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PARENTS' PERCEPTION OF WATER SAFETY AND DROWNING RISK FOR THEIR CHILDREN IN SELANGOR

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ABSTRACT

Drowning is a major public health concern, particularly among children. This study investigated parents' perceptions of water safety and the drowning risks their children face in Selangor. A total of 70 parents at the UiTM swimming pool were selected for this study. Descriptive statistics and Pearson correlation analysis were used to analyze parents' perceptions and their relationships with drowning risk. The study examined parent's perceptions of water safety, drowning risk and the relationship between these factors. The results showed that parents at UiTM swimming pool highly rated swimming skills and early swimming education as protective measures against drowning. For water safety perception, swimming ability had the highest mean score (M=3.98, SD=.534), while the role of supervision had the lowest score (M=3.66, SD=.624). Regarding drowning risk perception, the benefits of swimming received the highest mean score (M=4.64, SD = .430), with perceived barriers scoring the lowest (M=4.00, SD = .443). However, there were mixed responses regarding constant supervision. Moreover, a moderate positive correlation ($r = .512$, $p < .001$) was found

between parents' perceptions of water safety and drowning risk. These findings underscore the need for comprehensive water safety education programs addressing skill development and risk awareness.

Keywords: *water safety, drowning risk, swimming skill*

INTRODUCTION

Drowning is a major public health problem with significant economic and health consequences (Forjuoh, 2013). According to World Health Organization (WHO), in 2019, more individuals drowned than died from protein-energy malnutrition or maternal diseases (Meddings et al., 2021). In the last ten years, this has resulted in approximately 2.5 million deaths (Meddings et al., 2021). Childhood drowning is a global public health issue that impacts communities worldwide (World Health Organization, 2022; Wu et al., 2017). It is the third leading cause of death in children aged five years and older (Social Determinants of Health, 2017). In Asia, drowning causes nearly half of all injury-related deaths among children and is a significant health burden (Hyder et al., 2008; Rahman et al., 2017). Malaysia has a lower drowning death rate in children than other Southeast Asian countries, with an estimated 3.05 per 100,000 (Amir et al., 2014). Malaysia's drowning fatality rate for children was lower than that of neighbouring nations such as Cambodia (16.01), Vietnam (10.98), Thailand (10.84), and others (Social Determinants of Health, 2017). There were 591 drowning deaths of children aged 0-14 years between 2017 and 2021. 74% of these are boys. Between January and April year 2023, 97 drowning deaths were reported, with seven cases involving boys aged 8 to 11 years old until March (Pfordten, 2023). In the first nine months of the year 2017, 31 children were found drowned in swimming pools and amusement parks, with Selangor, Kedah and Pahang recording the highest number of victims. About 75% of the children were under the age of five (Dermawan, 2017).

Water safety is important for the prevention of drowning accidents, especially among adolescents who are overrepresented in drowning accident statistics (Taylor et al., 2020). A comprehensive review published in the Journal of Safety highlights the importance of water literacy for drowning prevention in children aged 2 to 4 years (Taylor et al., 2020). To reduce the number of drowning incidents, a health education booklet for parents on water safety and drowning prevention was designed and reviewed to improve parents' understanding of drowning tactics and prevention measures (Farizan et al., 2020). Education and awareness on water safety need to be disseminated widely, especially as the number of drowning cases in Malaysia has increased significantly. According to a University Putra Malaysia newspaper, Assoc. Prof. Dr. Tengku Fadilah Tengku Kamalden from the Department of Sports Studies, Faculty of Education, University Putra Malaysia (UPM) said that people need to know that water safety is more than just knowing how to swim and that anyone anywhere can learn water safety techniques even if they are not proficient swimmers (Ulfana, 2017).

With a higher mortality rate than in many other countries, drowning remains the leading cause of death among children under the age of eighteen in Malaysia. Recent statistics show that the state of Selangor has the highest drowning mortality rate nationwide (Farizan et al., 2021). While some efforts have been made to improve drowning prevention, Malaysia lags behind global benchmarks. The fact that drowning is largely preventable with the right information, care and precautions is a serious public health concern. In Malaysia, parents' knowledge and understanding of water safety is not sufficient to successfully prevent children from drowning. Despite the implementation of important drowning prevention projects and regulations by the government, there is still a lack of local education on drowning risks and prevention strategies for parents (Farizan, Sutan, & Mani, 2020a). Many parents do not know or understand what safety precautions are needed to supervise their children in everyday situations near water properly.

