



RESEARCH ARTICLE

Protection Motivation Theory (PMT), Risk of Drowning, and Water Safety Perceptions of Adult Caregivers/Parents

Kevin Moran^{1,*}, Jonathon Webber² and Teresa Stanley³

¹Faculty of Education, The University of Auckland, Auckland, New Zealand

²Department of Anaesthesiology, The University of Auckland, Auckland, New Zealand

³Research Manager, WaterSafe Auckland Inc (WAI), Auckland, New Zealand

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Abstract:

Background

While the circumstances surrounding drowning incidents in high income countries are well known, little is known about how members of the public perceive the risk of drowning and their role in drowning prevention.

Objective:

The purpose of the study was to analyze caregiver/parent perceptions of the risk of drowning in terms of risk (threat) appraisal processes and coping appraisal processes.

Method:

This study utilized Protection Motivation Theory (PMT) to analyse parent's perception of the risk of drowning as part of an evaluation of a water safety program. Participants ($N = 174$) completed a pre-intervention survey that sought information on their water competency, open water experience, previous instruction, and perceptions of drowning risk.

Results:

In terms of risk appraisal processes, more females, Asian peoples, and those with lower self-reported swimming and rescue competency perceived greater severity of drowning risk and greater vulnerability to that risk when swimming in open water. In terms of coping appraisal processes, males, non-Asian peoples and those with self-reported good swimming and rescue competencies were more likely to report confidence in the self-efficacy of their preventive actions.

Conclusion:

Considerable variations in risk (threat) appraisal and coping appraisal processes in respect of the risk of drowning were evident. The implications of the findings on water safety education are discussed. Ways of promoting water safety and drowning prevention are examined and recommendations for future research studies to address limitations of the study are made.

Keywords: Bystander rescue, Drowning prevention, Protection Motivation Theory (PMT), Risk of drowning, Swimming competency, Water safety.

1. INTRODUCTION

Drowning is "a significant, complex, and multifaceted phenomenon, which has at its heart, the way in which humans interact with the aquatic environment" (p.131) [1]. The recent Global Report on Drowning [2] reported

* Address correspondence to this author at the Principal Lecturer in Health and Physical Education, Faculty of Education, The University of Auckland, Private Bag 92601, Symonds Street, Auckland, New Zealand; Tel: +64 (9) 623 8899; Ext: 48620; Fax: +64 (9) 623 8898; Mobile: +6422 090 7726; E-mail: k.moran@auckland.ac.nz

that behavioural, environmental, and occupational risk factors account for more than half of global drowning mortality. It concluded that, in light of the prominence of behavioural risk factors, behavioural and social science research on interventions for these risks should be strengthened. In New Zealand, where opportunity for aquatic recreational activity and unintentional immersion abounds, water safety promotion has recently focussed on the complex interaction of people, activities, and environment to explain the drowning problem, but concluded that more research and investigation is required to unpack this complexity so as to better inform drowning prevention strategy [3]. Langendorfer’s adaptation of Newell’s dynamic constraints model (1986) to reflect the complex and fluid interaction of task, person and environment in drowning prevention, has provided a valuable framework upon which to explore the risk of drowning [4].

In New Zealand, drowning statistics indicate that, from a people perspective, males and minority groups are over-represented [3]. From an activity perspective, participants in high-risk activities such as rock-based fishing have consistently been over-represented in annual drowning statistics [5, 6]. From an environmental perspective, most drowning occurs in open water locations such as beaches, rivers, and lakes [7]. In spite of drowning prevention interventions such as water safety education and extensive lifeguard supervision and coastguard/rescue services coverage of open water sites, the drowning problem in countries like New Zealand remains prominent and persistent. Thus, while the circumstances surrounding most drowning fatalities are well reported, not a lot is known about what safety knowledge and perceptions inform public understanding of the risk of drowning, especially in open water environments.

The risk of drowning presents a unique challenge in safety research in that aquatic recreation is invariably recognised as a healthy and socially acceptable activity, even though the risk of drowning is ubiquitous. In New Zealand, with its aquatic lifestyle, temperate climate and easy access to water, recreational aquatic activities account for as much as half of all drowning fatalities and most are preventable [3]. The use of risk cognition measures as a way of identifying determinants of protective or risky behaviours underpins much risk perception research, more recently in the realm of drowning prevention [8, 6].

