International Journal of Aquatic Research and Education

Volume 13 | Number 2 Article 4

2-15-2021

Getting In: Safe Water Entry Competencies

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Recommended Citation

Moran, Kevin Dr; Blitvich, Jennifer; Petrass, Lauren; and McElroy, Keith (2021) "Getting In: Safe Water Entry Competencies," *International Journal of Aquatic Research and Education*: Vol. 13 : No. 2 , Article 4.
DOI: https://doi.org/10.25035/ijare.13.02.04
Available at: https://scholarworks.bgsu.edu/ijare/vol13/iss2/4

Abstract

In high income countries, jumping and diving into water are a small but persistent cause of death and serious injury especially among male youth and young adults. Although water entries maintain a high media profile, little is known about what entry competencies and underlying water safety knowledge youth bring to this practice. Undergraduates enrolled in aquatics (*N*= 76) completed a survey before attempting 7 entry jumping and diving tasks. While safety attitudes and self-reported behaviours were generally good, considerable variation in practical entry competence was evident. Most completed a deep-water compact jump (87%) and PFD jump (88%) with ease. Many completed a crouch dive (57%) and standing dive (53%) into deep water with ease, but only 33% completed a standing dive from a block/bulkhead (<1m height) with ease. Ways of addressing weaknesses in knowledge, attitudes, and behaviours are discussed and recommendations made to enhance the teaching of safe water entry.

Keywords: water competency, drowning prevention, water safety education, jumping, diving

Introduction

In high income countries, jumping and head-first dive entries into water (referred to as diving within this manuscript) are a small but persistent cause of death and serious injury associated with recreational activity. In the 10 years from 2009-2018, 15 fatal incidents from jumping/diving into water were reported in New Zealand (Water Safety New Zealand, 2019). Of these, all victims were male, and most were aged between 15-24 years (60%). Many drowning incidents occurred in river locations (67%), and were the consequence of jumping in (87%). In Australia, 'jumping in' accounted for 4% of the 291 drowning deaths in 2017 (Royal Life Saving Society-Australia, 2017). In the UK from 2006-2010, jumping off high cliffs and other structures into water (commonly referred to as tombstoning in the UK) resulted in 139 incidents requiring an emergency response, with 14 resulting fatalities and many more causing spinal cord and limb injuries (Wills & Dawes, 2011). A study on diving-related admissions to US emergency departments (EDs) from 2002-2014 reported 83,000 cases (mainly young adult males) accruing charges approaching US$620 million (Tadros et al., 2018).

Although water entry incidents have a high-profile media reporting, little is known of the water safety knowledge, perceptions, and practices of young adults when entering water. Much of the literature on water entry has focussed on the mortality and morbidity related to unsafe behaviours and practices in order to identify high risk groups and make recommendations to prevent future harm. One of the most frequently reviewed catastrophic outcomes of headfirst (dive) entries is spinal cord injury (SCI). Diving has been identified as the most frequent sporting activity related to SCI (Hartung et al., 1990; Katoh et al., 1996; Schmitt & Gerner, 2001). Several studies have focussed on diving injuries in swimming pools (DeVivo & Sekar, 1997; Tadros et al., 2018). In open water environments, entering the water from a pier or dock, diving headfirst, not having checked water depth, and being unfamiliar with location have been identified as risk factors (Branche et al., 1991). Alcohol consumption has also been identified as a risk factor associated with entering the water during aquatic recreation (Aito et al., 2005; Blitvich et al., 1999; Herman & Sonntag, 1991). Biomechanical analysis of unsafe techniques has resulted in clear recommendations with regard to head-first entry (Blanksby et al., 1997; Blitvich et al., 1999) and evidence-based specific techniques for teaching enhanced dive entry safety have been developed and published (Blitvich et al., 2000).

