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FLOOD DISASTER PREPAREDNESS: KNOWLEDGE, ATTITUDE AND PRACTICE AMONG MALAYSIAN

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ABSTRACT

Floods pose a significant threat to lives and property, and recent events in Malaysia underscore the need for robust disaster preparedness. This study explores the Knowledge, Attitudes, and Practices (KAP) of Malaysians regarding flood disaster preparedness to enhance community resilience. The survey, distributed nationwide, involved 442 respondents and utilized demographic factors such as gender, age, ethnicity, education, income, and residency. Findings indicate that Malaysians exhibit varied levels of knowledge, attitudes, and practices, with notable disparities across socio-demographic factors. While educational qualifications positively influence knowledge, gender, ethnicity, and income impact attitudes and practices. The study highlights the importance of targeted education, awareness campaigns, and practical initiatives to bridge gaps and enhance disaster readiness. Despite limitations, including a short research period and biased sample composition, the study provides valuable insights for policymakers and researchers aiming to improve flood preparedness in Malaysia. Recommendations include extending research duration, increasing sample diversity, and incorporating face-to-face surveys for enhanced reliability. Strengthening disaster preparedness activities is vital for building a resilient and well-informed society.

INTRODUCTION

Floods represent a prevalent natural disaster capable of inflicting substantial harm to human lives and property [1]. Recent years have witnessed Malaysia grappling with significant flood-related incidents, underscoring the imperative for robust disaster preparedness and response strategies. The efficacy of mitigating the impact of such calamities is not solely confined to the purview of authorities and disaster management agencies; it crucially extends to the preparedness and proactive efforts of citizens [2]. This study aims to scrutinize the Knowledge, Attitudes, and Practices (KAP) of Malaysians concerning flood disaster preparedness, with the overarching objective of enhancing community resilience and diminishing vulnerability [3].

Malaysia's geographic diversity, encompassing coastal regions, river systems, and urban centers, exposes a substantial segment of its populace to the threat of flooding [4]. A nuanced comprehension of the public's KAP in flood catastrophe preparedness is imperative, given the severe repercussions floods impose on human lives, infrastructure, and the economy [5]. Existing research underscores the significance of addressing knowledge gaps, attitudes, and practices to optimize the efficacy of disaster planning and response operations [6]. Thus, this study endeavors to scrutinize

and evaluate the levels of KAP among Malaysians, serving as a foundational basis for informed policy formulation and community-driven initiatives.

The overarching objective of this research is to appraise Malaysians' understanding, attitudes, and behaviours pertaining to flood catastrophe preparedness, aiming to identify areas for enhancement in public awareness and conduct.

METHODOLOGY

The survey was systematically distributed nationwide through random sampling. The determination of the sample size utilized the Raosoft software. The prescribed sample size was a minimum of 400 respondents, determined by identifying the smallest acceptable size of a demographic subgroup with a $\pm 5\%$ margin of error and a 95% confidence level [7]. The questionnaire survey, consisting of 30 questions, was adapted from Aung, K. T. et. Al (2019) with substantial modifications [8]. It was constructed using Google Forms and offered in two language versions, English and Malay. Additionally, a QR Code and a shortened link were generated to facilitate ease of access for survey respondents. Survey invitations, disseminated through various online platforms such

as WhatsApp, Telegram, Facebook, Twitter, Instagram, and email, included comprehensive information about the survey, its objectives, and a consent statement.

The data collection spanned over 40 days, commencing from 1st May 2022, to 10th June 2022. The inclusion criteria for this study encompassed Malaysians aged 18 years and above. The research team utilized a self-constructed questionnaire through Google Forms, focusing on three primary components: knowledge, attitude, and practice. The survey aimed to assess the preparedness of Malaysians for a flood disaster by examining these three key components—knowledge, attitude, and practice (KAP). A pilot study was conducted before the main study, and the Cronbach's alpha coefficient was 0.896, indicating high internal consistency (Knowledge: 0.855, Attitude: 0.834, and Practice: 0.810).

RESULT

From our findings, the results there are 442 respondents, consisting of Malaysians, both male and female. From our results, we have obtained the frequencies for each variable, which are demographic characteristics and KAP for flood disaster preparedness (Table 1).