We have used protection motivation theory [9, 10] so as to develop a deeper understanding of the health cognitions that may reduce the risk of drowning. Protection motivation theory (hereafter referred to as PMT) is based on two cognitive dimensions - risk appraisal process and coping/response appraisal process [11, 12]. Fig. (1) shows the four factors that self-protective behaviours are contingent upon in PMT: the perceived severity of the event and the perceived vulnerability to the threat (threat appraisal); the response efficacy of preventive action and perceived self-efficacy (coping appraisal) [8].

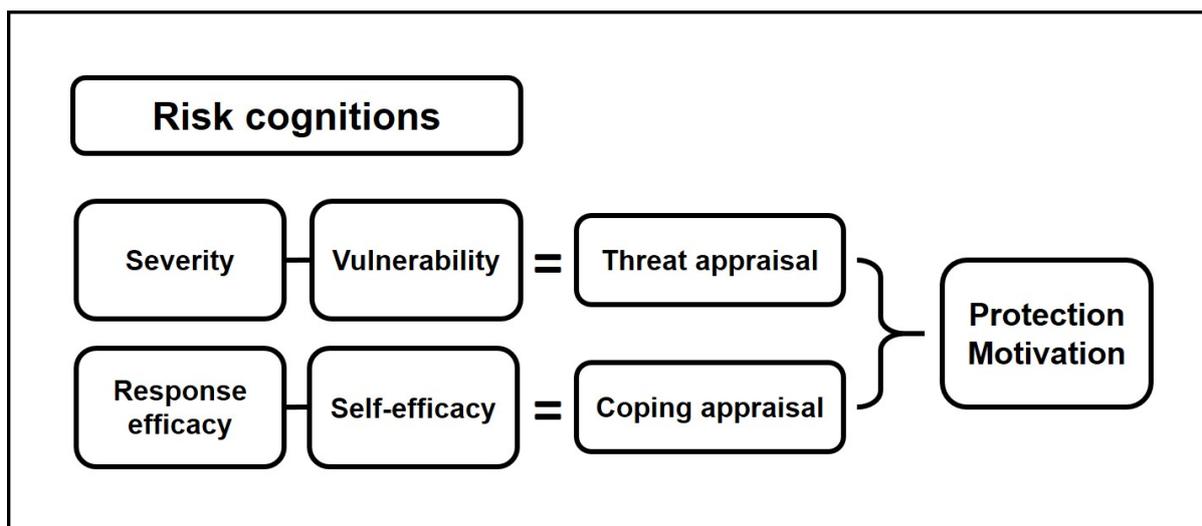


Fig. (1). Risk of drowning cognition variables (adapted from a revised theory of protection motivation, Rogers 1983).

Originally developed to explain the effects of fear-arousing communications [12], PMT offers a useful framework for understanding the various cognitive dimensions that contribute to undertaking, or intending to undertake protective behaviour related to risk of drowning [6, 8]. High levels of risk appraisal and high levels of coping appraisal are assumed to have a positive collective effect on the adoption of adaptive coping responses [13, 14]. Conversely, low

levels of risk and coping appraisal are more likely to lead to lesser protection motivation and the adoption of maladaptive coping responses. In the context of drowning risk, maladaptive responses may manifest themselves in terms of a risky behaviour such as swimming alone or swimming at unpatrolled surf beaches.

PMT is well positioned to tease out key motivating dimensions (such as underestimation of risk and overestimation of ability) that should underpin water safety education in a drowning prevention strategy. The conceptual framework of PMT can be adapted to explain any threat (e.g. risk of drowning) for which there is an effective recommended protective action (e.g. swim only at lifeguarded beaches). We aimed to investigate the dimensions of risk perceptions that inform caregivers/parents perceptions of safe behaviour drawing upon protection motivation theory as a guiding theoretical framework. In this context, the four risk cognition constructs were framed as follows:

1. Perceived severity of the threatened event (how severe is the risk of drowning?),
2. Perceived vulnerability to the likelihood of experiencing difficulty while engaging in aquatic activity leading to drowning (how vulnerable am I to that risk?),
3. Response efficacy of the risk prevention options, the belief that taking protective action will be effective in drowning prevention (water safety precautions such as swimming between patrol flags), and
4. Perceived self-efficacy, the extent to which one is able to undertake the recommended prevention behaviours (how well do I know/apply water safety rules?).