Moreover, as Noor Hamzani, Rosnah, Kulanthayan and Mani (2020) argue, a lack of understanding of the public perception of risk also contributes to the general lack of awareness of the problem. According to

Moran (2014), lower risk perception has been associated with drowning, highlighting the need for a risk assessment and skills-based approach to water safety among young beachgoers in New Zealand (Moran,2014). Raising awareness of drowning risk and improving risk perception can therefore, help prevent child drowning deaths. Thus, this study aims to investigate parents' perception of water safety and drowning risk for their children's safety. The objectives of this study are i) to determine parents' perception of water safety of their children in the UiTM swimming pool ii) to determine parents' perception of drowning risk of their children in the UiTM swimming pool and iii) to investigate the relationship between between parents' perception of water safety and their children's risk of drowning in the UiTM swimming pool.

LITERATURE REVIEW

2.1 Water safety

According to Wilks et al. (2017), water safety for children encompasses a variety of procedures and knowledge, including recognizing aquatic risks in water, managing emergencies, and first aid. Water safety can also be defined as safe life-saving knowledge and skills related to preventing drowning in children through an educational program (Turgut et al., 2016). Peden's et al. (2017) definition of water safety includes understanding hazards, rules of behavior, and how to safely help others in the aquatic environment. It is considered a core aquatic skill alongside other important swimming and water safety skills and is crucial for preventing drowning and teaching lifelong skills for safer water use. Based on previous research, improving parents' knowledge of water safety can help reduce the risk of child drowning and improve their ability to recognise the risk factors for the majority of child drowning incidents (Farizan et al., 2020b). Providing parents with water safety information will increase their awareness of child water safety and their understanding of the circumstances surrounding toddler drowning (Moran et al., 2012; Moran & Stanley, 2006b). Parents' perceptions of water safety, divided into three factors: children's swimming ability and lessons, role of supervision, and general issues of children water safety. Swimming ability is an important factor in water safety and drowning prevention. According to a report by Sport England, being able to swim regularly and integrating swimming into daily community life can have significant health and well-being benefits. Learning basic water safety skills, including swimming with a partner and knowing what to do in an emergency, is essential for people of all ages and experience levels. According to research, moving from swimming skills alone to water competence is critical, which encompasses a broader set of skills related to water safety and drowning prevention (Stallman et al., 2017). This shift emphasizes the importance of moving beyond standard swimming skills to include important water safety skills to develop a more comprehensive approach to drowning prevention. Stallman et al. (2017) also noted that swimming ability is a key component of water competence critical to water safety (Swimming and Health Commission, 2017).

2.2. Drowning Risk

Drowning risk refers to the potential danger and likelihood of a person drowning fatally or non-fatally in water, resulting in respiratory impairment. The process of respiratory impairment due to submersion or immersion in a liquid medium, with particular attention to the mortality associated with these impairments, is defined as drowning risk (Yang et al., 2007). The study also emphasizes the need for regular adult supervision and the use of swimming aids, such as flotation devices, as strategies to prevent drowning among children in rural areas of developing countries. Several studies have identified critical risk factors for drowning in children. According to the Centers for Disease Control and Prevention (CDC), major factors that increase the risk of drowning include poor swimming skills, inadequate barriers and fencing, lack of responsible supervision, drug or alcohol use, and epilepsy or other seizure disorders. Lack of supervision, poor caregiver health and poor swimming skills were also identified as important risk factors

by (Yang et al., 2007). Parents' drowning risk perception, divided into four factors: susceptibility to drowning, seriousness of drowning, benefits of swimming, and perceived barriers.

2.3 Perception of Water Safety and Drowning Risk

Various studies have highlighted the importance of water safety knowledge for drowning prevention. Della et al. (2018) found that immigrant parents in Western Australia had less knowledge about drowning risks and were less likely to introduce their children to the water acquaintance. Turgut et al. (2016) demonstrated that a water safety education program significantly improved children's knowledge and life-saving skills. Farizan et al. (2021) emphasised the importance of closing knowledge gaps and developing prevention strategies, especially in countries with high drowning rates among children. Moran and Stanley (2006) developed an educational program for parents that successfully addressed misconceptions about water safety in young children. These studies emphasise the critical role of water safety knowledge in drowning prevention. Moran (2009) emphasises the importance of close and constant supervision, especially at beaches where many parents do not adequately supervise their young children. Therefore, it is crucial to understand the risk factors for drowning so that we can prevent drowning fatalities and injuries (Turgut et al., 2016). A study conducted in New Zealand highlights the positive success of initiatives to raise parental awareness of toddler water safety. These efforts have effectively influenced parents' knowledge and behaviour, leading to a better understanding of drowning prevention and the introduction of appropriate supervision and a safe swimming environment for their children (Moran & Stanley, 2006).

