

Swimming Competence and Aquatic Disaster Preparedness of BPE Students in University of Mindanao

**Shekinah Nissi P. Rafols¹, Ria Mae S. Depillo²,
Daniel Gabriel B. Diamante³, Junald Jay L. Versano⁴**

^{1,2,3}Student Researcher, University of Mindanao

⁴Program Head, University of Mindanao

INTRODUCTION

Over the past 20 years, water-related dangers have become more frequent (U.N. World Water Development Report, 2020). Flood-related disasters have increased by 134% since 2000, while the number and scope of droughts have increased by 29% (Meteorological Organization, 2021). Thus, between 2006 and 2013, 3276 deaths have been recorded due to drowning in the Philippines (Guevarra, 2021). In Davao City, flooding is prone in most barangay since it is close to the Davao River (Miyamoto et al., 2022). The lack of public and staff education and competence about disaster risks is one of the significant problems associated with aquatic disaster response. Even the local emergency response workers in their barangays still had much to learn, especially the different swimming techniques (Artiaga et al., 2020). Although swimming is included in the Philippines' curriculum, it is only considered one of the sports activities, and water safety is not a part of it (Ravelo, 2022).

Indeed, aquatic disaster preparedness is essential to discuss since it prepares and ready an individual for unexpected water-related disasters (Ferry, 2017). Furthermore, risks and casualties crucially descend when there is enough knowledge, awareness, skills, and education regarding a disaster (Safapour & Kermanshachi, 2019). Knowledge about disaster preparedness can help students stabilize their mental state regarding disaster; it motivates them to engage in disaster risk reduction management, handle emergencies confidently, and understand the consequences of a disaster. Therefore, being knowledgeable and prepared for disasters can reduce vulnerability (Khorram-Manesh et al., 2018; Torani et al., 2019). Similarly, disaster risk reduction is crucial because it eliminates risks associated with water, where drowning is the leading cause of death (Sindall et al., 2022). Moreover, one of the ways to reduce drowning is to increase an individual's swimming competency level. Swimming-competent people are at less risk of accidents in the water (Water Safety USA, 2018). In addition, acquiring swimming skills can expand an individual's awareness of aquatic threats and hazards since it combines mind and body ability (Moreno-Murcia & Ruiz-Perez, 2019). Swimming competency is how an individual can get in and out of the water safely by possessing fundamental water skills. Furthermore, it is being able to provide necessary help to those in need or to oneself during water-related situations.

Accordingly, swimming competence encompasses swimming skills and swimming accessibility. Swimming skills are the ability of an individual to breathe comfortably in the water, perform swimming strokes, and float and turn quickly (Water Safety USA, 2018). Swimming accessibility, also called

swimming location, is where an individual swims and whether or not these locations are reachable to them (Richards et al., 2022). A study across Hong Kong showed that half of the primary students who can execute basic swimming skills are students with higher family incomes. Providing more opportunities regardless of socioeconomic status will reduce the risk of casualties (Hamilton et al., 2020). Furthermore, more reliable and validated tools must be used to measure the totality of swimming competence in children (Santos-Garcia et al., 2022). Thus, Protection Motivation Theory by Rogers was used to understand how individuals manage or be motivated to self-protect against threats such as disasters (Hu et.al, 2022).

Aquatic disaster preparedness consists of five indicators – disaster-related knowledge, preparedness and readiness, adaptation, awareness, and risk perception. Aquatic disaster preparedness is a state of readiness, or a level of preparedness for a disaster that enables a location or nation to respond successfully could involve a vulnerability assessment, the creation of appropriate emergency preparation techniques, public awareness campaigns, warning systems, and drills or simulations (Gerber, 2020). Disaster-related knowledge refers to the information and abilities people, communities, governments, and humanitarian organizations learn to prepare for disasters (Kusumastusi, 2020). Disaster readiness and preparedness instill a duty to prevent isolation during the disaster, see it as a shared problem, and motivate people to help one another (Hirano et al., 2021).

