

Assessing the Effect of Knowledge on Flood Disaster Awareness in School-Aged Children

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ABSTRACT

Introduction: School-age children are more vulnerable and are at greater risk of being affected by floods. Knowledge of flood disaster from early age has an important role in increasing awareness, especially at primary school in flood prone area. This research is to measure the correlation between the level of knowledge and awareness of flood disasters among primary school students. **Methods:** This quantitative research was carried out by distributing a validated questionnaire to 97 students, from three selected flood-prone primary schools in Segamat, Johor. **Results:** The research highlighted that the level of knowledge and awareness on flood disasters of students was 4.24 (SD \pm 0.36) which indicated a high level. The correlation of level of knowledge and awareness of flood disasters showed a significant correlation ($r=0.275$, $p<0.05$). **Conclusion:** The findings signify that increasing the level of knowledge on flood emergencies will result in high level of awareness among students at primary school. Thus, it is crucial to implement effective flood preparedness action initiatives to enhance the knowledge of flood disasters among school-aged children especially in flood-prone areas.

Keywords: Flood Preparedness, Flood Disaster, Knowledge, Awareness, School Safety

INTRODUCTION

Emergency and disaster events continue to cause substantial loss of life and economic damage worldwide each year (1). Such events are commonly categorized into disasters resulting from human activities and those caused by natural processes. Natural disasters, which often occur with limited warning, require timely and well-coordinated communication to ensure that accurate information reaches affected communities (2). In recent decades, the global occurrence of natural disasters has increased, involving geophysical, meteorological, hydrological, and climatological hazards (3).

Among these hazards, flooding remains one of the most disruptive natural disasters, frequently damaging infrastructure and interrupting essential community services, particularly in areas located near rivers and coastal zones (4). The rising frequency of flood events has drawn attention to vulnerable populations, especially children, who are often disproportionately affected during such disasters (5, 6, 7). This vulnerability is largely associated with limited knowledge of disaster risks and insufficient preparedness to respond appropriately during flood emergencies (6).

Schools play a critical role in safeguarding children during disaster situations, as students spend a significant portion of their time within school environments (7). However, existing literature indicates that many schools in flood-prone regions of Malaysia have experienced flood events without adequate preparedness measures in place. This situation suggests gaps in institutional awareness and uncertainty regarding appropriate disaster preparedness actions at the school level.

Education has been widely recognized as a fundamental strategy for enhancing disaster preparedness within society. This role is strongly emphasized in the Sendai Framework for Disaster Risk Reduction 2015–2030 (SFDRR), which identifies understanding disaster risk as a key priority and underscores the need for awareness across all segments of society, including school-aged populations. Similarly, the Hyogo Framework for Action 2005–2015 highlighted knowledge and awareness as essential components of preparedness, particularly in reducing losses associated with flood disasters (8).

Through structured educational and socialization initiatives, disaster-related knowledge and awareness can be strengthened. Although disaster education cannot completely prevent the occurrence or impacts of disasters, it can significantly reduce risks and mitigate adverse outcomes. Children are generally more susceptible to disaster impacts due to limited capacity to anticipate hazards and manage emergency situations independently (6). Enhancing knowledge and awareness among children is therefore essential. Adequate understanding of disaster risks enables students to identify potential dangers, appreciate the importance of emergency response measures, and act more effectively during disaster situations (9,10). Improved preparedness can contribute to reducing injuries, losses, and long-term negative effects.

Despite this recognized importance, limited disaster awareness among students has been closely associated with weaknesses in existing disaster education practices within schools (6). Previous studies have shown that disaster-related content has not been sufficiently incorporated into the Malaysian school curriculum (11). Consequently, younger generations often display lower levels of preparedness for flood emergencies compared to older populations. This lack of preparedness may also be linked to heightened feelings of anxiety, uncertainty, and helplessness experienced by young individuals when facing the effects of climate-related events (12). These findings highlight the need to systematically integrate disaster education into formal schooling, with emphasis on disaster types, underlying causes, and practical risk reduction strategies.

Fortified by the foregoing concerns, the present study aims to examine the relationship between knowledge and awareness of flood disasters among primary school students. Prior research has consistently emphasized that disaster risk reduction efforts should begin at an early age and be promoted across all levels of society, including among children (6). Assessing students' levels of knowledge and awareness is therefore crucial in identifying existing gaps and supporting the development of effective educational interventions that can strengthen preparedness and response capacities in flood-prone contexts.

METHODOLOGY

A quantitative research design was employed to enable systematic measurement of flood preparedness indicators. Numerical data were collected to determine levels of knowledge, awareness, and preparedness actions among the selected respondents. Data analysis was conducted using IBM SPSS Version 25.0.

The study was conducted in the Segamat district of Johor, Malaysia, an area selected due to its low-lying geographical characteristics and history of recurrent flooding. Segamat has experienced significant flood-related impacts, including high numbers of evacuees and substantial economic losses in recent years. The research population consisted of students from three primary schools identified as flood-prone by the Malaysian Ministry of Education. The total population comprised 189 students from Standard Five and Six.