It is the purpose of this study to determine how a group of adult caregivers/parents perceive the threat of drowning and their capacity to cope with that risk, and to explore how age, gender, ethnicity, self-reported swimming and rescue competency may impact on their perceptions of water safety.

2. METHODS

A cross-sectional survey of caregivers/parents who were enrolled in a family water safety program in the greater Auckland region was conducted during the 2015/16 summer period. In total, eight Auckland swim schools operating at 20 swimming pools agreed to conduct an in-water, family-oriented water safety program. The focus of the five 30-minute sessions delivered daily for one week was teaching water safety rather than a traditional teaching swimming approach, with both caregivers and children in the water together. The program included a newly developed unit on bystander rescue entitled the *4Rs of Aquatic Rescue*. The evaluation of that unit with its specific focus on safe methods of helping others in trouble in the water has been recently completed [15]. The present study focuses on information obtained from the initial questionnaire in relation to respondents' perceptions of the risk of drowning prior to the commencement of the water safety program.

2.1. Research Instrument and Measures

Prior to starting the lessons, participants that had agreed to take part in the study ($N = 174$) were surveyed using an anonymous, self-complete questionnaire. The survey was the first stage of a pre- and post-intervention evaluation of the new *4Rs of Aquatic Rescue* education package. The questionnaire consisted of 18 closed questions designed to be completed in 10-15 minutes. Swimming competency was determined by asking participants whether they could swim and if so, how they would rate their swimming competency using a four-point scale from *poor* to *very good*. In addition, they were asked to estimate how many lengths of a pool they could currently swim and when they had last swum this distance in open water (where most fatal drownings occur).

A series of 12 statements was designed to elicit responses on risk cognitions thought relevant to participants' perceptions of drowning risk using a 1-5 Likert-type scale ranging from *strongly agree* to *strongly disagree*. The statements were based on previous uses of PMT to analyze drowning risk perception among beachgoers [8] and rock-based fishers [5, 6]. Two components of threat appraisal - severity of the risk (e.g., "*If I got caught in a rip, it is likely I would need to be rescued*") and vulnerability (e.g., "*I think I am at higher risk of drowning than other people*") were included.

Two components of coping appraisal - response efficacy (e.g., "*I never swim out of my depth when swimming at the beach*") and self-efficacy (e.g., "*I could help someone in difficulty while swimming at the beach*") were included. Each of the four risk cognitions included three items, with a 5-point rating scale from *strongly agree* = 1 to *strongly disagree* = 5. Socio-demographic characteristics assessed included gender, age (15–19 years, 20–29 years, 30–44 years, 45+ years), self-identified ethnicity (New Zealand European, Maori, Pacific Islands, Asian, and "other" ethnic groups), and

length of residency (<1 year, 1-4 years, 5-9 years, >10 years).

2.2. Data Analysis

All data was entered into SPSS (Version 23, Armonk, NY, USA) for statistical analysis. Frequency tables using numbers and percentages were generated to report on respondent’s self-estimated swimming and rescue competencies, open water experience, and previous training. Measures of central tendency used to measure continuous data (such as the 0-100 scales) included means, medians and standard deviation. For binary data, chi-square tests were used to determine the associations among dependent variables (such as rescue knowledge and self-reported competencies) and independent variables (such as sex, age, and ethnicity). To test the relationship between perceived swimming competency and risk cognitions, self-estimates of competency were dichotomised into good/very good swimmers and weak/non swimmers. Confidence in rescue capacity was also dichotomised into confident/very confident rescuer and anxious/very anxious rescuer to test the relationship between perceived rescue competence and risk of drowning cognitions.

3. RESULTS

Table 1 shows the demographic characteristics of the sample group (n = 174) that completed the questionnaire prior to the commencing the water safety program. Most were females (77%) and most were aged between 30-44 years. One third of the respondents (33%) had lived in New Zealand for less than 10 years, 50% of the sample self-identified as European, 18% as Maori, 12% Pacific Island people, 17% Asian and 2% as being from ‘other’ ethnic groups.