The concept of adaptation highlights the idea that civilization must learn to live in a way that is more compatible with natural disasters rather than striving to control nature (Zhou et al., 2016). Disaster risk awareness determines the activities that can be taken, either individually or collectively, to address disaster exposure and susceptibility (Jamba, 2019). Disaster Risk Perception (DRP) motivates priority setting, preventive efforts, and resource allocation (Gianotti & Willy, 2020). A Bangladesh study showed that despite several communities practicing preparedness measures, early warning systems received little attention (Jagnoor, 2019).

A study focuses only on analyzing critical variables of the drowning rate, reflecting demographic groups' swimming competence. The findings indicate that parental fear of water serves as a drive for teaching their child to swim (Layne et al., 2020). The effectiveness of the extension project participated by Barangay Response Personnel regarding improving their swimming skills concerning water-related disaster preparedness implies that they still had a lot to work on, particularly in their swimming skills (Artiaga, 2020). Thus, this depicts the knowledge gap in empirical evidence to which Bachelor of Physical Education (BPE) students are competent in swimming in responding to aquatic disaster preparedness, whereby limits the gathering of data that can be of great support for the implementation of effective educational strategies, improvisation of emergency decisions, and effectual disaster planning.

This study will provide stakeholders with updated statistical data on BPE students' current knowledge and swimming skills in response to water-related disasters. The results will serve as a factor to contribute something to school administration through the data that will be gathered. Furthermore, it may or not emphasize the need to develop and implement more effective programs to aid what needs to be improved. The study aims to describe the relationship between swimming competence and aquatic disaster preparedness. It seeks to answer the level of swimming competence of BPE students in terms of swimming skills and swimming accessibility and the level of aquatic disaster preparedness in terms of disaster-related knowledge, disaster preparedness and readiness, disaster adaptation, disaster awareness, and disaster perception. At .05 level of significance, there is no significant relationship between swimming competence and aquatic disaster preparedness.

METHOD

This section discusses various data-gathering and analysis procedures employed in the study. The methodology covers; research respondents, research instrument, and research design and procedure.

Research Respondents

The target respondents are Bachelor of Physical Education students at the University of Mindanao S.Y. 2022-2023. The inclusion criteria were that they must be studying in University of Mindanao, bona fide BPE students aged 18 years old and above, any gender, and be willing to participate. Those who are not qualified are excluded. If the participants opt not to continue, they are allowed to withdraw.

The sample size of 201 was drawn from a population of 420 using the Raosoft sample size calculator. 200 respondents are acceptable sample size since it provides a reasonable margin of error (Goodmancoaching, 2022). The sampling method is quota sampling. It is suitable for quantitative design as it provides a sample representing a population as a whole (Nikolopoulou, 2022). Furthermore, it is a selection of participants with specific characteristics that serve as a quota for the basis of the sample (Bhardwaj, 2019).

Research Instrument

A modified survey questionnaire was used to determine the respondents' answers. This questionnaire is based on a structure consisting of different skills and knowledge about swimming competence and aquatic disaster preparedness. The modified questionnaire is based on a more appropriate factor structure to make it more suitable for the study (Hauser et al., 2018). Participants responded using a 5- point Likert scale. (1) Strongly Disagree, (2) Disagree, (3) Moderately Agree, (4) Agree, and (5) Strongly Agree, and the questionnaire was divided into three (3) parts. Part I consists of the respondents' demographic profiles. Part II consists of swimming competence indicators: Swimming skills (5 items) and swimming accessibility (4 items) (Misimi et al., 2020).

A range of means is used: 4.20-5.00 (very high), shows that participants' swimming competence is outstanding; 3.40-4.19 (high), shows that participants' swimming competence is very satisfactory; 2.60-3.39 (moderate), shows that participants' swimming competence is satisfactory; 1.79-2.59 (low), shows that participants' swimming competence is unsatisfactory; 1.00-1.79 (very low), shows that participants' swimming competence is poor.

