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Rock-Based Fishers' Perceptions and Practice of Water Safety

Kevin Moran

Fishing from rocky shorelines is one of New Zealand's most dangerous pastimes, with 63 fatalities from 1980 to 1995. Little is known about the characteristics of these fishers, their perceptions, and their water-safety practices. We selected four high-risk rock-based fishing locations on Auckland's west coast as sites to conduct a survey and safety campaign during the summer months of 2005–06. One third ($n = 81$, 32%) of fishers estimated that they could swim 25 m or less nonstop. Almost half ($n = 120$, 48%) had gone to the water's edge to retrieve a snagged line or engaged in other unsafe practices. Most agreed that wearing a buoyancy aid makes fishing a lot safer ($n = 177$, 71%), but almost three quarters ($n = 180$, 72%) admitted that they never wore one. The results indicated that many fishers have limited safety skills combined with an overly optimistic view of their survival skills. Based on our findings, we recommend widespread posting of fishing-safety messages along New Zealand's west coastline that emphasize the twin dangers of overestimation of ability and underestimation of risk.

Keywords: drowning, risk perception, swimming ability, safety attitudes

Rock-based fishing is one of New Zealand's most dangerous pastimes, with 63 people having lost their lives while engaged in land-based fishing in the 16 years from 1980 to 1995 (Davies, 1996). From 1999 to 2005, 11 drowning fatalities occurred on a 50-km stretch of Auckland's rugged west coast. The five most recent fatalities leading up to the summer season of 2005–06 created a great deal of concern among rescue and water-safety groups and the public at large (Moran, 2006).

In spite of the persistence of rock-based-fishing fatalities on Auckland's west coast, however, little is known about the rock-fishing fraternity, their demographic structure, their fishing-safety knowledge, their perceptions of associated risk of drowning, or their water-safety behaviors when fishing at hazardous New Zealand west-coast locations. Because of this lack of information, attempts to promote water safety specifically targeted at fishers using high-risk locations have been difficult. In addition, no direct attempt has been made to advise west-coast fishers of safety issues when they are actually engaged in fishing activity.

A previous study of Auckland's west-coast fishers found that the sample population was almost exclusively male, of diverse ethnicities, and 18–45 years of age (Davies, 1996). The study recommended the continued surveying of fishers

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so that at-risk attitudes and behaviors could be identified. The study also recommended that educational material and multilingual signage were ways to reach this at-risk group. In Australia, a recent study of coroners' files of rock-fishing fatalities in New South Wales found that it was one of that country's most dangerous pastimes, with an increase in fatalities of 45% from 1992 to 2000 (Jones, 2003). The study noted that, in terms of region of origin, Asian groups were overrepresented in rock-fishing drowning fatalities (Asian-born, 36%, Australian-born, 22%). It also reported that three quarters of victims were classified as swimmers (77%) and had worn no personal protection equipment (77%). This study concluded that education campaigns targeted at the at-risk groups, promotion of personal floatation devices, and improved search and rescue procedures were options to address rock-fishing safety.

In spite of the high-risk nature of fishing from rocks on a surf coastline, little is known about how fishers perceive the risks associated with the activity. Although risk perception is often viewed as playing a critical role in motivating safe behavior (Millstein & Halpern-Felsher, 2002), participant perceptions of risk of drowning when engaged in a high-risk activity such as rock fishing are not well understood. One theory of risk perception that might help explain how fishers behave with regard to their safety is that of protection-motivation theory (Rogers, 1983). This theory suggests that self-protective behaviors are contingent on four components: the perceived severity of the threat, the perceived vulnerability of the individual to the threat, efficacy of preventive measures, and self-efficacy of the individual to cope with the threat. Finding out how fishers perceive the risks associated with their fishing activity might help explain why some might underestimate the risk (threat appraisal) and overestimate their ability to cope with that risk (coping appraisal), with tragic consequences.

Although many of the recommendations of previous studies have been adopted in national water-safety promotions, rock fishers continue to drown, especially on Auckland's west coast. To address the public concerns raised by the spate of rocky-shoreline fishing fatalities, a west-coast fishing-safety project that piloted an on-site rock-fishing safety-education promotion was initiated in October 2005. The purposes of this study were twofold: to report on the demographics, beliefs, and behaviors of Auckland's west-coast rock fishers and to make recommendations for future rock-fishing-safety promotion based on the information obtained, especially with regard to fishers' perceptions of drowning risk.