A purposive sampling technique was applied to ensure that participants met specific criteria relevant to the study objectives. Student participants were limited to those aged 11 to 12 years, as this group was considered capable of understanding disaster-related concepts and recent flood experiences. Younger students were excluded due to concerns regarding limited cognitive maturity and recall ability related to disaster events.

Data collection involved both primary and secondary sources. Primary data were obtained through structured questionnaires. To ensure clarity and reduce response bias, questionnaire items were read aloud to student respondents in supervised classroom. Secondary data were collected from official documents, policies, and reports related to disaster management and education in Malaysia, including directives issued by the National Security Council and circulars from the Ministry of Education, as well as published academic literature and agency records.

The research instrument consisted of two questionnaire sets adapted from the New Zealand Shakeout Observation Evaluation (13) and modified to reflect flood-related contexts in Malaysian primary schools. The teacher questionnaire included sections on demographic information, disaster knowledge and awareness, and preparedness actions. The student questionnaire focused on demographic characteristics and disaster-related knowledge and awareness. All items were measured using a five-point Likert scale. Content validity was established through expert review involving specialists in environmental studies, language, and academic research.

A pilot study was conducted in two primary schools in Batu Pahat, Johor, to test the reliability and feasibility of the instruments. Reliability analysis using Cronbach's alpha indicated satisfactory internal consistency across all variables, with values exceeding the accepted threshold. As a result, all questionnaire items were retained for the main study.

Data analysis involved both descriptive and inferential statistical techniques. Descriptive statistics were used to determine mean scores and standard deviations, allowing classification of knowledge, awareness, and preparedness levels into low, moderate, and high categories. Pearson correlation analysis was applied to examine relationships between knowledge, awareness, and preparedness actions, with statistical significance set at the conventional level.

RESULTS

Socio-demographic Characteristic

The distribution of students involved in this study is presented in Table 1. The majority of respondents were male, comprising 54.6% (53 respondents). Additionally, the majority of respondents were of Malay ethnicity, representing 99.0% (96 students) of the sample. Most respondents were 12 years old or in Standard 6, accounting for 77.3% (75 students) of the total. The results also indicated that 61.9% (60 respondents) had never participated in flood disaster preparedness training or programs.

Table 1. Socio-demographic information

Variables	Frequencies (n)	Proportion (%)
Gender		
Male	53	54.6
Female	44	45.4
Race		
Malay	96	99.0
Indian	1	1.0
Age		
11 years old	22	22.7

12 years old	75	77.3
Participated in flood program/training		
Yes	37	38.1
No	60	61.9

N=97

The Level of Knowledge and Awareness of Flood Disaster

The mean and standard deviation values for each item assessing students' knowledge and awareness of flood disasters is shown in Table 2. The mean scores for knowledge ranged from 3.92 to 4.51, while the mean scores for awareness ranged from 4.08 to 4.16. The standard deviation (STD) values ranged from 0.69 to 1.09 for knowledge and from 0.70 to 0.85 for awareness. The overall mean score for knowledge was 4.24, and for awareness, it was 4.14, both indicating high levels of knowledge and awareness. The highest mean score for knowledge was found in the area of emergency definitions and terminology (4.51). In terms of awareness, the highest mean score was recorded for students' recognition of exit signage, which was 4.25.

Table 2. The level of knowledge of flood disasters

Variable	Mean	Standard Deviation (STD)	Interpretation
Knowledge level of flood disaster			
Term Emergency	4.51	0.71	High
Term Response Action	4.49	0.72	High
Role of Person in Charge	4.3	0.69	High
Term Response Program	4.28	0.73	High
Term Preparedness	3.95	0.95	High
Safe Exit Route	3.92	1.09	High
Average Mean Score	4.24		High

N=97

The Level of Awareness of Flood Disaster

The mean and standard deviation values for each item related to students' level of awareness regarding flood disasters is shown in Table 3. The mean scores for awareness ranged from 4.08 to 4.25, while the standard deviation (STD) values ranged from 0.70 to 0.85. The overall mean score for the level of awareness was 4.14, indicating a high level of awareness. The highest mean score for awareness was recorded for the understanding of exit language during flood disasters, with a score of 4.25.

Table 3. The level of awareness of flood disasters

Variable	Mean	Standard Deviation (STD)	Interpretation
Awareness level of flood disaster			
Exit Signage	4.25	0.84	High

Action Taken	4.16	0.77	High
Person in Charge	4.08	0.7	High
First Aid Kit	4.08	0.85	High
Average Mean Score	4.14		High

N=97

The Correlation of Level of Knowledge and Awareness of Flood Disaster

Table 4 illustrates the correlation between students' knowledge of flood disasters and their level of awareness. The correlation was found to be statistically significant, with a value of $r(97) = 0.275$, $p < 0.05$. This indicates a positive correlation between the level of knowledge and awareness regarding flood disasters among students. Therefore, it can be concluded that enhanced students' knowledge is linked to the increasing awareness level of flood disaster.