Knowledge

There is no significant association between knowledge of flood disasters and age, gender, and qualification (Table 2). However, there is a significant association between ethnicity, income, residency and knowledge of flood disaster preparedness.

Attitude

There is no significant association between attitude of flood disaster preparedness and gender, age and residency (Table 3). However, there is a statistically significant association between ethnicity, qualification, income and attitude towards flood disaster preparedness.

Practice

There is no significant association between Practice of flood disaster and age, income, ethnicity and qualification (Table 4). However, there is a statistically significant association between gender, residency and practice of flood disaster preparedness.

DISCUSSION

The study surveyed 400 respondents from Malaysia, including Sabah and Sarawak, to assess flood preparedness. The main issue is the lack of knowledge about flood risks, early warning signs, and

Table 1: Demographic characteristics of study respondent.

Demographic characteristics		Percentage (%)
Gender	Male	53.85
	Female	46.15
Age	18-29	68.1
	30-39	6.3
	40-49	14.3
	50-59	9.5
	>60	1.8
Ethnicity	Malay	93.4
	Chinese	1.4
	Indian	2.3
	Others	2.9
Education	Certificate	6.1
	Diploma	19.2
	Bachelor	60
	Master	5.2
	PhD	1.6
	Others	7.9
Income	<5000	74.9
	5000-10000	16.7
	>10000	8.4
Residency	Northern	14.3
	Central	38.7
	East coast	28.3
	Southern	14.7
	Others	4.1

Table 2: Pearson correlation between knowledge and ethnicity, income and residency.

Socio-demographic	Knowledge						Pearson Chi-square
	Poor		Moderate		Good		
	Frequency	%	Frequency	%	Frequency	%	
Ethnicity							
Malay	3	0.7	130	31.5	280	67.8	p<0.05
Chinese	0	0.0	5	83.3	1	16.7	
Indian	0	0.0	5	50.0	5	50.0	
Others	1	7.7	5	38.5	7	53.8	
Income							
< 5000	1	3.0	96	108.6	234	219.4	p<0.05
5000-10000	0	0.7	33	24.3	41	49.1	
> 10000	3	0.3	16	12.1	18	24.5	
Residency							
	0	0.6	10	20.7	53	63.0	p<0.05
Northern	2	1.5	53	56.1	116	171.0	
Central	1	1.1	52	41.0	72	125.0	
East coast	0	0.6	25	21.3	40	65.0	
Southern Others	1	0.2	5	5.9	12	18.0	

Table 3: Pearson correlation between attitude and ethnicity, qualification and income.

Socio-demographic	Attitude						Chi-square value	Pearson Chi-square
	Poor		Moderate		Good			
	Frequency	%	Frequency	%	Frequency	%		
Ethnicity								
Malay	1	0.2	75	18.2	337	81.6	36.297	p<0.05
Chinese	1	16.7	0	0.0	5	83.3		
Indian	1	10.0	2	20.0	7	70.0		
Others	1	7.7	1	7.7	11	84.6		
Qualification								
Certificate	0	0.0	8	29.6	19	70.4	21.326	p<0.05
Diploma	1	1.2	19	22.4	65	76.5		
Bachelor	0	0.0	41	15.5	224	84.5		
Master	1	4.3	4	17.4	18	78.3		
PhD	0	0.0	0	0.0	7	100.0		
Others	2	5.7	6	17.1	27	77.1		
Income								
< 5000	1	3.0	54	58.4	276	269.6	23.427	p<0.05
5000-10000	1	0.7	18	13.1	55	60.3		
> 10000	3	0.3	6	6.5	29	30.1		

Table 4: Pearson correlation between and ethnicity, qualification and income.

Socio-demographic	Practice						Chi-square value	Pearson Chi-square
	Poor		Moderate		Good			
	Frequency	%	Frequency	%	Frequency	%		
Gender								
Male	76	37.3	94	46.1	34	16.7	12.326	0.002
Female	81	34.0	140	58.8	17	7.1		
Residency								
Northern	10	22.4	38	33.4	15	7.3	< 0.001	
Central	56	60.7	98	90.5	17	19.7		
East coast	56	44.4	57	66.2	12	14.4		
Southern	31	23.1	30	34.4	4	7.5		
Others	4	6.4	11	9.5	3	2.1		

essential preparedness measures. These gaps can hinder effective disaster response and recovery efforts. To bridge this gap, education and awareness campaigns are essential. Access to resources, such as emergency kits, evacuation routes, and shelters, significantly influences preparedness practices. Identifying resource gaps and ensuring equitable access to these resources is crucial.