Table 1. Demographic Characteristics of Respondents.

Demographic Characteristic		n	%
Gender	Male	40	23%
	Female	134	77%
Ethnicity	European	87	50%
	Maori	31	18%
	Pasifika	20	12%
	Asian	30	17%
	Other	6	2%
Age group	15-29 years	34	20%
	30-44 years	117	67%
	45+ years	23	13%
Length of residency	<4 years	27	16%
	5-9 years	29	17%
	>10 years	118	68%
		174	100%

3.1. Estimated Swimming Competency

Table 2 shows respondents’ estimations of their swimming competency and swimming history. Most reported that they could swim (87%), and, of these, many considered themselves to be *good/very good* swimmers (64%), even though when asked how far they could swim, one half (50%) thought they could up to 25m only. Less than half (49%) reported having swum that distance in open water (where most bystander rescues take place), and, of these, 40% had done so in the previous year.

Table 2. Perceived water competency and open water experience.

		N	%
Can You swim?	Yes	151	87%
	No	23	13%
How well?	Poor	8	5%
	Fair	48	31%
	Good	63	41%
	Very Good	34	22%

(Table 2) contd....

		N	%
How far?	<25m	77	50%
	25-50m	32	21%
	51-100m	27	18%
	101-200m	6	4%
	>200m	12	8%
Swum in open water	Yes	85	49%
	No	89	51%
If yes, When?	In the last year	34	40%
	In the last 5 years	27	32%
	In the last 10 years	24	28%
		174	100%

No significant differences were evident when estimates of swimming competency, open water swimming experience, and recency of swimming activity were analyzed by gender, or age. Though not significantly different, those of Asian ethnicity or of recent residency (<5 years) were less likely to have recently swum in open water.

3.3. Estimated Rescue Competency

When asked about any previous instruction in lifesaving or rescue techniques, most (71%) had never received any instruction and, of those who had received instruction (n= 50, 29%), one half (50%) had done so more than 10 years previously. No significant differences were evident in respondents reporting of previous lifesaving tuition when analyzed by gender or age but significantly fewer Asian than non-Asian respondents (Asian 9%, non-Asian 35%) had received instruction ($\chi^2 = 16.482 (1), p = <0.001$). When asked about any previous instruction in cardiopulmonary resuscitation (CPR), two thirds of respondents (68%) reported that they had received training, and, of these, most had been taught CPR in conjunction with first aid courses (72%) and most had received that instruction in the past five years (65%).

When asked about how they felt about helping someone in trouble in the water, most (65%) expressed anxiety in their ability to perform a rescue. Significantly more males (males 68%, females 25%) were confident about their rescue ability in open water ($\chi^2 = 48.580 (3), p = <0.001$). Significantly fewer Asian respondents (Asian 17%, non-Asian 40%) expressed confidence in their ability to perform a rescue ($\chi^2 = 19.641 (3), p = <0.001$). In addition, significantly fewer Asian respondents (Asian 55%, non-Asian 74%) had received CPR instruction ($\chi^2 = 8.242 (3), p = .004$). Significantly more respondents of recent residency (<10 years) than long-term residents (>10 years 73%, <10 years 61%) were anxious about their rescue competence ($\chi^2 = 14.196 (3), p = .003$).

3.4. Perceptions of Risk of Drowning

Participants were asked to respond to 12 water safety statements on their perceptions of drowning based on the severity of the risk, their vulnerability to the risk of drowning, the efficacy of preventive actions and on self-efficacy of their preventive actions (Table 3).

Table 3. Risk perceptions of caregivers/parents.

		Agree/strongly agree	Disagree/strongly disagree	Unsure
1	If I got caught in a rip, it is likely I would need to be rescued	72 41%	58 33%	44 25%
2	If I was in deep water and got tired I would be in danger of drowning	42 24%	46 26%	86 49%
3	If I went for a swim outside of the flags it would not be dangerous	41 24%	90 52%	43 25%
4	I think I am at higher risk of drowning than other people	49 28%	32 18%	93 53%
5	My lack of swimming experience puts me at risk in open water	97 56%	36 21%	41 24%
6	I often feel unsafe swimming when conditions are rough	81 47%	63 36%	30 17%
7	I never swim out of my depth when swimming at the beach	102 59%	45 26%	27 16%

(Table 3) contd.....