Method

Four well-known danger spots for New Zealand rock-fishing fatalities, Whatipu, Karekare, Piha, and Muriwai, were identified as key locations for disseminating safety advice and surveying fishers. The water-safety promotion and survey data gathering took place during 8 weekends between February and April in the summer of 2006. Several peak holiday weekends were included in this time frame. It was anticipated that in this period we could reach many members of the targeted fishing population. Static displays of fishing safety, written material, and verbal advice from trained field officers were the educational tools used to promote fishing safety on site.

A safety advice and research team ($N = 4$) was trained to conduct all aspects of the fieldwork from fishing-safety education to data collection. The field officers worked in pairs and were randomly allocated to one of the four sites each weekend. The participants in the survey were all those who were either fishing from the chosen sites or in transit to and from the sites. Rock fishing was defined as not only fishing with rod and reel but also engaging in activities using others devices such as baskets or hand lines, as well as gathering shellfish from the rocks.

Because of the anticipated difficulty of obtaining accurate information from an expected large proportion of Chinese fishers who did not speak English as their first language, the questionnaire was produced in English and Mandarin. To further assist non-English-speaking Chinese, the field officers used in the data-gathering process were fluent in both English and Chinese. Potential adult participants over 16 years of age were approached by the field officers and asked to voluntarily participate in an anonymous written survey on fishing safety. To promote rock-fishing safety and encourage participation in the survey, potential respondents were also invited to take part in a drawing to receive inflatable life jackets and other safety equipment.

A cross-sectional survey using a written, self-completion, anonymous questionnaire, designed to be completed on site and take a maximum of 10 min to complete, was the research tool used to gather information from fishers. The questionnaire consisted of 11 questions on familiarity with the fishing site, swimming competency, past fishing behaviors, and perceived risk of drowning. Familiarity with the fishing site was assessed on a 5-point scale ranging from *first time* to *more than 20 times*. Swimming competency was assessed in a question that asked respondents to estimate how many lengths of a 25-m pool they could currently swim nonstop, using five response categories ranging from *cannot swim* to *can swim more than 16 lengths (400 m)*. Seven risky fishing practices (such as drinking alcohol when fishing or going down the rock face to retrieve a snagged line) were reported using a 4-point frequency scale (*never, sometimes, often, and always*). The four components of risk perception identified in Roger's (1983) protection-motivation theory (severity, vulnerability, efficacy of preventive measures, and self-efficacy) were assessed via responses to 12 statements on fishing safety using a 5-point Likert scale (*strongly agree, agree, unsure, disagree, and strongly disagree*).

Data from the completed questionnaires were entered into Microsoft Excel X for statistical analysis using SPSS version 13.0 in Windows. Descriptive statistics such as means and proportions were used to describe the baseline characteristics of the population. Frequency tables were generated for all questions and, unless otherwise stated, percentages are expressed in terms of the number of respondents to each survey question, within groups. Data were analyzed according to a number of sociodemographic variables including gender, age, and ethnicity. Kruskal–Wallis H tests were used to determine significant differences in responses between groups. Although we recognize the limitations of agglomerating several peoples into one category (Rasanathan, Craig, & Perkins, 2004), for the purpose of comparisons by ethnicity, ethnic groupings were broadly based on Statistics New Zealand classification and included European, Maori, Pacific Islands (hereafter referred to as Pasifika), Asian, and a category for those who self-identified as “other.” Full details of the survey were presented in a report titled “Water Safety and Auckland’s West

Coast Rock Fishers” (Moran, 2006), available in PDF format at www.watersafe.org.nz/page.asp?page=342

Results

All rock fishers at the selected sites were invited to take part in the survey, but several declined. The number of fishers who declined to take part was not recorded at one site, but at the other three, 149 fishers agreed to take part in the study while 17 declined out of a total of 166 who were approached, resulting in a response rate of 89.8%. A total of 255 questionnaires were returned and, of these, five (0.2%) were considered invalid because of illegibility or incorrect completion and were excluded from the data analysis. Thus, the final database for this study included 250 adults who were interviewed while participating in rock-fishing activity at four popular locations on the west coast of Auckland during the summer of 2006.