Part III is about aquatic disaster preparedness indicators: Disaster-related knowledge (3 items), disaster preparedness and readiness (5 items), disaster adaptation (6 items), and disaster risk perception (4 items) (Tuladhar et al., 2014). It will be presented by the scale below.

A range of means is used: 4.20-5.00 (very high), which shows that participants' disaster preparedness is always manifested; 3.40-4.19 (high), shows that participants' disaster preparedness is often manifested; 2.60-3.39 (moderate), shows that participants' disaster preparedness is sometimes manifested; 1.79-2.59 (low), shows that participants' disaster preparedness is rarely manifested; 1.00-1.79 (very low), shows that participants' disaster preparedness is not manifested.

The questionnaires were validated by two expert validators with a mean score of 4.565. Pilot testing data was subjected to reliability assessment resulting in a Cronbach Alpha coefficient of 0.8365, indicating acceptable internal consistency.

Design/Procedure

A descriptive correlational design was used in this study. The correlational study aims to uncover correlations between variables and to forecast future events using present knowledge (Strangor & Walinga, 2019). Furthermore, descriptive correlational is a suitable design when the goal of the study is to describe the relationship between two variables: swimming competence and aquatic disaster preparedness.

The researchers asked permission from the dean to conduct the survey. Due to the pandemic, the study was conducted and distributed online in Google Forms among targeted respondents. The researcher contacted the participants using Facebook and Messenger platforms and asked for consent. Upon securing approval to participate, the researcher provided the link to the survey questionnaire through email or messenger chat. The confidentiality and anonymity of the participants will be protected at all times. Responses were organized into tables for statistical processing. Data will be analyzed using mean, standard deviation, and Pearson correlation coefficient.

RESULTS AND DISCUSSION

This chapter presents the tabulated data and findings drawn from the respondents. It also covers the explanation of results based on statistical findings. The data collected were summarized, organized, tabulated, analyzed, and presented in the following, which addressed the objectives of the study; determining the relationship between Swimming Competence and Aquatic Disaster Preparedness of BPE students in the University of Mindanao.

Level of Swimming Competence of BPE Students

Table 1 presents the data on the level of swimming competence of Bachelor of Physical Education students in the University of Mindanao. The swimming competence was measured in terms of swimming skills and swimming accessibility. Each criterion's weighted mean was calculated, in which swimming competence equals $M=3.16$ and $SD=0.85$ with a descriptive interpretation of *moderate*. This indicates that the respondent's level of swimming competence is satisfactory. The results manifested that *swimming skills*, as the first indicator, had the highest mean score with the values of $M=3.67$ ($SD=0.94$), which was described as *high*; *swimming accessibility* with $M=3.51$ ($SD=1.10$), which was described as *high*.

Table 1. Level of swimming competence of BPE students, N = 201

Indicators	Mean	SD
Swimming Skills	3.67	.94
Swimming Accessibility	3.51	1.10
Overall	3.16	.85

The high level of swimming competence among BPE students denotes that participants' level of swimming competence are satisfactory due to the high rating given on swimming skills and swimming accessibility. Therefore, it indicates that the students are competent in swimming, which makes them at less risk of accidents in the water (Water Safety USA, 2018). In addition, most respondents reside in urban areas, which is consistent with what Hamilton et al. (2020) observed that students who can execute the basic swimming skills have higher family income.