METHODOLOGY

Research Design

Research design is essential as it provides a methodological approach to solve a scientific problem. It can be either quantitative or qualitative, with the latter category comprising non-experimental and experimental designs (Indu & Vidhukumar, 2020). In this study, a non-experimental and quantitative method is used. This research design allows for collecting quantitative data that enables statistical analysis to uncover patterns, trends, and associations within the target population. Through surveys or questionnaires, quantitative approaches enable the collection and analysis of numerical data. The ethical approval number of this study is *FERC1/1/2024 (UG/MR/0309)*.

Population and Sampling Technique

The population in this study is selected using simple random sampling. Random sampling is a probability sampling technique where each member of the population has an equal chance of being selected for the sample. This method ensures that the sample is representative of the entire population and reduces the potential for bias in the selection process. In this case, parents who come to UiTM Shah Alam swimming pool either to swim or for recreation are considered as the population. The total population considered in this study comprises approximately 85 parents. Using the methodology proposed by Krejcie and Morgan (1970), the sample size for this study is 70 respondents.

Instrumentation

The questionnaire consists of three sections: A, B, and C. Section A gathers demographic information. Section B measures water safety perception using 12 items that were adapted from a study by Moran et al. (2004), while Section C assesses drowning risk perception using 13 items that were adapted from a study by Luo (2024). Both section B and C employ a 5-point Likert scale ranging from 1 (Strongly disagree) to 5 (Strongly agree). SPSS version 28.0 was used to analyse the data in this study.

RESEARCH FINDINGS

Table 4.1: Reliability Test

No.	Factors	No. of item	Cronbach Alpha Value
1	Perception of water safety	12	0.706
2	Drowning risk perception	13	0.779

The results of the reliability test are shown in Table 4.1. The Cronbach's alpha values for perception of water safety with a total of 12 items, were 0.706, while drowning risk perception with a total of 13 items, were 0.779. According to research, Cronbach's alpha values between 0.7 and 0.8 are considered acceptable for research purposes, especially in the initial stages of research or for scales with a relatively small number of items. The data is analyzed using the Statistical Package for Social Sciences (SPSS) statistical 28 software.

Table 4.2: Frequency Distribution of Gender

Gender	Frequency (n)	Percent (%)
Female	51	27.1
Male	19	72.9
Total	70	100.0

The study sample consisted of 70 participants. Most participants were female, accounting for 51 respondents (72.9%). Male participants comprised the remaining of 19 respondents (27.1%). This gender distribution clearly shows a predominance of female participants in the study.

Table 4.3: Frequency Distribution of Gender

Age	**Frequency (n)**	**Percent (%)**
20-30 years old	10	14.3
30-40 years old	28	40.0
40- 50 years old	25	35.7
Above 50 years old	7	10.0
Total	70	100.0

The majority of participants fell within the 30-40 age group, comprising 28 respondents (40.0%). It was closely followed by the 40-50 age group, which accounted for 25 respondents (35.7%). The youngest age group, 20-30 years old, represented 10 respondents (14.3%), while the oldest category, above 50 years old, made up a minor proportion with 7 respondents (10.0%).

Table 4.4: Frequency Distribution of Educational Level

Educational level	**Frequency (n)**	**Percent (%)**
School	17	24.3
University	53	75.7
Total	70	100.0

53 respondents (75.7%) reported having a university education. The remaining 17 respondents (24.3%) indicated that their highest level of education was at the school level.

Table 4.5: Frequency Distribution of Occupation

Occupation	Frequency (n)	Percent (%)
Not working	3	4.3
Housewife	7	10.0
Self-employed	4	5.7
Government sector	32	45.7
Private sector	21	30.0
Others	3	4.3
Total	70	100.0

Most participants were employed in the government sector, accounting for 32 respondents (45.7%). The second largest group comprised those working in the private sector, representing 21 respondents (30.0%). Housewives comprised 7 respondents (10.0%), while self-employed individuals comprised 4 (5.7%). Both the "Not working" and other categories each represented 3 respondents (4.3%).