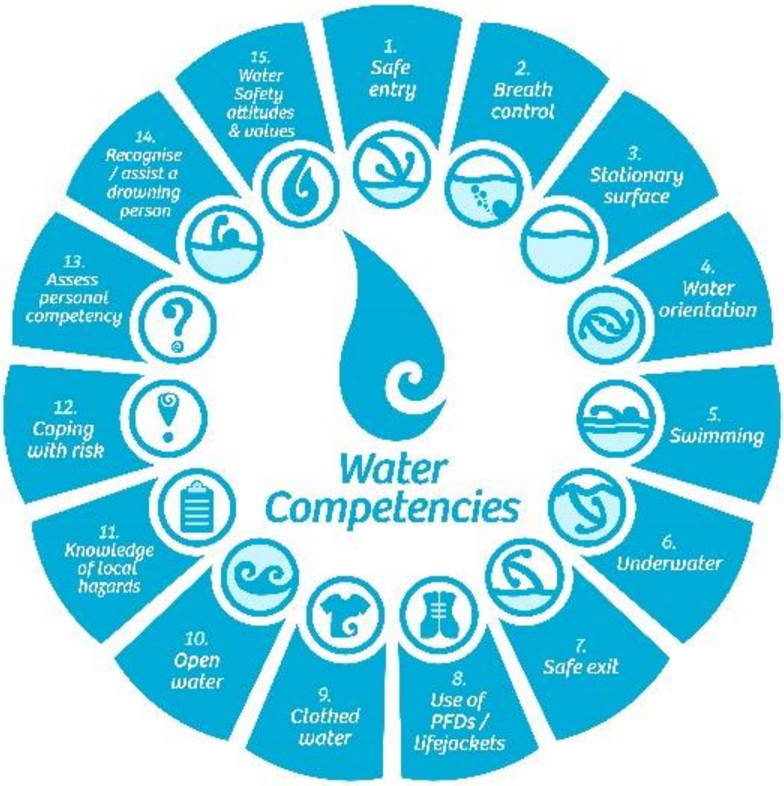
Other studies have shown that youth and young adult males are most likely to engage in high-risk entries from height (Moran, 2014a) and to adopt unsafe entry behaviours (Moran, 2008; 2011). As a way of promoting safe entry learning and teaching, Langendorfer (2010) suggested the use of a dynamical constraints model to help focus attention on the constraints associated with the person-task-environment triad that influence entry risk and safety.

Following a review of available research evidence, Stallman and colleagues (2017) included safe entry competence as one of 15 essential elements of water competency required to prevent drowning. They noted that further research was required on the teaching of safe entry competence especially among high-risk groups such as male youth and adolescents. They concluded that future inquiry focus on what is taught, the nature and extent of safe entry competencies, and the associated knowledge, attitudes, and behaviours that inform current practice.

In keeping with the promotion of the concept of water competency (see Figure 1), the authors established a foundational project entitled the *Can You Swim? Study* that focussed on real and perceived swimming and floating competence (Moran et al. 2012; Petrass et al., 2012). Further research focussed on other essential competencies including: swimming and floating competence in open water simulation (Kjendlie et al., 2013; Kjendlie et al., 2018); swimming and floating competence in clothing (Moran, 2014b; 2015; Rejman et al., 2020); safe exit competence (Moran, 2014c); stationary surface competence (Moran, 2019a), and lifejacket competence (Moran, 2019b). Rescue competence has also been studied in an effort to promote safe practice of bystanders in an emergency situation (Pearn & Franklin, 2009, 2012; Moran & Stanley, 2013; Moran et al., 2016; Petrass & Blitvich, 2018), and a 12-week water safety intervention was conducted and evaluated to provide evidence of the effectiveness of such an approach for improving water safety competencies (Petrass & Blitvich, 2014).

DOI: https://doi.org/10.25035/ijare.13.02.04

Figure 1
Components of water competence (after Stallman, et al., 2017)



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Consequently, the purpose of the study was to explore safe water entry competence to ascertain:

1. Safety perceptions and practices of young adults getting into the water;
2. Actual water entry competencies of young adults, with a specific focus on feet first and headfirst entry; and
3. Water entry knowledge, attitudes, and behaviours of young adults.

Method

A cross sectional study was undertaken in the summer term of 2016 at the University of Auckland, New Zealand and Federation University Australia, Victoria. Ethics clearance for the study was obtained from both the Federation University Australia Human Research Ethics Committee (*Project No: A16-007)* and the University of Auckland Human Participants Ethics Committee (UAHPEC) as an extension of the *Can You Swim? Study* (Case number 010667).