Demographic Characteristics of Rock Fishers

Analysis of respondents’ age, gender, length of New Zealand residency, and ethnicity indicated that the demographic structure of the rock-fishing population was quite different from population norms. As Table 1 shows, the sample consisted of 10 times more men than women, and more than half (56.8%, $n = 142$) were in the 25- to 44-year age group. Almost half (42.0%, $n = 105$) of those surveyed were of

Table 1 Demographic Characteristics of Fishers

Demographic characteristic	<i>n</i>	%	Total
Gender			
male	229	91.6	
female	21	8.4	250 (100%)
Ethnicity			
European	83	33.2	
Maori	16	6.4	
Pasifika	24	9.6	
Asian	123	49.2	
other	4	1.6	250 (100%)
Age group			
15–24 years	58	23.2	
25–44 years	142	56.8	
45–64 years	46	18.4	
65 years+	4	1.6	250 (100%)
Length of residency			
<4 years	105	42.0	
4–9 years	44	17.6	
>10 years	101	40.4	250 (100%)

recent residency (<4 years). Proportionally more Asian people (49.2%, $n = 123$) and fewer European (33.2%, $n = 83$) and Maori (9.6%, $n = 16$) New Zealanders were included in the study.

Further analysis of respondents' ethnicity revealed a diverse range of backgrounds. Those who were categorized as Asian (49.2%) self-identified as Chinese/Taiwanese (38%), Korean (6.4%), Indian (3.2%), and Filipino (1.6%). A further indication of the current prevalence of Chinese or Taiwanese New Zealanders among Auckland's rock-fishing population was the number of participants ($n = 59$, 24%) who chose to respond to the Chinese-language version of the questionnaire.

To determine how familiar rock fishers were with the site at which they were currently fishing, respondents were asked how often they had fished at the site. For more than one third (36.4%) of respondents, it was their first time at the site. More than two thirds (69.2%) of rock fishers had fished at that location less than five times, four fifths (79.6%) had fished there less than 10 times, and only one fifth (20.4%) had fished at that location more than 10 times.

Water-Safety Skills of Rock Fishers

To determine how well rock fishers might be able to cope with an unintentional immersion or an emergency rock-fishing situation involving fellow fishers, respondents were asked to estimate their swimming and resuscitation competencies. Table 2 shows that one third (32.4%, $n = 81$) of fishers estimated that they could currently swim nonstop for 25 m or less, with 1 in 10 (12.0%, $n = 30$) describing themselves as nonswimmers and a further one fifth (20.4%, $n = 51$) estimating they could only swim 25 m. Almost one third (31.6%, $n = 79$) estimated that they could currently swim 100 m, and one quarter (24.4%, $n = 61$) were confident that they could currently swim 400 m nonstop.

Significant differences were found when swimming ability was analyzed by ethnicity, $\chi^2(4) = 11.07$, $p = .026$. More Pasifika and Asian than European and Maori fishers thought that they could swim less than 25 m (33.4% and 44.5% compared

Table 2 Self-Estimated Swimming and CPR Competencies

Question/Answer	<i>n</i>	%	Cumulative %
How far can you currently swim nonstop?			
cannot swim	30	12.0	12.0
25 m	51	20.4	32.4
100 m	79	31.6	64.0
200 m	28	11.2	75.2
400 m	61	24.4	99.6 ^a
Could you perform CPR on a drowning victim?			
no ability	88	35.2	35.2
poor skill level	67	26.8	62.0
confident about skill level	62	24.8	86.8
excellent skill level	33	13.2	99.6 ^a

^aOne (0.4%) missing value from a respondent who failed to answer the question.

with 19.5% and 12.5%, respectively). No significant differences were evident when swimming ability was analyzed by age group or by length of residency. Slightly more of the older 45- to 64-year age group than the 15- to 29- or 30- to 44-year age group estimated that they could only swim 25 m or less (41.3% compared with 34.5% and 28.9%, respectively). In addition, slightly more fishers of recent residency (<4 years or 4–9 years) estimated lesser swimming ability than those who had lived in New Zealand for 10 years or more (35.3% and 47.7%, respectively, compared with 22.8%).

Most fishers (62.0%) had limited or no ability to perform CPR, with one third estimating no knowledge of CPR and more than one quarter (26.8%) estimating poor ability. Only 1 in 10 fishers (13.2%) thought that they had excellent CPR skills with current qualifications.