Table 4.6: Frequency Distribution of Pool Ownership

Do you have a swimming pool at home?			
		Frequency	Percent
Valid	Yes	6	8.6
	No	64	91.4
	Total	70	100.0

If yes, do you have a pool fence?			
		Frequency	Percent
Valid	No	70	100.00
	Total	70	100.0

The data presented in table above shows that 6 respondents (8.6%) stated that they had a swimming pool at home, while the vast majority, 64 respondents (91.4%), did not have a pool. None of those who did own a pool had a pool fence installed.

Table 4.7: Frequency Distribution of Children's Swimming Ability

Does your child know how to swim?			
		Frequency	Percent
Valid	Yes	48	68.6
	No	22	31.4
	Total	70	100.0

Has your child ever taken swimming lesson?			
		Frequency	Percent
Valid	Yes	46	65.7
	No	24	34.3
	Total	70	100.0

The results show that 48 respondents (68.6%) reported that their child knows how to swim, while 22 respondents (31.4%) indicated that their child could not swim. 46 children (65.7%) have taken swimming lessons, while 24 (34.3%) have not participated in formal swimming lessons.

Table 4.8: Frequency Distribution of Parents' Swimming Ability

Do you know how to swim?			
		Frequency	**Percent**
Valid	**Yes**	43	61.4
	No	27	38.6
	Total	70	100.0

Have you ever taken swimming lesson?			
		Frequency	**Percent**
Valid	**Yes**	38	54.3
	No	32	45.7
	Total	70	100.0

The results show that most parents in the study have swimming skills. Specifically, 43 respondents (61.4%) stated that they knew how to swim, while 27 respondents (38.6%) stated that they did not know how to swim. Regarding swimming lessons, the data shows a slightly more balanced distribution. Most of the 38 parents (54.3%) have taken swimming lessons, while 32 (45.7%) have not received formal swimming lessons.

Table 4.9: Frequency Distribution of Drowning Incidents

Has your child ever drowned (while swimming)?			
		Frequency	**Percent**
Valid	**Yes**	3	4.3
	No	67	95.7
	Total	70	100.0

Have your children almost drown?			
		Frequency	**Percent**
Valid	**Yes**	25	35.7
	No	45	64.3
	Total	70	100.0

In terms of actual drowning incidents, 3 respondents (4.3%) reported that their child had experienced drowning while swimming. The vast majority of the 67 respondents (95.7%) stated that no such incidents existed. 25 respondents (35.7%) reported that their children had almost drowned at least once. The remaining 45 respondents (64.3%) stated that their children had never almost drowned.

Table 4.10: Results of Factor Analysis of Parents' Perception on Water Safety

Items	**Mean**	**Standard Deviation (SD)**
swimming_ability	3.98	.534
role_of_supervision	3.66	.624
general_issues	3.70	.565

The factor for parents' perception on water safety with the highest mean score is swimming ability (M=3.98, SD=.534), indicating that parents place the greatest emphasis on children's swimming skills for water safety. The factor with the lowest mean score is the role of supervision (M=3.66, SD=.624), suggesting that parents may underestimate the importance of constant supervision in water safety situations.

Table 4.11: Results of Factor Analysis of Parents' Perception of Drowning Risk

Items	Mean	Standard Deviation (SD)
susceptibility_to_drowning	4.28	.591
seriousness_of_drowning	4.18	.535
benefits_of_swimming	4.64	.430
barriers_perceived	4.00	.443

The factor for parents' perception of drowning risk with the highest mean value is the benefits of swimming (M=4.64, SD=.430), suggesting that parents are most aware of the importance of swimming skills in preventing drowning. The factor with the lowest mean value, although still high, is the perceived barriers (M=4.00, SD=.443), indicating that while parents recognize challenges, they may see them as slightly less significant compared to other factors.

Table 4.12: Relationship Between Parents' Perception of Water Safety and Drowning Risk Perception Among Parents.

Correlations

		Water_safety_perception	Drowning_risk_perception
water_safety_perception	Pearson Correlation	1	.512**
	Sig. (2-tailed)		<.001
	N	70	70
drowning_risk_perception	Pearson Correlation	.512**	1
	Sig. (2-tailed)	<.001	
	N	70	70

The interpretation of the size of the coefficient by Cohen (1992) are as follows: Weak (-0.3 to +0.3), Moderate (0.3 to 0.5), Strong (0.5 to 0.9) and Very strong (0.9 to 1.0). The analysis revealed a moderate positive correlation between water safety perception and drowning risk perception ($r = .512$, $p < .001$, $N = 70$). This correlation was statistically significant at the .01 level. These results indicate a significant linear relationship between parents' perception of water safety and their perception of drowning risk. The moderately positive correlation suggests that a higher perception of water safety is associated with a higher perception of drowning risk and vice versa.