Participants

Undergraduate students enrolled in Bachelor of Health and Physical Education or Bachelor of Exercise and Sports Science degrees that included an aquatics education course as part of their studies were invited to participate. Most enrollees in such programs were active in sport and recreation and were likely to have previous exposure to aquatic activities. Students reporting any medical or physical disability likely to impact on performance or safety were excluded from the study. Participants who did not complete any part of the practical activity but had completed the written questionnaire were withdrawn from the final analysis.

Procedures

All participants who agreed to take part in the study completed an initial questionnaire prior to the commencement of the pool-based activities. Practical testing took place during normal timetabled classes and was completed over 3 weeks during the summer term (March–April 2016).

Research Instruments

Self-Report Questionnaire

Prior to engaging in the pool-based activities, students were asked to complete a questionnaire that consisted of 15 close-ended questions designed to be completed in 15 minutes. To reduce the possibility of response bias, participants were not told that some of the survey questions related directly to the practical tasks they would complete during their aquatics program. Data were collected based on the original *Can You Swim? Study* (Moran et al., 2012). The questionnaire sought information on sociodemographic characteristics including age and gender. Self-estimates of swimming competence included the use of a four-point scale of *high, good, low,* or *no competence,* and an estimate of how far participants thought they could swim nonstop in a pool. A three-part question sought information on their perceived capacity to jump feet first and dive headfirst from the poolside and dive from 3m height into the pool.

In addition to seeking information on their self-reported perceptions of water competence, participants were asked to report on whether they had been taught how to enter the water safely, whether they had ever injured themselves when entering the water, and whether they had ever pushed someone into the water without prior warning. Three multiple part questions that determined the knowledge, attitudes, and behaviours that informed their understanding of safety when entering the water were also included. A true/false question consisting of 6 statements was included to test their knowledge of safe entry techniques (for example, *lift head before entering water*). To ascertain their attitudes towards safe entry, a seven-part question asked whether they agreed or disagreed with statements related to safe entry (for example, *diving into shallow water is okay if you know how to dive*). A 10-part question with 4 frequency categories (*never*, *once or twice*, *often* and *very often*) was used to obtain self-reported entry behaviours (for example, *have you ever dived into water after drinking alcohol?*).

DOI: https://doi.org/10.25035/ijare.13.02.04

Practical Tests of Safe Water Entry

The practical component of the study consisted of a series of seven entry activities with increasing levels of difficulty that included: a feet first jump into shallow water (1m); a compact jump into deep water (2m) wearing a PFD; a compact jump into deep water; a stride entry into deep water; a crouch dive into deep water; a standing dive into deep water, and a standing dive from height (<1m) into deep water (see Table 1 for further details). Participants who could not complete any task or considered themselves at risk of injury informed the assessor of their wish to withdraw from that task.

Table 1

Practical entry tests and brief descriptors

Level	Title	Brief Descriptors
1	Jump into shallow water	Chest depth water with full submersion
2	Compact jump into deep water (PFD)	Full submersion
3	Compact jump into deep water	Overhead depth, full submersion
4	Stride entry into deep water	Head kept above water on entry
5	Crouch dive into deep water	Hips higher than head on entry
6	Standing dive into deep water	Flush poolside < 200mm height
7	Standing dive from height into deep water	Entry point >400mm height

All entries were executed into the deep end of the pool except the shallow water jump. The authors were the sole assessors and participants were allowed two attempts at each task with the highest score recorded. All entries took place from the poolside apart from the last dive entry that was executed from a bulkhead or starting block. All entries were scored on a 6-point scale ranging from 1-2 = achieved with difficulty, 3-5 = achieved with ease, with 6 = did not complete. Scores were dichotomised for ease of interpretation to *achieved with ease* or *achieved with difficulty/not completed.*

Data Gathering and Analysis

All data were double-entered and cleaned in Microsoft Excel and then transferred to SPSS (Version 24, Armonk, NY, USA) for statistical analysis. Descriptive statistics were reported via numbers and percentages. Measures of central tendency included mean (*M*), median (*Mdn*), and standard deviation (*SD*). Chi-square tests of independence were used to determine relationships between independent (such as age and gender) and dependent variables (such as practical entry score).