Significant differences in self-estimated ability to perform CPR were evident between ethnic groups, $\chi^2(4) = 40.381, p \leq .001$. More Asian than European, Maori, and Pasifika fishers thought that they could not perform CPR (53.8% compared with 14.9%, 6.3%, and 33.3%, respectively). More European and Maori than Pasifika and Asian fishers thought that they had good or excellent CPR skills (62.1% and 68.8% compared with 37.5% and 16.0%, respectively). No significant differences were found when CPR ability was analyzed by age group. Significant differences were evident when CPR ability was analyzed by length of residency, $\chi^2(2) = 22.657, p \leq .001$, with those of recent residency (<4 years) reporting the poorest CPR skills. One half (50.5%, $n = 53$) of fishers with residency of less than 4 years thought that they could not perform CPR. In contrast to this, proportionally fewer (15.8%, $n = 16$) longer term residents (≥ 4 years) thought they had no CPR skills.

Fishers' Water-Safety Behaviors

Fishers were asked to report previous water-safety behaviors using four frequency categories including *never*, *sometimes*, *often*, and *always*. Table 3 shows that almost three quarters (72%, $n = 180$) never wore a life jacket, almost half had gone to the water's edge to retrieve a snagged line (48.0%, $n = 120$) or had turned their backs to the sea (41.2%, $n = 103$), more than a third (36%, $n = 90$) had worn gumboots or waders, and one fifth (19.6%, $n = 49$) had consumed alcohol while fishing from rocks.

Table 3 also shows that, in terms of high-frequency risk, some fishers often or always wore gumboots or waders (12.8%, $n = 32$) or went down the rock to retrieve a snagged line (10.0%, $n = 25$). In addition, more than one third of fishers sometimes engaged in the potentially dangerous behavior of turning their backs to the sea (36.0%, $n = 90$) or going down the rock face to the water's edge to retrieve a snagged line (38.0%, $n = 95$). One fifth of fishers never or only sometimes checked the weather before setting out on a fishing trip (20.4%, $n = 51$) or never or only sometimes took a cell phone with them in case of emergencies (22.8%, $n = 57$). A small proportion of fishers reported often or always drinking alcohol when fishing from rocks (4.0%, $n = 10$); a greater proportion did so sometimes (15.6%, $n = 39$).

When the seven risky behaviors were analyzed by ethnicity, significant differences were found only in the responses relating to alcohol consumption, $\chi^2(4) = 27.446, p \leq .001$, and wearing gumboots or waders, $\chi^2(4) = 20.794, p \leq .001$.

Table 3 Fishers' Water-Safety Behaviors

Question	Answer								
	Never		Sometimes		Often		Always		
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	
When fishing from rocks, do you . . .									
wear a lifejacket or other flotation device?	180	72.0	58	23.2	7	2.8	4	1.6	
turn your back to the sea?	146	58.4	90	36.0	6	2.4	7	2.8	
wear gumboots or waders?	159	63.6	58	23.2	16	6.4	16	6.4	
drink alcohol?	200	80.0	39	15.6	7	2.8	3	1.2	
take a cell phone in case of emergencies?	24	9.6	33	13.2	38	15.0	154	61.6	
check weather/water conditions first?	11	4.4	40	16.0	54	22.0	144	57.6	
go down the rock to retrieve a snagged line?	129	51.6	95	38.0	20	8.0	5	2.0	

Note. One (0.4%) missing value from respondent who failed to answer each statement in the question.

More Asian and fewer European fishers never drank alcohol (92.4% compared with 65.5%). More European and Maori fishers than Pasifika and Asian fishers never wore gumboots or waders (73.6% and 81.3% compared with 50.0% and 57.1%, respectively). Similar significant differences were reported when alcohol consumption was analyzed by length of residency, $\chi^2(2) = 15.323$, $p \leq .001$, with more short-term (<4 years) and medium-term residents (4–9 years) than long-term residents (10 years+) reporting never having consumed alcohol when fishing (88.6% and 90.9%, respectively, compared with 66.3%).

Significant differences were evident when risky behaviors were analyzed by age group with regard to fishers' failure to check the weather beforehand, $\chi^2(2) = 9.751$, $p = .008$, and turning their backs to the sea, $\chi^2(2) = 11.625$, $p = .003$. Fewer fishers age 15–24 years than those age 25–44 and 45–64 years often checked the weather beforehand (69.0% compared with 78.1% and 93.5%, respectively), and more had turned their backs to the sea when fishing (58.5% compared with 39.4% and 26.1%, respectively).

Fishers' Perceptions of Drowning Risk

Rock fishers were asked to respond to 12 statements related to their perception of the risk of drowning associated with rock fishing, using a 5-point scale. For ease of interpretation, the *strongly agree/agree* and *strongly disagree/disagree* responses were aggregated as seen in Table 4.