DISCUSSION

This study provides important insights into parents' perceptions of children's water safety, focusing on the factors that received the highest and lowest mean scores. The factor with the highest mean score in the study was children's swimming ability and lessons (M=3.98, SD=.534). This result indicates that parents place the highest importance on swimming skills as a crucial aspect of their children's water safety. This strong emphasis on swimming skills is consistent with previous research emphasising the protective effect of swimming skills. Asher et al. (1995) found that participation in swimming classes for young children was associated with improved water safety skills. However, Moran and Stanley, (2006a) point out that parents' perceptions of their children's swimming ability do not always match actual competence, leading to overestimating safety. In stark contrast to the high importance attached to swimming ability, the parents in the study attached the least importance to the role of supervision (M=3.66, SD=.624). This result is particularly worrying, considering that adult supervision plays a crucial role in preventing drowning accidents, especially in young children. The underestimation of supervision is at odds with a few research findings that emphasize its importance. Petrass et al. (2011) identified inadequate supervision as a

significant risk factor in drowning incidents involving children. Morrongiello et al. (2013) also found that swimming lessons might lead to complacency in supervision.

Next, this study provides critical insights into parents' perceptions of drowning risk, particularly emphasizing the factors that received the highest and lowest mean scores. The factor with the highest mean score in the study was the benefits of swimming (M=4.64, SD=.430), indicating that parents strongly recognize the importance of swimming skills in drowning prevention. This high awareness of the benefits of swimming is in line with current recommendations and research findings on water safety, Stallman et al. (2017) the importance of moving from swimming skills to water competence in drowning prevention. This concept is also supported by Moran et al. (2012), who emphasize the critical role of swimming ability in reducing drowning risk. In stark contrast to the high recognition of swimming benefits, parents showed the lowest level of agreement regarding perceived barriers to implementing water safety measures (M=4.00, SD=.443). The results are consistent with previous findings, as (Laosee et al., 2014) found in their study of rural guardians in Thailand that there are often significant obstacles to water safety practices, including limited access to facilities, financial constraints and lack of knowledge.

Furthermore, the results of this study show a moderately positive correlation between parents' perception of water safety and their perception of drowning risk at the UiTM swimming pool. This result indicates a significant relationship between these two factors, which is important for both theoretical understanding and practical application in water safety. The moderate strength of the correlation (r = .512) indicates that while there is a clear relationship between water safety perception and drowning risk perception, other factors are likely to contribute to these perceptions. The correlation is consistent with the Protection Motivation Theory (Moran et al., 2018), which states that parents who become more aware of water safety measures also become more aware of drowning risks, which may lead to increased protective behaviours. Moreover, Moran and Stanley (2006a), study of parental perceptions of toddler water safety, found that greater knowledge was associated with more accurate risk assessment. However, the moderate strength of the correlation also suggests that these perceptions are likely to be influenced by other factors.

CONCLUSION

This study provides valuable insights into parents' perceptions of water safety and drowning risk at the UiTM swimming pool. The findings show a moderately positive correlation between water safety perception and drowning risk perception, supporting the Protection Motivation Theory and the concept of water literacy. Parents showed a strong recognition of the importance of swimming ability and lessons as crucial aspects of water safety and drowning risk for children. Furthermore, parents need high awareness of barriers perceived and role of supervision. These findings highlight the complexity of water safety perceptions and the need for comprehensive approaches to drowning prevention. Addressing the gaps in parental knowledge and perceptions identified in this study, we can work toward more effective water safety education and drowning prevention strategies.

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CONFLICT OF INTEREST

No agency or organization has a conflict of interest with this study, which might be interpreted as influencing the findings or interpretation of this study. No financial resources were available to support this project

AUTHORS' CONTRIBUTION

AZ led this project and presented the idea. In particular, she coordinated the project and helped with the

drafting of the manuscript. NA wrote the manuscript and directions. FF helped with the research methodology. NAZ and AR reviewed the manuscript for sequence and alignment. All authors read and approved the final manuscript.

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