Results

Self-Report Questionnaire Responses

The participants (n = 76) were young adults with most aged between 17–20 years (67%) and slightly more than half were male (55%, n = 42). Most (78%) self-reported their water competency as good (50%) or high (28%), with significantly more females (44%) than males (14%) self-reporting high swimming competence ($\chi 2$ = 9.757 (3), p = 0.021). When asked to estimate how far they could swim without stopping, almost one third (30%) estimated they could swim less than 50m, one quarter (25%) thought they could swim 200 m, and almost one third (32%) estimated they could swim 400 m (20%) or more (12%).

The majority of participants (80%) reported that they had been taught to enter the water safely, with primary school the most frequently cited source of instruction (56%), followed by private lessons (25%), high schools (12%), family (5%), and self-taught or others (3%). No significant differences were evident when analysed by age or gender, although quantitatively more males (24%) than females (15%) reported having never been taught safe entry.

Most participants reported that they had never hurt themselves getting into the water (82%). Of those who had, the injury had occurred mainly to the abdomen (50%), followed by back injury (29%), head injury (14%), and lower body (7%). No significant differences were evident between age and gender regarding whether they had ever experienced injury because of an unsafe entry.

In response to the question asking had they ever pushed someone into the water without the person knowing they were going to, more than half (60%) reported they had done so. Significantly more males (71%) than females (47%) reported that they had pushed someone into the water ($\chi 2$ = 4.272 (1), p = 0.039).

Participants were asked to describe how competent they felt about performing three entry tasks, jumping feet first into a swimming pool; diving headfirst into a pool, and diving in from a height of 3m (Table 2). Most participants (88%) considered that they could easily jump feet first from the poolside while 8% thought that they could not jump in. Fewer thought they could easily dive in headfirst (68%), almost one third (29%) thought they could do so with difficulty and, of these, some reported not being able to enter the water headfirst (16%). Less than half considered they could easily enter the water headfirst from a height of 3m (43%), 41% thought they could do it with difficulty and, of these, almost one third (29%) thought they could not dive in headfirst from that height.

DOI: https://doi.org/10.25035/ijare.13.02.04

Table 2
Self-estimates of entry competency by gender

Self-estimated competency	Total		Male		Female	
	n	%	*n*	%	*n*	%
How would you describe your ability to jump feet first into deep-end of pool?						
Complete with ease	67	88%	38	90%	29	85%
Complete with difficulty/ Can't jump in	7	9%	2	5%	5	15%
Don't know	2	3%	2	5%	-	-
How would you describe your ability to dive headfirst into deep end from poolside?						
Complete with ease	52	68%	29	69%	23	68%
Complete with difficulty/Can't dive	22	29%	11	26%	11	32%
Don't know	2	3%	2	5%	-	-
How would you describe your ability to dive headfirst into deep end from 3m height?						
Complete with ease	33	43%	21	50%	12	35%
Complete with difficulty/Can't dive	31	41%	14	33%	17	50%
Don't know	12	16%	7	17%	5	15%

No significant differences were evident when self-estimations were analysed by age or gender, although females were less likely descriptively than males to report being able to easily perform the entry competencies (i.e., jump entry females 85%, males 91%; dive entry from poolside females 67%, males 69%, and dive entry from 3m females 35%, males 50%).

Practical Tests of Safe Entry

Most participants completed the shallow water jump (96%), PFD compact entry (88%), and the deep-water compact entry (87%) with ease; less than half (45%) completed the stride entry with ease (Table 3). More than half of the group completed the crouch dive (57%) and standing dive into deep water (53%) with ease, but only one third (33%) could complete the standing dive from the block/bulkhead (<1m height) with ease.

No significant differences were found when practical entry tests were analysed by age, gender or having previously been taught safe water entry. When entries were analysed by estimates of self-reported competency, in each instance those with higher self-reported competency were significantly more likely to complete the tasks with ease: stride entry ($\chi 2$ = 42.489 (1), p = 0.016), the crouch dive ($\chi 2$ = 41.505 (1), p = 0.020), the standing dive ($\chi 2$ = 36.867 (1), p = 0.049), and the standing dive from height ($\chi 2$ = 40.929 (1), p = 0.023).

