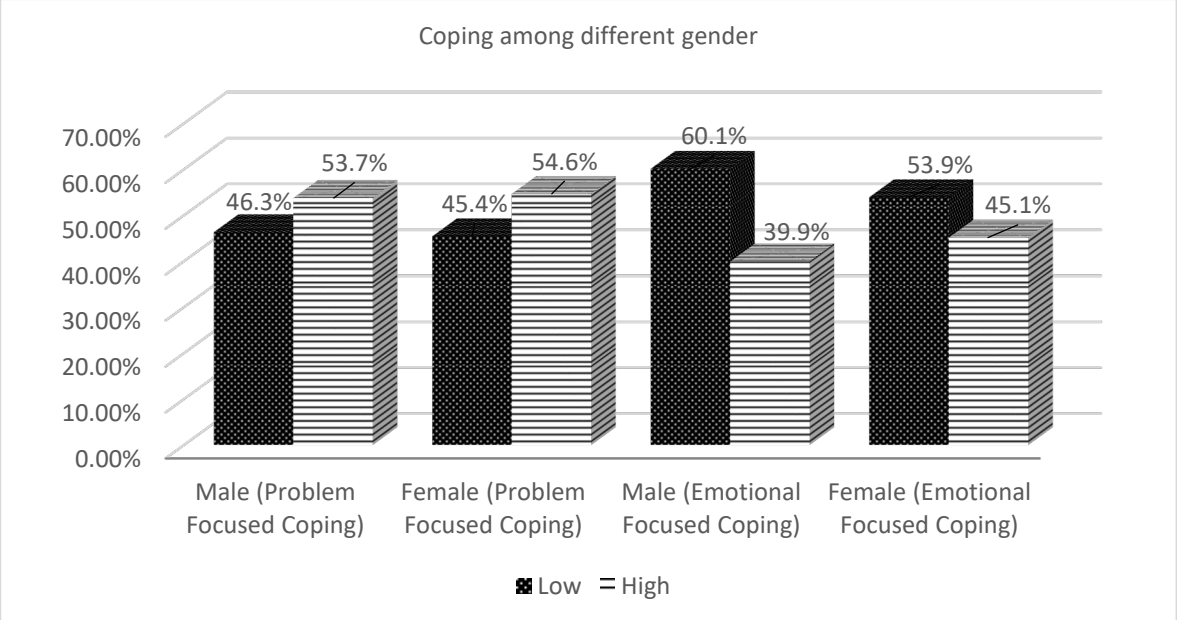

Figure 1. Coping among different gender (n=1378)

Table 2. Multivariable logistic regression analysis of demographic characteristics and community resilience subscales among the respondents (n=1378)

Variable	Connection and caring			Resources			Transformative potential			Disaster Management			Information and communication		
	AOR	95%CI	*p*	AOR	95%CI	*p*	AOR	95%CI	*p*	AOR	95%CI	*p*	AOR	95%CI	*p*
Age															
≥25	Ref			Ref			Ref			Ref			Ref		
<25	1.20	0.87, 1.66	0.278	1.31	0.97, 1.78	0.082	1.16	0.86, 1.57	0.335	1.17	0.86, 1.59	0.308	0.97	0.72, 1.30	0.815
Gender															
Female	Ref			Ref			Ref			Ref			Ref		
Male	1.15	0.89, 1.48	0.287	1.08	0.85, 1.37	0.546	1.06	0.84, 1.34	0.620	0.97	0.76, 1.22	0.774	1.12	0.89, 1.41	0.344
Marital status															
Married	Ref			Ref			Ref			Ref			Ref		
Unmarried*	1.35	0.94, 1.84	0.101	1.03	0.74, 1.44	0.870	1.24	0.89, 1.73	0.208	1.01	0.72, 1.41	0.968	1.14	0.82, 1.58	0.426
Education															
Basic education level	Ref			Ref			Ref			Ref			Ref		
Higher education level	1.11	0.79, 1.55	0.558	1.19	0.87, 1.62	0.280	1.02	0.75, 1.39	0.892	0.89	0.65, 1.21	0.448	1.10	0.81, 1.48	0.540
Household income (monthly)															
High	Ref			Ref			Ref			Ref			Ref		
Middle	1.16	0.75, 1.81	0.507	0.70	0.46, 1.07	0.101	1.09	0.72, 1.65	0.673	1.28	0.86, 1.90	0.231	1.17	0.79, 1.74	0.440
Low	1.05	0.71, 1.57	0.804	0.78	0.53, 1.15	0.211	0.84	0.58, 1.22	0.371	1.39	0.97, 1.99	0.073	1.08	0.76, 1.55	0.657
Employment															
Unemployed	Ref			Ref			Ref			Ref			Ref		
Employed	1.48	1.11, 1.96	0.007	1.51	1.16, 1.97	0.002	1.48	1.14 1.91	0.003	1.39	1.07, 1.81	0.013	1.15	0.89, 1.48	0.276
Problem-focused Coping															
High	Ref			Ref			Ref			Ref			Ref		
Low	4.24	3.23, 5.57	<0.001	1.50	1.15, 1.95	0.003	1.62	1.25, 2.11	<0.001	1.54	1.18, 2.00	0.001	1.50	1.16, 1.93	0.002
Emotion-focused Coping															
High	Ref			Ref			Ref			Ref			Ref		
Low	2.91	2.24, 3.78	<0.001	1.59	1.23, 2.07	<0.001	1.30	1.01, 1.69	0.046	1.28	0.99, 1.66	0.063	1.30	1.01, 1.67	0.044
Hosmer and Lemeshow test**			0.902			0.809			0.905			0.360			0.466

Note. High community resilience is reference group of dependent variables.