Table 4. Correlation of level of knowledges and awareness of students on flood emergency

		Level of Knowledges	
Pearson Correlation	Level of Awareness	Correlation Coefficient	0.275*
		Sig. (2-tailed)	0.006
		N	97

N=97

*Significant at $p < 0.05$

The result shows that there is a significant correlation between knowledge and the awareness level of students at primary schools. A large proportion of students demonstrated adequate understanding of what constitutes an emergency, the circumstances in which such situations may arise, and the appropriate responses required. In addition, students showed clear awareness of the responsible authorities during emergency events and the procedures that should be followed in urgent situations, including flood incidents. Awareness of evacuation routes and exit signage was also evident among the majority of respondents.

DISCUSSION

The findings indicate that a substantial proportion of respondents had limited exposure to formal flood preparedness initiatives. More than half of the participants, representing 61.9% of the respondents (n=60), reported having no prior involvement in flood-related training or preparedness programs. Despite this lack of formal training, most respondents indicated previous experience with flood events, either within school environments or at their places of residence. This contrast highlights a gap between direct disaster exposure and access to structured preparedness education. In addition, respondents expressed a strong need for certified training and regular drills to strengthen readiness and improve response capacity in the event of future flood incidents.

Disaster preparedness is widely recognized as a process that should begin early in an individual's development (14). Children face heightened risk during flood situations, particularly when supervision from adults is limited and when adequate knowledge and response skills are lacking (15). Students, in particular, are highly vulnerable to flood-related hazards if preparedness measures are insufficient. Without appropriate preparation, exposure to floods may result in greater physical and psychological impacts. Strengthening preparedness

among students is therefore essential to reduce vulnerability and enhance the ability to respond effectively to flood-related challenges (12).

Education plays a crucial role in preparing younger populations to contribute to community resilience in the face of future disasters. Through systematic learning, children can develop a clearer understanding of potential risks, expected conditions during flood events, and appropriate coping strategies. Educational institutions have an important responsibility to enhance students' knowledge of flood disaster preparedness and to cultivate positive attitudes toward safety, cooperation, and mutual assistance. Hence, the capacity of schools to respond effectively to disasters is contingent upon the presence of well-developed flood disaster plans, which must be rooted by proactive planning and ongoing corrective interventions (17). Therefore, improved disaster education can contribute to lower vulnerability levels and increased resilience among young populations during future flood events (16).

Various initiatives have been implemented to support disaster risk reduction among children and adolescents. Government agencies, research institutions, and non-governmental organizations, including Mercy Malaysia, have actively promoted disaster risk reduction through school-based programs, awareness campaigns, and extracurricular activities. These efforts commonly include emergency response exercises and disaster preparedness drills aimed at improving practical understanding and readiness (11). Perhaps the next step would be to integrate disaster-related education into the school curriculum.

Collaborative programs focused on disaster awareness and preparedness further reinforce the importance of early education in strengthening long-term disaster resilience (16). The close and sustained collaboration between Mercy Malaysia and schools, including government agencies, humanitarian partners, and civil society organisations, could be initiated to support flood-affected schools while providing targeted training to advance disaster preparedness. Collaboration with the wider community plays a vital role in reducing risk and vulnerability while boosting local capacities. Another way to promote catastrophe awareness and education among students is through dissemination of informational materials, such as posters, signage, and other visual aids.

CONCLUSION

The present study highlights the significance of disaster education for children in primary schools as a strategy to reduce community vulnerability and mitigate the impacts of disasters. The findings indicate that a majority of respondents have previously experienced flood events, emphasizing the need for targeted awareness and training programs at the school level. Enhancing students' knowledge, awareness, and preparedness for flood events is essential to improve their capacity to respond effectively in future emergencies.

Although the level of students' knowledge and awareness regarding flood disasters is currently moderate to high, evidence suggests that many lack the practical skills required to respond appropriately during actual events. . This gap suggests that students' theoretical knowledge is insufficient to prepare them for the complexities of real-world disaster scenarios. Understanding the nature of flood hazards is crucial for improving preparedness, reducing potential injuries, and minimizing losses, as demonstrated in prior studies. However, the absence of certified practical training and routine simulation drills raises concerns regarding the depth and applicability of current preparedness efforts. Without these experiential learning components, students may remain inadequately equipped to respond effectively to flood events. Furthermore, higher levels of disaster-related knowledge are closely associated with increased awareness, which in turn can enhance students' ability to act effectively without direct supervision, particularly in executing basic preparedness measures.

Given the critical role of knowledge in shaping awareness and fostering proactive behaviour, it is essential for all primary school students to attain a comprehensive understanding of flood disasters. Equipping students with sufficient knowledge not only increases their awareness of potential school-based flood risks but also empowers them to respond more effectively and independently, thereby contributing to overall disaster resilience within the school community.

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