Table 3
Practical entry tests by gender

	Completed with ease			**Completed with difficulty/ Did not complete**		
	Total *n (%)*	**Male** *n (%)*	**Female** *n (%)*	**Total** *n (%)*	**Male** *n (%)*	**Female** *n (%)*
Shallow water jump	73 (96%)	40 (95%)	33 (97%)	3 (4%)	2 (5%)	1 (3%)
Compact jump into deep water with PFD	67 (88%)	36 (86%)	31 (91%)	9 (12%)	6 (14%)	3 (9%)
Compact jump into deep water	66 (87%)	35 (83%)	31 (91%)	10 (13%)	7 (17%)	3 (9%)
Stride entry	34 (45%)	19 (45%)	15 (44%)	42 (55%)	23 (55%)	19 (56%)
Crouch dive	43 (57%)	24 (57%)	19 (56%)	33 (43%)	18 (43%)	15 (44%)
Standing dive	40 (53%)	22 (52%)	18 (53%)	36 (47%)	20 (48%)	16 (47%)
Block/bulkhead dive	25 (33%)	14 (33%)	11 (32%)	51 (67%)	28 (67%)	23 (68%)

Knowledge of Safe Entry Technique
Most participants were able to identify correct and incorrect techniques related to safe entry (Table 4). Some significant differences in knowledge of safe entry technique were evident when analysed by gender but not by age. Significantly more females (97%) than males (74%) correctly identified the correct responses relating to placement of the chin onto chest ($\chi 2$ = 7.638 (1), p = 0.006), and more females (94%) than males (78%) identified the incorrect technique of lifting the head before entering the water ($\chi 2$ = 3.835 (1), p = 0.050).

While the remaining responses were not significantly different, descriptively more males (17%) than females (6%) incorrectly responded on palm down placement of the hands, pulling arms back to start swimming on entry (males 28%, females 21%), steer downwards to make dive deeper (males 22%, females 18%), and leaning backwards and twisting to one side (males 13%, females 9%).

Table 4
Knowledge of entry technique by gender (Q10)

Technique	Total *n*	Total %	Male *n*	Male %	Female *n*	Female %
Tuck chin onto chest (correct technique)						
Correct response	64	84%	31	74%	33	97%
Incorrect response	12	16%	11	26%	1	3%
Place both hands together palm down (correct technique)*						
Correct response	66	88%	34	83%	32	94%
Incorrect response	9	12%	7	17%	2	6%
Lift head up before entering water (incorrect technique)*						
Correct response	64	85%	32	78%	32	94%
Incorrect response	11	15%	9	22%	2	6%
Pull arms back to start swimming straight away (incorrect technique)*						
Correct response	59	80%	29	73%	26	79%
Incorrect response	15	20%	11	27%	7	21%
Steer downwards to make dive deeper (incorrect technique)*						
Correct response	55	75%	32	78%	27	82%
Incorrect response	18	25%	9	22%	6	18%
Lean backwards and twist body to one side (incorrect technique)*						
Correct response	65	89%	35	88%	30	91%
Incorrect response	8	11%	5	12%	3	9%

Note. *Missing cases not included in calculations

Attitudes towards Safe Entry Practices

Table 5 shows whether participants agreed or disagreed with six statements relating to safe entry practices. Almost all students (>90%) agreed with the statements: ‘diving in without checking the depth can be dangerous’; never dive/jump in if you don’t know the depth of the water’, and ‘teaching water entries in schools is very necessary’.

Most (67%) also agreed that jumping in feet first was safer than diving in headfirst and disagreed that diving into shallow water was okay if you knew how to dive (82%). Most students (86%) disagreed that diving should be banned in public pools, but opinions were mixed on whether people should be allowed to jump from heights. No significant differences were evident when attitudes were analysed by age or gender with the exception of the statement relating to jumping from heights where significantly more males (66%) than females (38%) agreed that it was okay for people to jump in from height into water if they wanted to ($\chi 2$ = 5.807 (1), p = 0.016).