*Unmarried include never married and widow

**Hosmer and Lemeshow test: *p*-value >0.05 indicates a good fitting model

strategies across individuals of all genders can be related to the perception that these strategies are successful in reducing stress by actively engaging with and resolving stressors. The inclination described here aligns with the prevailing societal focus on individual independence, practical approaches to tackling problems, and effectiveness.

Unfortunately, the health impacts of flooding can affect a wide range of individuals particularly in low- and middle-income countries where people from lower SES usually live in flood-prone areas with limited or lack of infrastructure in place to warn, evacuate, or protect communities from flooding (Paterson et al., 2018). Particularly for individuals with lower SES, diseases and outbreaks are major health concerns in the event of flooding. Commonly, floodwaters are contaminated with sewage, chemicals, and other pollutants, increasing the risk of contracting waterborne diseases such as cholera, typhoid fever, and leptospirosis (Paterson et al., 2018). Floods also increase the transmission of vector-borne diseases including malaria and dengue fever, by providing breeding grounds for mosquitoes and other vectors (Paterson et al., 2018). Additionally, mental health issues, which may arise later in life, are often overlooked, and have received less research attention than the immediate health consequences of floods (Paterson et al., 2018). Following a flooding disaster, mental health issues such as post-traumatic stress disorder, anxiety, and depression are frequently encountered among low SES groups. Consequently, the most vulnerable tend to be the economically disadvantaged, as they face significant challenges in rebuilding lives post-disaster.

Socioeconomically, employment predicts lower community resilience in terms of connection and caring, resources, transformative potential, disaster management, and information and communication, promoting a crucial academic discussion. The relationship that has been observed underscores the complex relationship between employment and community dynamics. The empirical evidence of a decline in interpersonal bonds, empathy, and available resources among individuals in the workforce indicates that occupational obligations may impede social integration and shared support systems, hence impeding the capacity for community resilience (Wut & Lee, 2022). The diminishing of transformative capacity among persons who are working brings attention to the inherent tensions between personal professional aspirations and the advancement of the community. Reduced participation in crisis management and information sharing among the working population also highlights potential setbacks in community readiness and shared knowledge. Moreover, the world is getting digitalise ever than before and the evolving role of social media has emerged greatly to fulfill different needs in our life (Marzo et al., 2024; Chen et al., 2023). These digital tools or platforms have become the new trend and preference for working groups to stay at home.

Our study found that low problem-focused coping predicts lower community resilience for connection and caring, resources, transformative potential, disaster management, and information and communication. This predictive link emphasizes the critical importance of appropriate coping methods in the context of community dynamics. The discovery of a positive association between problem-focused coping and connection and caring emphasizes the importance of coping strategies in fostering interpersonal connections necessary for fostering community resilience (Liu, 2022). The community spirit plays a crucial role in mitigating community recovery efforts. Additionally, the link between low problem-focused coping and low community resources emphasizes the effect of individual coping deficits on resource allocation in the community, which is crucial for resilience (Pfefferbaum et al., 2017). The study's discovery of lower transformational potential among people with insufficient problem-focused coping skills emphasizes the connection between individual adaptation and communal progress (Touza et al., 2021). Furthermore, the relationship between poor problem-focused coping and poor disaster management and information sharing highlights the significance of strong coping techniques in promoting active community engagement. A previous study stresses lack of effective coping strategies will lead those involved in disaster to have a high level of dependency whereby only expect assistance without putting effort into coping with the situation (Akhir et al., 2021).

The findings of our study demonstrate a noteworthy correlation, indicating that individuals who employ emotion-focused coping strategies at a lower level are likely to exhibit diminished levels of community resilience across various dimensions, including connection and care, resources, transformative potential, and information and communication. Notably, this correlation does not extend to disaster management. The intricate nature of this relationship necessitates a comprehensive examination within the field of community psychology and resilience research. The association between low emotion-focused coping and decreased connection and caring demonstrates the essential role of emotional mechanisms in nurturing the interpersonal bonds that are essential for resilience (Rime, 2007). Community social support is crucial to improve the functionality of those being affected by natural disasters. A review has shown that social support provided to those affected by flood disasters assisted them to be more resilient post-disaster (Akhir et al., 2021). Insufficient emotion-focused coping abilities can impede the capacity for effective involvement, hence diminishing collective resilience in times of stress (Liu, 2022). Moreover, the anticipation of limited communal resources highlights the significance of emotion-focused coping in the context of allocating shared resources (Gil-Rivas & Kilmer, 2016). The correlation identified between the utilization of emotion-

focused coping strategies and transformative potential implies that an individual's ability to adjust emotionally has an impact on the overall growth of a community (Carter & Nicolaides, 2023). The ability to effectively cope with emotions may be crucial in collaboratively handling obstacles (Mah et al., 2020). Furthermore, the correlation between lower emotion-focused coping strategies and diminished levels of information and communication highlights the significance of emotions in facilitating successful knowledge transfer.