		Agree/strongly agree	Disagree/strongly disagree	Unsure
8	At a surf beach, if I swim between the patrol flags I will be safe.	99 57%	35 20%	40 23%
9	If I swim with other people I am in less danger of drowning	99 57%	53 31%	22 13%
10	I can identify dangerous swimming places at the beach	97 56%	50 29%	27 16%
11	I could get myself out of a difficult situation when swimming at a beach	78 45%	67 37%	29 17%
12	I could help someone in difficulty while swimming at the beach	47 27%	40 23%	87 50%

Table 3 shows that when commenting on the severity of the risk of drowning (statements 1-3), almost one half (41%) agreed that they would need rescuing if caught in a rip, and one quarter (24%) would be in danger of drowning if they got tired in deep water. One half (52%) disagreed with the statement that it would not be dangerous if they swam outside the patrol flags. In terms of their vulnerability to drowning (statements 4-6), most people (53%) were unsure as to whether they were at greater risk of drowning than others, most (56%) considered that their poor swimming competency made them vulnerable to the risk of drowning, and most (47%) felt unsafe in rough conditions.

In terms of coping appraisal and their perceptions of the efficacy of preventive actions (statements 7-9), most agreed that they never swam out of their depth (59%), that they would be safe if they swam between the patrol flags (57%), and that they would be safe if they swam with others (57%). In terms of self-efficacy (statements 10-12), more than one half (56%) of respondents thought they could identify dangerous places to swim at a beach, almost half (45%) could get themselves out of difficulty at a beach, and one quarter (27%) thought that they could help others in difficulty. In the latter risk perception, one half (50%) were unsure about whether they could assist someone in difficulty.

When analyzed by gender, significant differences were evident in both aspects of risk appraisal. In terms of severity of the risk, more females than males (females 47%, males 23%) thought they would need rescuing if caught in a rip ($\chi^2(1) = 8.903, p = .012$), and more females (females 27%, males 15%) thought they would drown if tired in deep water ($\chi^2(1) = 21.791, p < .001$). In addition, significantly more females than males (females 57%, males 35%) were likely to disagree that swimming outside patrol flags at a lifeguarded surf beach was not dangerous ($\chi^2(1) = 7.766, p = .021$).

Significant differences were found in two of the three perceptions of participants' vulnerability to the risk of drowning. More females than males (females 60%, males 43%) agreed that their lack of swimming experience made them more vulnerable to risk of drowning ($\chi^2(1) = 6.801, p = .033$) and more (females 52%, males 30%) felt unsafe when conditions were rough ($\chi^2(1) = 6.867, p = .032$). No significant differences in risk appraisal were found by age, but, when analyzed by ethnicity, significantly more Asian than non-Asian (Asian 78%, non-Asian respondents 50%) thought their lack of swimming experience made them more vulnerable to risk of drowning, more (Asian 61%, non-Asian respondents 20%) considered themselves to be at greater risk of drowning than others, and more (Asian 72%, non-Asian respondents 37%) felt unsafe in rough conditions.

When coping appraisals - efficacy of preventive actions and self-efficacy - were analyzed by gender, significant differences were again evident. More females (females 64%, males 40%) agreed that never swimming out of your depth at a beach was preventative ($\chi^2(1) = 12.780, p = .002$), and more females (females 58%, males 52%) considered that swimming between patrol flags meant safety ($\chi^2(1) = 8.383, p = .015$). Similar proportions of males (55%) and females (58%) thought swimming with others an effective preventative measure.

Males were more likely to report confidence in the self-efficacy of their preventive actions. Significantly more males (56%) than females (29%) thought they could identify dangers at the beach ($\chi^2(1) = 13.434, p = .001$) and more males (males 45%, females 37%) thought that they could get themselves out of difficulty when swimming at the beach ($\chi^2(1) = 26.029, p < .001$). More males (males 68%, females 15%) also thought they could help someone in difficulty in the water ($\chi^2(1) = 43.937, p < .001$). No other significant differences were found in coping appraisal perceptions when analyzed by age and length of residency but significant differences were evident when self-efficacy was analyzed by ethnicity. Fewer Asian than non-Asian respondents agreed that they could identify dangerous places to swim (Asian 47%, non-Asian respondents 58%), and fewer thought they could get themselves out of difficulty (Asian 33%, non-Asian respondents 48%), yet more thought that they could help someone in difficulty in the water (Asian 44%, non-Asian respondents 23%).