Statements 1–3 related to fishers' perception of the severity of the risk associated with fishing from rocks. Most fishers (70.2%) agreed that getting swept off the rocks was likely to result in their drowning, yet a third of fishers thought

Table 4 Attitudes Toward Risk of Drowning When Fishing From Rocks

Statement	Strongly agree/ Agree		Unsure		Strongly disagree/ Disagree	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Getting swept off the rocks is likely to result in my drowning.	176	70.2	39	15.6	31	12.4
Rock fishing is no more risky than other water activities.	103	41.2	46	18.4	97	38.8
Drowning is a constant threat to my life when rock fishing.	126	50.0	45	18.0	75	30.0
I am not concerned about the risks of rock fishing.	68	27.2	26	10.4	152	60.4
Others rock fishers are at greater risk of drowning than me.	81	32.4	76	30.4	89	35.6
I am a strong swimmer compared with most other people.	116	46.4	48	19.2	82	32.8
I avoid fishing in bad conditions to reduce the risk of drowning.	219	87.8	10	4.0	17	6.8
Always wearing a life jacket makes fishing a lot safer.	177	70.6	20	8.0	49	19.6
Turning my back to the waves when rock fishing is very dangerous.	229	91.8	14	5.6	3	1.2
My local knowledge of this site means I'm unlikely to get caught out.	127	50.4	46	18.4	73	29.2
My experience of the sea will keep me safe when rock fishing.	144	57.8	51	20.4	51	20.4
My swimming ability means I can get myself out of trouble.	110	44.0	56	22.4	80	32.0

Note. Four missing values from respondents who failed to answer question.

that rock fishing was no more risky than other aquatic activities (38.8%) or did not consider drowning a constant threat (30%). When analyzed by ethnicity, age group, and length of residency, few major differences were found in perception of the severity of risk posed by rock fishing except that proportionally fewer Maori (44%) thought that they were likely to drown if swept off the rocks when fishing and fewer young fishers (15–24 years) thought drowning was a constant threat to their lives when fishing.

Table 4 also shows that, in response to Statements 4–6 on fishers' perceptions of their vulnerability to drowning, one quarter (27.2%) were not concerned about the risk of drowning, one third (32.4%) felt that others fishers were at greater risk than themselves, and almost half (46.4%) thought that they were strong swimmers in comparison with others. No significant differences in perceptions of vulnerability to drowning were discernible when responses were analyzed by ethnicity, age, or length of residency, except that Asian fishers and those of recent residency (<4 years) were less confident in their swimming ability.

Statements 7–9 sought fishers' perceptions of the efficacy of preventive action in reducing their risk of drowning. Most fishers agreed that avoiding fishing in bad conditions reduced their risk of drowning (87.8%), always wearing a life jacket made fishing a lot safer (70.6%), and turning their backs to the waves when rock fishing was very dangerous (91.8%). As previously reported in Table 3, however, most rock fishers admitted that they had never worn a life jacket (72.0%), and many had turned their backs to the waves (41.2%) when fishing. No significant differences in perceptions of the efficacy of preventive action were discernible when responses were analyzed by ethnicity, age, or length of residency.

Statements 10–12 related to fishers' perceptions of self-efficacy of their preventive behaviors. Half (50.4%) agreed that their local knowledge of the site meant that they were unlikely to get into difficulty, and more than half (57.8%) thought that their experience of the sea would keep them safe when fishing. In addition, almost half (44.0%) of respondents thought that their swimming ability meant that they could get themselves out of trouble (even though this perception did not correspond with fishers' low estimates of their swimming ability previously reported in Table 1).

When self-efficacy was analyzed by ethnicity, significant differences were found in perceptions of the protective capacity of fishers' swimming ability, $\chi^2(4) = 15.856, p = .003$, with Asian fishers less confident than other ethnic groups. Although not statistically significant ($p = .055$), some older fishers (45–64 years) were more confident than younger age groups in the efficacy of their local knowledge and their knowledge of the sea. When analyzed by length of residency, significant differences were found in self-efficacy of local knowledge, $\chi^2(2) = 7.202, p = .027$; experience of the sea, $\chi^2(2) = 8.280, p = .016$; and swimming ability, $\chi^2(2) = 11.867, p = .003$. Fewer recent residents than more established residents were confident of the protective value of their local knowledge, their knowledge of sea conditions, or their swimming ability.

