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Richard Hsiao

Indiana University of Pennsylvania, hsiao@iup.edu

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An Analysis of Risk Management Implementation in Aquatic Centers in Taiwan and a Review of Selected Law Cases

Richard Hsiao

Today, members of most institutions realize how important risk management practices are, but many encounter difficulties in putting such policies into practice (Hsiao, 2007). Most accidents have been associated with the absence of risk management plans and the failure to provide instruction in swimming. Because of the high rate of accidents in water-related activities, the focus of this research was to understand the management status of aquatic centers in schools, YMCAs, public/private communities, hotels, and theme parks in Taiwan; the risk management practices employed by these institutions; and associated legal concerns. The aforementioned institutions are believed to be in the most reasonable position to provide water safety education and swimming classes for children and adults in Taiwan.

In the United States, there are currently over 220,000 young people between the ages of 8 and 18 enrolled in the USA Swimming competitive age group program, as well as hundreds of thousands more participating in similar programs through a variety of local organizations, including community centers, YMCAs, and country clubs (Gale Encyclopedia of Childhood & Adolescence, 1998). According to *Pediatrics* (2001), drowning is the second most common cause of accidental deaths in children 1–19 years old and there were 1,420 drowning deaths in this age group in the United States in 1995. Every year, drowning takes the lives of approximately 600 children in the United States under the age of 5 and about 220 children between the ages of 5 and 9. About one fourth of the older children who drown know how to swim (Gale Encyclopedia of Childhood & Adolescence, 1998).

Drowning has always been a concern in school facilities (Johnson, 2002). School pools are used for holding aquatic-related activities, such as instructional and competitive swimming, water polo, scuba diving, water aerobics, and water fitness. YMCA and public/private community swimming pools play an important role in swimming instruction of teenagers and adults and also provide safety instruction in the area of aquatics for the general public in Taiwan. Hotel swim-

Richard Hsiao is with the Health and Physical Education Department at Indiana University of Pennsylvania in Indiana, PA. E-mail: hsiao@iup.edu.

ming pools and theme park pools also provide citizens a good place to spend their free time and satisfy their needs for leisure and recreation.

Taiwan has the third highest drowning accident rate in the world (Database of Citizen's Sport in Taiwan, 2003). Because of the high accidental drowning rate and the lack of aquatic risk management practices in Taiwan, the purpose of this study was to take a step further to extend a previous study (Hsiao, 2007) to focus on aquatic directors' perceptions, knowledge, and skills of risk management and the risk management manual implementations employed by aquatic centers in Taiwan.

Most accidents have been associated with the absence of risk management plans and the failure to provide instruction in swimming. School, YMCA, and community swimming pools are believed to be in the most reasonable position to provide water safety education and swimming classes for people in Taiwan. The purpose of this study was to establish the management status of aquatic centers, the risk management practices employed by organizations, and the associated legal concerns in Taiwan. The significance of this study was to provide first-hand information about risk management in general aquatic center settings in Taiwan. The results can provide assistance to aquatic directors in controlling potential risk in their aquatic centers and also help to prepare aquatic directors with more knowledge in terms of risk management implementation and evaluation so they may provide a safer environment for the general public participants of pool-related activities in Taiwan.

The research questions for this study are based on Annie Clement's risk management system of identification, evaluation, and control (Clement, 2004). Research questions include all facets of the system.

1. What is the use, accident, and litigation status of the selected aquatic facilities?
2. What institutional demographic factors are most closely associated with the implementation of risk management in aquatic centers in Taiwan?
3. Do aquatic directors' gender, age, and/or years of experience affect their risk management practices in their aquatic centers?
4. Does an aquatic center's status (public or private) affect aquatic directors' risk management practices?
5. What is the relationship between incidents of accidents/injuries and lawsuits in aquatic centers in Taiwan?
6. What risk management practices are used with the aquatic centers in Taiwan?
7. What are the relationships of the six general practice areas under facilities and equipment: inspections, maintenance, emergency care/medical, participant forms, participant education, and staff?