When risk cognitions were analyzed by self-estimated swimming competency, significant differences were evident in risk appraisal. Lesser able swimmers were more likely to perceive greater severity of the risk of drowning (poor swimmers 53%, good swimmers 30%) ($\chi^2(2) = 13.505, p = .001$), and were more likely to perceive greater vulnerability to that risk. More considered themselves at greater risk than others (poor swimmers 48%, good swimmers 12%) ($\chi^2(2) = 30.871, p < 0.001$), more thought their lack of swimming experience put them at risk (poor swimmers 65%, good swimmers 47%) ($\chi^2(2) = 8.886, p = .050$), and more felt unsafe in rough water (poor swimmers 61%, good swimmers 35%) ($\chi^2(2) = 13.081, p = .001$).

When coping appraisal was analyzed by self-estimated swimming competency, no significant differences were found in responses related the efficacy of preventive actions. Significant differences were evident in perceptions of self-efficacy of preventive actions. Able swimmers were more likely to be able to identify dangerous places to swim (good swimmers 67%, poor swimmers 41%) ($\chi^2(2) = 17.573, p < 0.001$), more likely to think they could get themselves out of difficulty in open water (good swimmers 59%, poor swimmers 27%) ($\chi^2(2) = 22.386, p < 0.001$), and more likely to think they could help someone in trouble in the water (good swimmers 46%, poor swimmers 28%) ($\chi^2(2) = 11.063, p = .005$).

When risk appraisal cognitions were analyzed by confidence in rescue ability, a pattern of heightened sense of vulnerability for those anxious about their rescue competency was evident. More respondents anxious about their rescue competence felt they were at greater risk of drowning than others (confident rescuer 35%, anxious rescuer 15%) ($\chi^2(2) = 8.363, p = .015$), thought their lack of swimming experience placed them at greater risk (confident rescuer 31%, anxious rescuer 69%) ($\chi^2(2) = 24.321, p < 0.001$), and more felt unsafe in rough conditions (confident rescuer 30%, anxious rescuer 56%) ($\chi^2(2) = 14.651, p < 0.001$). When coping appraisal cognitions were analyzed by rescue confidence, more respondents who were confident in their rescue capacity thought they could identify dangerous places (confident rescuer 82%, anxious rescuer 42%) ($\chi^2(2) = 27.040, p < 0.001$), could get themselves out of difficulty (confident rescuer 77%, anxious rescuer 27%) ($\chi^2(2) = 39.758, p < 0.001$), and more thought they could help someone in trouble in the water (confident rescuer 40%, anxious rescuer 20%) ($\chi^2(2) = 12.3870, p = .002$).

4. DISCUSSION

In this study of adult caregivers enrolled in a family-oriented water safety program, we utilized the constructs within PMT to assess the associations between the perceptions of the risk of drowning and various demographic variables and water-related competencies. We asked participants to report on their estimated swimming competency, their experience in open water, and their level of lifesaving instruction. With these background factors underpinning engagement in aquatic activity, we assessed differences in risk appraisal (vulnerability, severity) and coping appraisal (response efficacy and self-efficacy) in response to the risks associated with aquatic activity by gender, age, ethnic group, and length of residency.

Based upon the risk and coping appraisal mechanisms that inform protection motivation theory and lead to adaptive safety responses, it was found that females, Asian ethnicities and lesser able swimmers have a heightened sense of the risk of drowning, and consequently are more likely to practise safer behaviours in open water environments. Consistent differences were evident between males and females with regard to their appraisal of risk, with females more likely to perceive greater severity of the risk of drowning and greater personal vulnerability to that risk. Similar gender differences were reported in a study of New Zealand beachgoers where females also perceived greater severity and vulnerability regarding their risk of drowning [8]. Males however perceived lower risk of drowning with respect to both the severity of the threat of drowning and their vulnerability to that threat. Given that males account for 80% of the drowning statistics in New Zealand [7] and other developed countries [16], the accuracy of male risk appraisal processes remains questionable. Similar findings and concerns about male underestimation of risk have been expressed in previous studies of adults [17], of boat users [18], of new settlers [19], of youth [20], and of rock-based fishers [5, 6].