Education plays a pivotal role in preparing communities for disasters [9]. Assessing the inclusion of disaster preparedness education in school curricula and the availability of training programs for the public is essential [10]. Investing in education and training can empower individuals and communities to be more resilient in the face of floods. Promoting sustainable and eco-friendly flood preparedness practices is also crucial [11]. The study found that there is no significant difference in knowledge, attitude, or practice among Malaysians according to socio-demographic factors. Education levels play a pivotal role in influencing individuals' ability to access the latest flood warnings and updates [12]. Gender-based differences in responses suggest a potential influence of gender on individuals' willingness to be proactive in assisting others during flood disasters [13].

Ethnicity also played a significant role in shaping individuals' responses to disasters, influencing their perceptions of risk, and guiding their actions when confronted with such situations [14]. Therefore, bridging knowledge gaps, improving communication and awareness campaigns, and promoting sustainable and eco-friendly flood preparedness practices are essential for a more resilient future [15]. The study found a significant relationship between income, residency, ethnicity, and attitude in flood disaster preparedness. Individuals earning less than \$5000 had a higher level of knowledge (70.7%) compared to those with incomes between

\$5000 and \$10000 (55.4%) and those earning over \$10000 (48.6%). This could be attributed to their heightened vulnerability to flood disasters and the need for additional knowledge, experience, and skills related to catastrophes.

Residence also showed a significant correlation with knowledge, with individuals residing in the northern region having a higher level of knowledge (84.1%) compared to those in other areas. Ethnicity also played a role, with "Others" displaying a higher level of positive attitude (84.6%) compared to Malay, Chinese, and Indian ethnic groups. Differences in culture and language, particularly among new immigrant communities, render them vulnerable and less knowledgeable, ultimately affecting their preparedness and ability to recover swiftly from flood emergencies. Educational qualifications also played a significant role in shaping attitudes, with PhD holders exhibiting the most positive outlooks, while certificate holders displayed the lowest rate of positivity at 70.4%. Income levels were associated with a higher likelihood of possessing good knowledge, with lower income levels being associated with a higher likelihood of possessing good knowledge.

Flood disaster preparedness showed a clear distinction between genders, with female respondents exhibiting a notably higher level of preparedness (58.8%) compared to male counterparts (46.1%). Understanding these gender-based variations is essential for tailoring effective disaster preparedness and response strategies that address the specific needs and behaviors of different demographic groups. Regional knowledge disparities were also observed, with people residing in the northern region having the highest level of awareness, possibly influenced by regional factors, access to education, or local awareness campaigns [16]. Recognizing these disparities is crucial for policymakers and educators to target knowledge

enhancement initiatives and disaster preparedness efforts effectively [17].

The study on the Knowledge, Attitude, and Practice (KAP) of Flood Disaster Preparedness among Malaysians highlights the importance of improving these elements to strengthen disaster readiness. Enhancing knowledge through comprehensive information dissemination, fostering positive attitudes through awareness campaigns, and facilitating practical actions is crucial. This can be achieved through informative campaigns, workshops, and educational programs [18]. Attitudes play a significant role in motivating people to take action towards flood preparedness [19]. Public awareness campaigns can emphasize the importance of preparedness and highlight the benefits of being proactive [20]. Showcasing success stories of those who have effectively prepared for floods can inspire others to adopt a similar mindset [21]. Implementing practical preparedness measures, such as creating emergency kits, developing evacuation plans, and conducting regular drills, can empower Malaysians to be better prepared for flood events [22].

The research was conducted with 442 participants from diverse regions of Malaysia, including Sabah and Sarawak. A significant challenge in evaluating KAP in flood preparedness lies in the existence of knowledge gaps. Addressing these knowledge gaps through educational and awareness campaigns is imperative. The availability of resources, such as emergency kits, evacuation routes, and shelters, profoundly influences preparedness practices [23]. Identifying resource gaps and ensuring equitable access to these resources is indispensable. Education is also a pivotal factor in preparing communities for disasters, underscoring the importance of incorporating disaster preparedness education in school curricula and the availability of training programs for the public [9].