Review of Literature

The most effective risk management practice associated with an aquatic facility begins at the conceptual stage and continues through construction and operation (Schwartz, 1998). The conceptual framework for the study of aquatic incidents

and the use of risk management in Taiwan and in the United States are similar. The following literature review provides an analysis of the rate of aquatic incidents in Taiwan, an analysis of aquatic incidents in the United States, and a review of law cases from both the United States and Taiwan. The author presents selected real-world law cases in hopes that readers will get more of an understanding of how to create a safer aquatic environment.

Analysis of the Rate of Aquatic Incidents in Taiwan

Accidental drowning is a very important type of unintentional injury in Taiwan (Department of Health Executive Yuan, 2003), being the second most common cause of unintentional death among adolescents (Wang, 2001). Drowning has always been a concern in swimming facilities in Taiwan. The facilities of various public and private institutions provide not only pools for swimming, but also places for holding a wide range of aquatic activities, such as classes in swimming, water polo, scuba diving, water fitness, and water aerobics. According to Department of Health Executive Yuan, Taiwan, R.O.C. (2003) data, an average of 961 people have died in accidental drownings each year over the past 10 years. Table 1 shows the details of the statistical data.

Drowning has always been a concern and a major accidental death in Taiwan. How to reduce and prevent accidental drowning has always been a priority in governmental sport departments. Because the incident of accidental drownings and risk management practices are similar between Taiwan and the United States, the following content includes analysis of risk management implementations and a review of American law cases.

Analysis of Aquatic Centers in the United States

According to the National Spa and Pool Institute (NSPI, 2003), the world's largest organization for the pool and hot tub industry, the installation and construction of all pools and hot tubs nationally in 2001 resulted in more than \$6.6 billion in sales revenue. The results of this economic impact mean that there is an increasing aquatic participation and awareness of risk for the safety of aquatic centers nationwide. Swimming is the second most popular exercise in the United States with approximately 400 million pool visits annually (US Bureau of the Census, 1995). Mills-Senn (2000) identified drowning as the third most common cause of accidental death for adults in the United States. For children, drowning is the second most common cause of accidental death. Although all age groups are represented, children from birth to four years represent the highest death rate due to drowning. In 1998, 500 children under the age of five drowned. Most drowning and near-drowning happens when a child falls into a pool or is left alone in a bathtub (National Safety Council, 2003). Although few cases of drownings are found in organized classes in the United States, drowning has always been a concern in school facilities. A secondary cause is the failure of schools to provide lifeguards in aquatic classes.

According to the U.S. Consumer Product Safety Commission's National Electronic Injury Surveillance System (NEISS; 2003), 27% of all swimming pool injuries and 33% of all diving board injuries treated in 2002 occurred to children

Table 1 The Number of Accidental Deaths from Drowning Over the Past 10 Years in Taiwan

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Number of Deaths	1,236	1,154	1,112	1,115	917	934	829	836	853	629

Note. From Department of Health in Taiwan-Health and National Health Insurance Annual Statistics Information System.

between 10 and 14 years of age. Of the reported injuries associated with swimming pool slides, 37% occurred to children between five and nine years of age. Males accounted for 63% of these swimming pool injuries, 72% of the diving board injuries, and 56% of all swimming pool slide injuries. These victims, who most commonly suffered lacerations to the face and head, were usually treated in hospital emergency rooms and then released. It is important to note, however, that these figures do not reflect injuries treated at lifeguard stations, at home, in doctors' offices, health clinics, or after direct hospital admission.

Clement (2001) reviewed all aquatic incidents in court decisions reported in Lexis/Nexus Universe among children from birth to 15 years of age, between 1990 and 1999. She found a fluctuation in the number of cases for various age groups, with a pattern of more cases involving very young children and the 12–15 year old age group. A consistent pattern for males and females was found through age nine. The very largest discrepancy between males and females was in the 14–15 year old age group. The majority of these incidents occurred in swimming pools. Clement's findings also indicated that males (89 cases) had roughly twice the water-accident rate of females (43 cases).