Level of Aquatic Disaster Preparedness of BPE Students

As manifested in Table 2, the level of aquatic disaster preparedness was measured based on the following indicators: *disaster-related knowledge*, *disaster preparedness*, *disaster adaptation*, *disaster awareness*, and *disaster risk perception*. Aquatic disaster preparedness has an overall weighted mean score of 3.87 and $SD=0.55$, with a verbal interpretation of *high*. This means that aquatic disaster preparedness is often manifested among the respondents. For the specific indicators, *disaster preparedness* has the highest mean score with values of 4.17 ($SD=0.61$) and a descriptive level of *high*; *disaster-related knowledge* with

M=3.63 (SD=0.80) and a descriptive level of *high; disaster adaptation* with M=4.00 (SD=0.65) and a descriptive level of *high; disaster awareness* with M=3.87 (SD=0.65) and a descriptive level of *high; disaster risk perception* with M=3.47 (SD=0.79) and a descriptive level of *high*. This means the respondents often manifest disaster-related knowledge, disaster preparedness, disaster adaptation, disaster awareness, and disaster risk perception.

Table 2. Level of Aquatic Disaster Preparedness of BPE students, N = 201

Indicators	Mean	SD
Disaster-related Knowledge	3.63	.80
Disaster Preparedness	4.17	.61
Disaster Adaptation	4.00	.65
Disaster Awareness	3.87	.65
Disaster Risk Perception	3.47	.79
Overall	3.87	.55

There is a high level of aquatic disaster preparedness since the respondents rated highly on disaster-related knowledge, preparedness, adaptation, awareness, and perception. This indicates that the students often manifested aquatic disaster preparedness. Davao City is prone to water-related disasters since its location is close to Davao Gulf and rivers, making it a part of the risk profile of the city (City Government of Davao, 2022). In line with the results, it shows that the students are capable and prepared for water-related disasters. Knowing disaster preparedness can help students stabilize their mental state regarding with water-related disasters; motivates them to engage in disaster risk reduction management; handle emergencies with confidence, and understand the consequences of a disaster. Therefore, being knowledgeable and prepared for disasters can reduce vulnerability (Torani et al., 2019; Khorram-Manesh et al., 2018).

Correlation of Swimming Competence and Aquatic Disaster Preparedness

Table 3 shows the significant relationship between swimming competence and aquatic disaster preparedness. It depicted a positive relationship with a total correlation coefficient of .372*. This means that the students have a low positive correlation between swimming competence and aquatic disaster preparedness, which rejected the null hypotheses at .05 level of significance.

Table 3. Correlation of Swimming Competence and Aquatic Disaster Preparedness

Aquatic Disaster Preparedness	Swimming Competence		Overall
	Swimming Skills	Swimming Accessibility	
Disaster-related Knowledge	.347*	.212*	.334*
Disaster Preparedness	.298*	-.007	.178*
Disaster Adaptation	.390*	.045	.264*
Disaster Awareness	.430*	.142*	.345*
Disaster Risk Perception	.368*	.285*	.388*
Overall	.460*	.159*	.372*

The test of the relationship between swimming competence and aquatic disaster preparedness manifested a significant relationship. This shows that the students' swimming competence is correlated to aquatic disaster preparedness. Moreover, the increase in swimming competence would also increase the level of aquatic disaster preparedness.

Overall, the result of this study corresponds with the contention of Lasco (2018) that swimming ability should be taken a more significant emphasis as part of disaster preparedness since the Philippines is prone to water-related disasters such as typhoons and floods. Thus, swimming should be included in the curriculum as well as water safety and disaster-related skills. Furthermore, aquatic disaster preparedness is essential to discuss since it prepares an individual for unexpected water-related disasters (Ferry, 2017). In addition, acquiring swimming skills can expand an individual's awareness of aquatic threats and hazards since it combines mind and body ability (Moreno-Murcia & Ruiz-Perez, 2019).

CONCLUSION AND RECOMMENDATION

The study's findings drawn from the students of Bachelor of Physical Education in University of Mindanao indicates a high relationship between the two variables, confirming the significant relationship of swimming competence and aquatic disaster preparedness. This finding confirms with the Protection Motivation Theory that motivating factor which is swimming skill influences the willingness to prepare for disasters thus encourages organizations and institutions to implement disaster planning (Hu et.al, 2022).