Table 5
Attitudes towards safe entry practices

	Agree		Disagree	
	n	**%**	***n***	**%**
Diving in without checking the water depth can be dangerous*	73	99%	1	1%
Never dive /jump in if you don't know the depth of the water*	69	93%	5	7%
Teaching water entries in schools is very necessary*	73	99%	1	1%
Diving into shallow water is okay if you know how to dive*	13	18%	61	82%
Diving should be banned in all public swimming pools*	10	14%	64	86%
If people want to jump from heights into water that's okay*	39	53%	34	47%
Jumping in is safer than diving*	49	67%	24	33%

Note. * missing cases not included in calculations

Self-reported Behaviours Related to Safe Entry

About two thirds of respondents reported that they *never* dived headfirst into water of unknown depth (68%), and *never* dived in after drinking alcohol (62%) (Table 6). Slightly more than half indicated that they *never* dived headfirst into shallow water (57%); *never* dived in from a height greater than 5m (56%) or jumped in from a height greater than 10m (55%). Jumping in became more prevalent as the jump height decreased (64% had *jumped once or twice,* or *often/very often* from a height of 6-10m, while 91% reported jumping in from a height of 1-5m *once or twice,* or *often/very often*). Half (50%) reported *often/very often* diving into water from a height of 1-5m, and 29% said they did this *once or twice*. More than half of participants (57%) reported that they *often/very often* ran into the water and dived headfirst when at the beach, while 28% did this *once* or *twice.* One third (32%) reported that they *never* dived into water in the dark or at night.

When analysed by gender, males were more likely than females to have engaged in any of the risky water entry behaviours. Significantly fewer males (57%) than females (82%) had *never* dived into water of unknown depth ($\chi2$ = 5.623 (2), p = 0.050) and had *never* dived into water after consuming alcohol (males 50%, females 77%) ($\chi2$ = 6.239 (2), p = 0.044). Although not statistically significant ($p > 0.05$), descriptively more males had *often/very often* dived into water at night or in the dark (males 19%, females 9%), jumped in from a height greater than 10m (males 14%, females 9%), run and dived headfirst into the water at the beach (males 62%, females 50%) and jumped from a height greater than 6m (males 77%, females 53%).

Table 6
Self-reported behaviours related to safe entry

	Never *n (%)*	Once or twice *n (%)*	Often/Very often *n (%)*
Dived headfirst into water of unknown depth	52 (68%)	21 (28%)	3 (4%)
Dived headfirst into water you knew was shallow	43 (57%)	30 (39%)	3 (4%)
Run and dived into the water at the beach	12 (16%)	21 (28%)	43 (57%)
Dived into any water after drinking alcohol	47 (62%)	22 (29%)	7 (9%)
Dived into water in the dark or at night	24 (32%)	41 (54%)	11 (14%)
Dived into water from a height 1-5m	16 (21%)	22 (29%)	38 (50%)
Dived into water from a height > 5m*	42 (56%)	20 (27%)	13 (17%)
Jumped into water from a height of 1-5m	7 (9%)	23 (30%)	46 (61%)
Jumped into water from 6-10m*	27 (36%)	18 (24%)	30 (40%)
Jumped into water from a height > 10m	42 (55%)	25 (33%)	9 (12%)

*Note.** missing cases not included in calculations

Discussion

The primary goal of this study was to explore the perceptions and practices of young adults in getting into the water safely using a range of entry techniques in shallow and deep water. Recording self-estimates of entry proficiency prior to the practical testing allowed for a comparison of real and perceived competency and thus an indication of their capacity to assess personal competency (See Figure 1, competency 13).

Safe entry is considered one of the fundamental elements of water competence (See Figure 1, competency 1). When asked to predict the ease or difficulty they might have in entering the water, most were confident in their capacity to jump feet first into the pool (88%) but fewer thought they would do this with ease when diving headfirst (68%), and fewer still (43%) thought they could dive from a height of 3 metres. When tested, however, significantly fewer participants (53%) were able to safely execute a standing dive from the poolside into deep water with ease and even fewer (33%) were able to safely complete a dive with ease from height (<1m).

This overestimation of competency is consistent with the findings of previous studies (for example, Moran et al., 2012; Petrass et al., 2012) although, perhaps surprisingly, no gender differences were evident. While other studies have found that, in comparison to females, males were more likely to overestimate a range of water competencies (for example, Gulliver & Begg, 2005; McCool et al., 2008; Moran, 2008, 2011, 2014c, 2015; Moran et al., 2012; Moran & Stanley, 2013; Rejman et al., 2020), for the water entry competencies in the current study, this was not the case. The inaccuracy in predicting personal competency is concerning given most participants considered they were proficient swimmers (78%) and most reported having been taught to enter the water safely (80%). We recommend that, in addition to being taught safe techniques of entering the water, water safety programs should simultaneously challenge students to: identify hazards associated with water entry (see Figure 1, competency 11); learn how to cope with the risks associated with those various hazards (see Figure 1, competency 12), and be taught how to assess their personal competency accurately (see Figure 1, competency 13).