Discussion

This study examined the demographic characteristics and the safety knowledge, attitudes, and behaviors of fishers engaged in high-risk fishing activity on Auckland's rugged west coast. The fishers were a demographically diverse group that was predominantly male, mainly 25–44 years old, mostly of Asian ethnicity, and primarily of recent residency. Similar demographic characteristics have been reported in previous rock-fisher studies (Davies, 1996; Jones, 2003). The swimming and CPR skills of participants were equally diverse, with those of Asian ethnicity and of recent residency self-reporting lesser swimming ability than others, which suggests that they might be at greater risk of drowning in the event of an emergency. The low level of swimming ability reported by fishers in this study is consistent with the findings of other studies of adults (Gilchrist, Sacks, & Branche, 2000), adult beachgoers (McCool, Moran, Ameratunga, & Robinson, 2008), young adults (Gulliver & Begg, 2005), and ethnic minorities (Mael, 1995; Smith & Brenner, 1995).

Among the key findings of fishers' attitudes and behaviors, it is concerning that even though most fishers recognized the value of life jackets to their survival, more than three quarters reported never using them when fishing. Quan, Bennett, Cummings, Trusty, and Treser (1998) found similar resistance to wearing buoyancy aids in male youth and adults in a study of 4,000 boaters in the U.S. northwest. In addition, many fishers (42%) presumed that their swimming ability would afford them some protection in the event of their sudden immersion—even though many reported limited swimming ability. Many fishers perceived that other fishers were at greater risk of drowning than themselves and that they were strong swimmers in comparison with others. These two perceptions are interesting given that one third (32%) of respondents estimated that they could not swim more than 25 m and only one third (36%) thought that they could currently swim more than 200 m (see Table 2). This suggests that some fishers have a lesser sense of vulnerability to drowning that might lead to underestimating risk because of a misplaced trust in their swimming competency.

Furthermore, fishers' risk of drowning might be exacerbated by a misguided belief in the protective value of their local knowledge and experience. Half the fishers believed that their local knowledge and experience of the sea would keep them safe, yet for many it was their first visit to the site (36%), more than two thirds (69.2%) had only visited the site five times or less (see Table 1), and many were relatively recent residents (42%). In terms of protection-motivation theory and the fishers who took part in this study, it would appear that fishers' threat-appraisal perceptions (severity of risk and vulnerability to the risk) might lead to an underestimation of the risk of drowning associated with fishing from rocks. In addition, their coping-appraisal perceptions (efficacy of preventive actions and self-efficacy of managing risk) might lead to an overestimation of their ability to look after their own safety. Other studies (Baker, O'Neil, Ginsburg, & Li, 1992; Brenner, Saluja, & Smith, 2003; Howland, Hingson, Mangione, Bell, & Bak, 1996) have reached similar conclusions about the propensity of some (especially males) to underestimate risk and overestimate their ability to cope with that risk.

Study Limitations

Although the results from this study offer evidence of why rock fishers might be at greater risk of drowning, the results should be interpreted with some caution in light of several methodological limitations. The study did not include those who fished at the dangerous sites on weekdays or outside the summer season. In addition, self-estimation of ability (such as swimming, rescue, and CPR ability) and self-reported safety behaviors might not accurately express true measures (Howland et al., 1996; Robertson, 1992). Further study is required to determine the validity of such measures, using swimming-proficiency testing and observational studies of fishing-safety behavior. These limitations notwithstanding, this study found evidence of a gap between what fishers think and what they do with regard to their safety when fishing from rocks, which suggests that entrenched risky practices persist even when participants are aware of the danger. Further study is required

also to determine whether such entrenched safety attitudes can be changed by the type of on-site safety promotion undertaken in conjunction with this study.

Conclusions

In light of these findings, I would make four recommendations. First, fishing-safety messages should emphasize the twin dangers of overestimating ability and underestimating risk. Second, the use of inflatable life jackets among the rock-fishing community should be encouraged at all high-risk sites. Inducements to purchase life jackets and joint promotions with fishing-tackle shops, fishing magazines, and television programs could be valuable ongoing promotional strategies. Third, given the high proportion of Asian fishers that took part in the study, targeted interventions might profitably focus on the Asian community and those of recent residency where fishing popularity is high. In addition, given the infrequency of fishers' visits to the sites where interviewed, multilingual signage at all high-risk sites indicating site-specific dangers and emergency instructions might reinforce safety messages to fishers. Fourth, given the extensive lack of personal flotation aids reportedly used by fishers, angel rings and other appropriate flotation devices should be placed at all high-risk fishing locations.

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