Based on the study's findings, several recommendations are offered. Since the participants' swimming competence is very satisfactory, it is suggested that the University will produce an indoor swimming pool which allows the students to be more engaged, thus strengthening their swimming skills even more. In addition, providing an indoor swimming pool inside the campus enables the professors to implement swimming clubs and swimming programs. Furthermore, findings revealed that participants' aquatic disaster preparedness is often manifested. Therefore, it is suggested that professors handling swimming and aquatics subjects enhance their lessons by planning and implementing comprehensive educational workshops that allow the students to engage in hands-on experiences to promote expertise in responding to different aquatic disasters. Thus, it is recommended that BPE students should actively participate in recreational activities inside or outside of the school premises specifically in swimming, for strengthening and refining of skills. In addition, to widen up their knowledge about disaster preparedness, full interest in taking seminars, forums, and activities is encouraged. The findings also show that most of the respondents reside in urban areas, indicating that most of them are from families with higher incomes. With that, it is recommended that the community will also produce an accessible public swimming pool for lessons for the lower family income to be involved in such activities.

REFERENCES

1. Artiaga, T. et al. (2020). Effects of "Langoy sa Kaluwasan-Learn to Swim" Extension Project to the Swimming Competency of Barangay Emergency Response Personnel. 10.13189/saj.2020.080616
2. Chan, D., Lee, A. & Hamilton, K. (2020). Descriptive epidemiology and correlates of children's swimming competence, *Journal of Sports Sciences*, 38:19, 2253-2263, DOI: 10.1080/02640414.2020.1776947
3. City Government of Davao (2022). Dabawenyos urged to practice disaster preparedness vs. La Niña. Retrieved from <https://tinyurl.com/2869xkjk>

4. Ferry, A. (2017). The Importance Of Being Prepared Before A Disaster Strikes. Retrieved from <https://tinyurl.com/bdeb9d8p>
5. Gerber, B. (2020). The Oxford Encyclopedia of Natural Hazards Governance. Retrieved from <https://tinyurl.com/3nxesz8s>
6. Gianotti, A., Wiley, K. (2017). Risk Perception in a Multi-Hazard Environment. Retrieved from <https://doi.org/10.1016/j.worlddev.2017.04.002>
7. Goodmancoaching (2022). What Is A Good Rough Rule Of Thumb Regarding Required Sample Size For Questionnaire Studies? Retrieved from <https://tinyurl.com/2tj6ncer>
8. Guevarra, J.P., Peden, A.E., Orbillo, L.L., Uy, M.R.S.Z., Madrilejos, J.J.R., Go, J.J.L.; Martinez, R.E.C., Cavinta, L.L., Franklin, R.C. (2021). Preventing Child Drowning in the Philippines: The Need to Address the Determinants of Health. *Children* 2021, 8, 29. <https://doi.org/10.3390/children8010029>
9. Hirano, M., Matsuo, Y. (2021). Effectiveness of disaster preparedness education in helping older people prevent isolation. <https://doi.org/10.1111/phn.12911>
10. Hu, Sy., Yu, M., Que, T. et al. (2022). Individual willingness to prepare for disasters in a geological hazard risk area: an empirical study based on the protection motivation theory. *Nat Hazards* 110, 2087–2111 <https://doi.org/10.1007/s11069-021-05026-8>
11. Jamba. (2019). Household disaster awareness and preparedness: A case study of flood hazards in Asamankese in the West Akim Municipality of Ghana. [10.4102/jamba.v11i1.789](https://doi.org/10.4102/jamba.v11i1.789)
12. Kasumastusi, R.D., Wibowo, S., Nurmala, A. (2021). Knowledge and natural disaster preparedness: A systematic literature review and a case study of East Lombok, Indonesia. <https://doi.org/10.1016/j.ijdr.2021.102223>
13. Khorram-Manesh, A., Berlin, J., Roseke, L., Aremyr, J., Sörensson, J., & Carlström, E. (2018). Emergency Management and Preparedness Training for Youth
14. (EMPTY): The Results of the First Swedish Pilot Study. *Disaster Medicine and Public Health Preparedness*, 12(6), 685-688. doi:10.1017/dmp.2017.144
15. Lasco, G. (2018). Filipinos should know how to swim. Retrieved from <https://opinion.inquirer.net/112088/filipinos-know-swim>
16. Layne, T. et.al. (2020). Factors Impacting Swimming Participation and Competence: A Layne, Todd E.; Irwin, Carol C.; Pharr, Jennifer Renee; and Irwin, Richard L. (2020) "Factors Impacting Swimming Participation and Competence: A Qualitative Report," *International Journal of Aquatic Research and Education*: Vol. 12: No. 4, Article 10. <https://scholarworks.bgsu.edu/ijare/vol12/iss4/10>
17. Miyamoto, M., Kakinuma, D., Ushiyama, T., Rasmy, A. W. M., Yasukawa, M., Bacaltos, D. G., Sales, A. C., et al. (2022). Co-Design for Enhancing Flood Resilience in Davao City, Philippines. *Water*, 14(6), 978. MDPI AG. Retrieved from <http://dx.doi.org/10.3390/w14060978>
18. Moreno-Murcia, J. A., & Ruiz-Perez, L. M. (2019). Cómo lograr la competencia acuática: El método acuático comprensivo. Sb editorial. <https://books.google.es/books?id=a9sKywEACAAJ>
19. Nikolopoulou, K. (2022). What is Probability Sampling? Types & Examples. Retrieved from <https://www.scribbr.com/methodology/probability-sampling/>
20. Ravelo, J.L. (2022). The Challenges of Drowning Prevention in the Philippines. Retrieved from <https://www.devex.com/news/the-challenges-of-drowning-prevention-in-the-philippines-103354/amp>
21. Richards, A., Klos, L., Swindell, N., Griffiths, L., Martelaer, K., Edwards L., Brophy, S., Stratton, G. (2022) Associations between swimming & cycling abilities and fitness in 9-11 year old boys and girls. *Journal of Sports Sciences* 40:6, pages 658-666. doi:<https://doi.org/10.1080/02640414.2020.1776947>