A secondary goal of the study was to ascertain the knowledge, attitudes and behaviours that inform students' water entry practices (See Figure 1, competencies 11 and 15) and thus provide an indication of their capacity to identify hazards and cope with risks (See Figure 1, competencies 11 and 12). Results of the pre-test questionnaire suggested many students had a sound knowledge of safe entry techniques, with most (75–89%) being able to identify correct and incorrect entry techniques (Table 4). Most respondents also held mainly positive attitudes toward safe entry practice, especially with regards to acknowledging that diving without checking water depth can be dangerous and that you should never dive/jump into water of unknown depth. Previous studies involving school age youth reported males especially more likely to hold at-risk views on these practices (Moran 2008, 2011). Interestingly, most respondents disagreed (87%) that dive entries should be banned in public pools. Not surprisingly, significantly more males agreed that jumping into water from a height was acceptable (males 66%, females 38%), reinforcing findings of a previous study of *YouTube* videos (Moran, 2013).

The self-reported behaviours of participants when getting into the water suggest some risky practices are undertaken and many of these are gender specific (Table 6). The most frequent cause of aquatic spinal cord injury is headfirst entry into shallow water (Blanksby et al., 1997; Blitvich et al., 1999) and it is concerning that some young adults in our study had, at some time, dived headfirst into water of unknown depth (32%), dived into water known to be shallow (43%), or run and dived into the water at the beach (84%). Males were more likely than females to have engaged in risky behaviours, especially diving into shallow water as reported by Branche and colleagues (1991), and after alcohol use (Aito et al., 2005, Blitvich et al., 1999). Respondents in the present study reported that they had most frequently been taught safe entry techniques at primary school (56%); however, since the risky behaviours appeared prevalent in youth recreational activities, it would be prudent to engage adolescents at high schools in appropriate water entry education related to their socio-cultural background and in its social context. Furthermore, given the gender differences in attitudes and behaviours reported here, it is recommended that attempts to change male practices and mind-sets are a priority if water entry competence is to be improved.

Limitations

While the results of this study advance our understanding of the safe entry problem identified by previous research, several limitations merit consideration when planning further studies on safe entry competence and suggest caution when attempting to generalize the findings of this study to other situations and populations. First, the participants were not representative of the general population because, as students of physical education and sports sciences, their water competency and confidence were likely to be higher than the norm. Second, the sample size was relatively small, and the power of the findings requires further validation with larger and more diverse samples. Third, the tests of entry competence were developed specifically for this study and content validated by the authors in conjunction with peer expert advice and observations of students in a pilot test before the commencement of the study. Fourth, the entry activities took place in the confines of a pool and thus did not wholly reflect the demands of entering open water in a variety of more demanding environments such as cold water, slippery ledges, underwater obstacles, swift currents, waves, and darkness. Further studies involving different subpopulations (such as children and adolescents) and different environments (such as beaches, rocky foreshores, and rivers) will help address these limitations. Fifth, because the study was undertaken in two separate countries under time and funding constraints, it was not possible to tests inter-rater accuracy. Future studies involving the research instruments developed here should bear in mind inter-rater reliability in order to address this limitation. These limitations notwithstanding, the results of this study suggest that inaccurate perceptions and practice of safe entry into water continue to pose a serious risk of drowning and serious injury especially among male youth and young adults.

Conclusion

Given the shortcomings identified in this study on the perceptions and practices of safe entry into water by young adults, it would appear prudent to place greater emphasis on this aspect of water safety education. In addition, given the disparity between the preconceived ideas of personal competency of getting into the water and the actual entry tasks when tested, it would also seem prudent to promote teaching strategies that incorporate experience of simulated entry scenarios so that youth are forewarned about potential dangers and are able to more effectively manage the life-threatening challenges associated with getting into the water. Targeted interventions that focus on males, the risks of jumping or diving into water from a height, the dangers of peer pressure to engage in risky behavior, and linking actual personal competency with perceptions are recommended. Further research on the safe entry perceptions and practice of others who are less water competent is advised.

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