In terms of coping appraisals, females were more likely than males to identify the efficacy of protective actions such as never swimming out of your depth at a beach (females 64%, males 40%) and swimming between patrol flags (females 58%, males 52%). Males however, reported higher scores in self-efficacy compared to females by perceiving that they could identify dangers at the beach (males 59%, females 29%), and could get themselves out of difficulty when swimming at the beach (males 45%, females 37%). Whether this capacity is real or illusory requires further investigation, but it is consistent with findings of other drowning prevention studies that reported male overestimation of ability [5, 6, 8, 20 - 22].

With respect to rescuing others, more males also thought they could help someone in difficulty in the water (males 68%, females 15%) even though they had received no more instruction than their female counterparts. The lack of swimming competency as measured by the estimated distance swum, the lack of recency of having swum that distance, and the infrequency of having done the distance in open water (reported in Table 2) suggest that male preparedness for the task of in-water retrieval in an open water environment may be illusory. This latter finding concurs with those of a previous study on bystander readiness to rescue which found that males may be at greater risk of drowning as would-be rescuers because of their confidence (rather than competence) in being able to perform a rescue or extricate themselves from trouble without assistance [17, 23].

5. LIMITATIONS

Results from this study should be treated with some caution in light of several methodological limitations. First, the data were obtained from a convenience sample of parents/caregivers attending family-oriented water safety lessons, consequently the sample population varied from the national population demographics with more females (73%) taking part in the study. Given the tendency for females to be risk averse, further study with greater male representation may shed further light on male drowning risk cognition reported here. Second, it is possible that, since respondents were enrolled in a water safety program, the participants were already sensitive to the need for water safety and may thus have given socialised responses. Third, self-estimation of swimming and rescue competence, even though often used in studies on water safety, can result in measurement error and might not accurately express true competence [24 - 26]. Fourth, the sample group was relatively homogenous in term of age, so no significant differences in risk cognitions were identified by age. Further research with a more representative cross section of age groups is recommended. Finally, given the cross sectional nature of the study, the associations observed in this study cannot be assumed to be either causal of safe or unsafe aquatic activity but only relational. These limitations notwithstanding, the findings do provide evidence of considerable differences in risk and coping appraisal mechanisms and the explanatory power of PMT in the context of drowning prevention.

CONCLUSION

Male underestimation of risk and overestimation of ability to cope with that risk have been the subject of recent research attention. The present study has used PMT to explore risk and coping appraisal processes that help explain why these characteristics offer strong explanatory power of the predominance of males and minority groups in drowning statistics in developed countries. Males and non-Asian respondents in this study perceived lower risk of drowning in open water environments, and males, in particular, were more confident of the self-efficacy of their actions in coping with the risk of drowning. Further research is required to corroborate these findings among other sectors of society, especially among those charged with supervision of planned water activity or where unintentional immersion in water is possible in non- recreational setting. Some evidence suggests that parents/caregiver vary not only in the perception of personal risk of drowning as reported here but also in their perception of risk to others in their care [27]. Further research on drowning risk perception of those supervising others around water is recommended. In light of the evidence presented in this and other corroborating studies, it is recommended that water safety educational interventions include an awareness of risk appraisal and coping appraisal so as to instil more realistic perspectives on the risk of drowning and its prevention.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The study was approved by the University of Auckland Human Participants Ethics Committee (AUHPEC) case number 10065.

HUMAN AND ANIMAL RIGHTS

Participants who took part in the survey volunteered their time and energy and gave written permission for the results of the study to be made public with the standard provisos of anonymity and due care.

CONSENT FOR PUBLICATION

The authors give consent for the publication of the manuscript.

CONFLICT OF INTEREST

No funding implications or financial contributions associated with this study. There are no conflicts of interest for

the authors in the submission of this manuscript.

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