Attitude towards flood disaster preparedness was found to be influenced by factors such as education levels, gender-based differences, ethnic disparities, income levels, and regional variations [24]. Recommendations for strengthening disaster readiness include enhancing knowledge through comprehensive information dissemination, fostering positive attitudes through awareness campaigns, and facilitating practical actions by enabling individuals to implement preparedness measures [25].

However, the study faced limitations, including a short research period, a small sample size, and reliance on online survey methods. Recommendations include extending the research duration, increasing the sample size, and incorporating face-to-face surveys for more accurate results. Biases were identified in sample composition, with an overrepresentation of women, degree holders, and certain educational levels, suggesting the need for broader and more representative sampling for increased reliability.

CONCLUSION

The study found that Malaysians have a poor understanding of flood disaster preparedness, with bachelor's degree holders showing better preparedness knowledge. However, gender disparities in attitudes towards flood preparedness were noticeable, with females showing a more positive attitude. Knowledge levels varied across geographic regions, with the northern region showing the highest awareness. Ethnicity also influenced knowledge levels, with Malays outperforming other ethnic groups. Lower-income people had higher levels of knowledge, highlighting the need for information dissemination and preparedness initiatives for vulnerable populations. Future research should address limitations by extending the study duration, increasing sample variety, and ensuring a more equitable representation of gender and education levels. Strengthening preparedness activities is crucial for a more resilient and disaster-ready society.

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REFERENCES

1. Rentschler, J., Salhab, M., & Jafino, B. A. (2022). Flood exposure and poverty in 188 countries. *Nature Communications*, *13*(1), 1–11. <https://doi.org/10.1038/s41467-022-30727-4>
2. Ahmad, S., Bin, H., Muzamil, S., Zainun, N. Y., Ajman, N. N., Sulaiman, N., Khahro, S. H., Rohani, M., Mohd, S., Mohd, B., & Ahmad, H. (2022). Proposed Framework for the Flood Disaster Management Cycle in Malaysia. *Sustainability (Switzerland)*, *14*, 1–21.
3. Rosmadi, H. S., Ahmed, M. F., Mokhtar, M. Bin, & Lim, C. K. (2023). Reviewing Challenges of Flood Risk Management in Malaysia. *Water (Switzerland)*, *15*(13), 1–21. <https://doi.org/10.3390/w15132390>
4. Mazlan, A. G., Zaidi, C. C., Wan-Lotfi, W. M., & Othman, B. H. R. (2005). On the current status of coastal marine biodiversity in Malaysia. *Indian Journal of Marine Sciences*, *34*(1), 76–87.
5. Elum, Z. A., & Lawal, O. (2022). Flood risk perception, disaster preparedness and response in flood-prone urban communities of Rivers State. *Jamba: Journal of Disaster Risk Studies*, *14*(1), 1–10. <https://doi.org/10.4102/JAMBA.V14I1.1303>
6. Albumijdad, J. R., Alismail, A. S., Albeshier, M. A., & Alhajri, A. M. (2022). Attitude, knowledge, and barriers towards research analysis and writing in Saudi Arabia. *Journal of Family Medicine and Primary Care*, *11*, 2123–2128. <https://doi.org/10.4103/jfmpc.jfmpc>