Justifiably, 'strengthening' community resilience should be the main focus now. But without a proper plan to 'build' community resilience, the former task is almost impossible to realize. Integrating potential factors that can influence community resilience is crucial for disaster management and risk reduction. Moreover, disasters nowadays are not limited to natural disasters. One of the important lessons learned from the COVID-19 pandemic is how enhancing resilience can reduce negative mental impacts resulting from the pandemic (Abdalqader et al., 2020a; Abdalqader et al., 2020b; Skalski et al., 2022). Accounting for emerging and re-emerging communicable diseases, we must look into different directions that the current and future pandemics might take and expand the range of plausible futures (Najimudeen et al., 2022). Research is the key to identifying potential influence on fostering resilience, discussing implications, sustainable approaches and planning actions aimed at preventing the occurrence or mitigating the impact of different disasters (Jun Chen et al., 2021; World Health Organization, 2022). Nevertheless, the lack of this association in the field of disaster management suggests a complex interaction, potentially attributed to the multifaceted nature of disaster responses.

5. Limitations and Recommendation for Future Research

A few limitations on this cross-sectional study should be taken into account. The dependence on self-reported data for both coping mechanisms and community resilience introduces the prospect of self-report bias, potentially compromising the accuracy of results. The cross-sectional design employed in this study poses limitations in establishing causal linkages, hence emphasizing the necessity for longitudinal research to investigate the temporal dynamics between coping techniques and community resilience. Furthermore, given the possibility for sample bias and the specific demographic representation, the findings' generalizability may be constrained. Although sociocultural influences were acknowledged, more research should explore the cultural intricacies that impact coping mechanisms and community resilience in greater depth. Future research directions might include longitudinal studies to establish causality, mixed-methods approaches for a more thorough understanding, interventions to improve coping strategies, and qualitative investigations to elucidate the emotional underpinnings of coping choices in order to address these limitations. The inclusion of comparative research involving varied populations, together with the integration of mixed-model analyses, has the potential to enhance the field's comprehension. By examining these dimensions, future studies might enhance the comprehension of the complex interaction between coping mechanisms and community resilience, so making a valuable contribution towards the development of more efficient approaches to improve communal welfare and adaptation.

6. Conclusion

This study identifies the importance of coping in resilience building, offers further investigation that might assist future evidence-based guidelines, and provides evidence to assist the governmental policymakers in designing strategies and plans to reduce the negative health impacts of floods. Since a lack of community resilience can undermine or undo progress towards the SDGs, to ensure that the SDGs are not undercut by the impacts of floods, Malaysia's DRR initiatives should emphasize establishing holistic flood-resilient communities through inclusive resilience-building programs. While the nation's proactive regional engagements, such as with the Association of Southeast Asian Nations (ASEAN), and domestic initiatives like the Twelfth Malaysia Plan (12MP) emphasize a holistic approach, vulnerabilities still linger, particularly in sectors like education and health. Therefore, DRR initiatives aimed at reducing direct and indirect health impacts are crucial to (1) conduct a comprehensive risk assessment across key sectors, (2) adopt a longitudinal approach to monitoring evolving risks and strategy effectiveness, (3) delve deeper into socio-cultural determinants of resilience, (4) incorporate positive coping in resilience building, and (5) assess and fortify vital infrastructure. Embracing these targeted measures will bolster Malaysia's journey towards enhanced disaster resilience and safeguard its socio-economic future. Multidisciplinary collaboration through joint effort is also important to build resilient and well-informed communities with good knowledge and awareness of disaster preparedness and mitigation, to better prevent and reduce human casualties, adverse health implications and socio-economic loss.

Author contribution

H.W.J.C., R.R.M. conceptualized, H.W.J.C. and R.R.M. established methodology, I.M., A.S., and H.A. performed validation, M.N.N.H. and h.W.J.C. conducted formal analysis, H.W.J.C. carried out investigation, S.R. and J.R.N. provided resources, H.W.J.C. and R.R.M. managed data curation, H.W.J.C., S.M.Z.A., and A.A.N. prepared original draft, H.W.J.C. and R.R.M. wrote, reviewed, and edited, I.M. and A.S. performed visualization, R.R.M. supervised, H.W.J.C. and H.A. managed project administration. All authors read and agreed to the published version of the manuscript.

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Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Competing financial interests

The authors have no conflict of interest.

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