22. Safapour, E., Kermanshachi, S. (2019). Investigation of the Challenges and Their Best Practices for Post-Disaster Reconstruction Safety: Educational Approach for Construction Hazards. Retrieved from <https://tinyurl.com/355tmj83>
23. Santos-García, D. J., Rocca, O., Navandar, A., & Moreno, J. A. (2022). Measurement Of Aquatic Competence In Toddlers, Infants, And Children Between 6 Months And 14 Years: A Systematic Review. *Motricidade*, 18(1), 1-15. doi: <https://doi.org/10.6063/motricidade.25590>
24. Sindall, R., Mecrow, T., Queiroga, A.C., et.al. (2022). Drowning risk and climate change: a state-of-the-art review *Injury Prevention*;28:185-191. doi:10.1136/injuryprev-2021-044486
25. Stangor, C. & Walinga, J. (2019). Psychologists Use Descriptive, Correlational, and Experimental Research Designs to Understand Behaviour. Retrieved from <https://openpress.usask.ca/introductiontopsychology/chapter/psychologists-use-descriptive-correlational-and-experimental-research-designs-to-understand-behavior/>
26. 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. https://doi.org/10.4103/jehp.jehp_262_18
27. Water Safety USA (2018). Become water competent. Retrieved from <https://www.watersafetyusa.org/water-competency.html>
28. World Meteorological Organization. (2021). 2021 State of Climate (WMO-No. 1278. Retrieved from
29. https://library.wmo.int/index.php?lvl=notice_display&id=21963&fbclid=IwAR1CEfKn55UXkWIPjJKNf6CMOfAVIV0Xu4rse8V5iyv3jnpqD3rBXZJI3BIk#.Y0Al8nbMIIdX