7. Andrade, C. (2020). Sample Size and its Importance in Research. *Indian Journal of Psychological Medicine*, 42, 102–103. <https://doi.org/10.4103/IJPSYM.IJPSYM>
8. Aung, K. T., Nurumal, M. S., & Ahayalimudin, N. A. (2019). Nurses' knowledge, Attitude and Practices (KAP) During Flood Disaster Affected East Coast Region in Malaysia. *IOSR Journal of Nursing and Health Science (IOSR-JNHS)*, 8(4), 51–59. <https://doi.org/10.9790/1959-0804085159>
9. Torani, S., Majd, P. M., Maroufi, S. S., Dowlati, M., & Sheikhi, R. A. (2019). The importance of education on disasters and emergencies: A review article. *Journal of Education and Health Promotion*, 8(85), 1–7. <https://doi.org/10.4103/jehp.jehp>
10. Seddighi, H., Sajjadi, H., Yousefzadeh, S., López López, M., Vameghi, M., Rafiey, H., Khankeh, H. R., & Garzon Fonseca, M. (2020). Students' preparedness for disasters in schools: A systematic review protocol. *BMJ Paediatrics Open*, 4(1), 1–5. <https://doi.org/10.1136/bmjpo-2020-000913>
11. Shah, M. A. R., Rahman, A., & Chowdhury, S. H. (2020). Assessing sustainable development of flood mitigation projects using an innovative sustainability assessment framework. *Sustainable Development*, 28(5), 1404–1417. <https://doi.org/10.1002/sd.2094>
12. Raghupathi, V., & Raghupathi, W. (2020). The influence of education on health: An empirical assessment of OECD countries for the period 1995-2015. *Archives of Public Health*, 78(1), 1–18. <https://doi.org/10.1186/s13690-020-00402-5>
13. Reyes, D. D., & Lu, J. L. (2016). Gender dimension in disaster situations: A case study of flood prone women in malabon city, metro manila. *International Journal of Disaster Risk Reduction*, 15, 162–168. <https://doi.org/10.1016/j.ijdr.2015.11.001>
14. Bethel, J. W., Burke, S. C., & Britt, A. F. (2013). Disparity in disaster preparedness between racial/ethnic groups. *Disaster Health*, 1(2), 110–116. <https://doi.org/10.4161/dish.27085>
15. Shariff, N. N. M., & Hamidi, Z. S. (2019). Community-based approach for a flood preparedness plan in Malaysia. *Jamba: Journal of Disaster Risk Studies*, 11(1), 1–6. <https://doi.org/10.4102/jamba.v11i1.598>
16. Enarson, E., Fothergill, A., & Peek, L. (2018). Gender and Disaster: Foundations and New Directions for Research and Practice. *Handbooks of Sociology and Social Research*, 205–223. https://doi.org/10.1007/978-3-319-63254-4_11
17. Stough, L. M., Kang, D., & Lee, S. (2018). Seven school-related disasters: Lessons for policymakers and school personnel. *Education Policy Analysis Archives*, 26(August). <https://doi.org/10.14507/epaa.26.3698>
18. Janizadeh, R., Omidvari, F., Motlagh, Z., & Jahangiri, M. (2023). Disaster Preparedness: Knowledge, Attitude, and Practice of Hospital Staff. *Health in Emergencies and Disasters Quarterly*, 8(3), 185–192. <https://doi.org/10.32598/hdq.8.3.482.1>
19. Ao, Y., Zhou, X., Ji, F., Wang, Y., Yang, L., Wang, Q., & Martek, I. (2020). Flood disaster preparedness: experience and attitude of rural residents in Sichuan, China. *Natural Hazards*, 104(3), 2591–2618. <https://doi.org/10.1007/s11069-020-04286-0>
20. Chagutah, T. (2009). Towards improved public awareness for climate related disaster risk reduction in South Africa: A Participatory Development Communication perspective. *Jambá: Journal of Disaster Risk Studies*, 2(2). <https://doi.org/10.4102/jamba.v2i2.19>
21. Wang, L., Cui, S., Li, Y., Huang, H., Manandhar, B., Nitivattananon, V., Fang, X., & Huang, W. (2022). A review of the flood management: from flood control to flood resilience. *Heliyon*, 8(e11763), 1–12.
22. Singh, H., & Subramaniam, S. (2009). Health emergency and disaster preparedness in Malaysia. *Southeast Asian Journal of Tropical Medicine and Public Health*, 40(SUPPL. 1), 11–15.
23. FEMA. (2019). Planning Considerations: Evacuation and Shelter-In-Place. In *Federal Emergency Management Agency* (Issue July). https://www.fema.gov/media-library-data/1533580334064-72e9356ed35b726b1a25f4a8c3372c9d/DRAFT_Planning_Considerations_Evacuation_and_Shelter-in-Place_201808.pdf
24. Noorhashirin, H., Nor Faiza, T., Mohammad Farhan, R., & Juni, M. H. (2016). Assessing Malaysian disaster preparedness for flood. *International Journal of Public Health and Clinical Sciences*, 3(2), 1–16.
25. Albris, K., Lauta, K. C., & Raju, E. (2020). Strengthening Governance for Disaster Prevention: The Enhancing Risk Management Capabilities Guidelines. *International Journal of Disaster Risk Reduction*, 47(June 2019), 101647. <https://doi.org/10.1016/j.ijdr.2020.101647>