The National Spa and Pool Institute (NSPI) estimated that there are 3.3 million in-ground swimming pools, 3.2 million above-ground pools, and 3.2 million spa/hot tubs in the United States. The aforesaid data clearly demonstrate the popularity of swimming activities in the United States (NSPI, 2003). Despite the reported high level of participation in aquatic activities and the many pools and spas in the United States, Terri Simmons, editor of *Aquatic International*, quoted Sam Frees in a 1994 editorial stating that less than 40% of all Americans consider themselves swimmers (Clement, 1998). According to Frees, then the President of the International Swimming Hall of Fame in Fort Lauderdale, this is a radical change from 1949, when 66% of the United States population considered themselves swimmers. *USA Swimming* concurs with Frees, stating that more than half of all residents of the United States cannot swim and would not survive if thrown into deep water (Clement, 1998), and The United States Water Fitness Association estimates that less than 5% of Americans can swim 500 yards or more without stopping (Spannuth, 2001).

Sports and activities that take place on the water are usually considered high-risk. Aquatic professionals need to be aware of accident and fatality rates in sport and physical activity in general as well as in aquatic activities. In addition, they must recognize that as the number of serious injuries increases, the potential for lawsuits also increases (Clement, 1997). Since litigation is an inherent problem for aquatic activities, steps have to be taken to minimize liability for negligence. Several options exist: (a) high liability insurance policies, (b) cancellation of programs likely to generate liability, and (c) adoption of risk management concepts and practices. For purposes of this research, these litigation-related issues were represented in a generalizable form to determine how they apply to circumstances in Taiwan.

According to Clement (1997, 1998, 2004), risk management practices require a systematic examination of the environment, with identification of potential loss and legal liability. Clement's conceptual framework, designed in 1988, is a three step system of (a) identification, (b) evaluation, and (c) control. The first step of

this system is the identification of potential risk involvement or exposure to risk. An aquatic director, for example, would first ensure that his/her staff is following standard procedures in operating the facilities in their assigned areas, including the locker room, spa area, sauna, Jacuzzi, and swimming pool. Daily operational checklists should be on file, and the emergency action and risk management plans should be regularly practiced. The implementation of such “interventions” will assist in not only providing a safe environment for customers, but will also protect employees. When accidents happen, causes and solutions can be more readily identified.

In the second step, identified risks are evaluated in relation to three categories: (a) probability, (b) severity, and (c) magnitude. A risk may have a high probability of occurring, but when it occurs, only a few people will suffer minor discomfort. On the other hand, a risk could have a very low probability of occurring, and should it occur, there is a good chance that someone will die. Any activity scoring high on any one of the risk characteristics should be given serious thought. Although a single death could be devastating to an organization or facility, even minor discomforts for a large population can result in a public relations disaster (Clement, 1997, 1998, 2004).

After evaluating the risks, the third step involves control. This final step is essential in making the system work efficiently. According to Clement (1997, 1998, 2004), liability can be controlled by (a) accepting the risk and assuming the responsibility, (b) retaining the activity and transferring the risk through contract or insurance, (c) altering the activity to reduce the risk, or (d) eliminating the activity.

Management and Liability in Aquatic Facilities

The purpose of aquatic risk management is to make the swimming and aquatic-related activities as safe as possible for participants and the business as efficient as possible by employing accepted aquatic risk management practices. Fletemeyer (2003) stated that aquatic liability is approaching a paradigm shift and thus requires that aquatic professionals have a certain level of understanding to practice and implement the basic principles of aquatic risk management. He also said that the needs for aquatic risk management were threats of negligence litigation, a trend for courts to impose verdicts favoring the plaintiff, the need to better educate the public about aquatic safety, a high level of awareness by the public about the dangers associated with aquatic environments, and stronger emphasis on preventative practices rather than on reactionary measures.

Fletemeyer (2003) provided seven steps for increasing safety in aquatic risk management:

1. Identify goals and objectives.
2. Organize an assessment team.
3. Identify and measure risks.
4. Provide effective warning.
5. Train staff.
6. Keep records.
7. Conduct performance and safety audits.

Many hazards related to aquatic environment are not easily recognizable. The above seven steps really highlight the implementation of safety in aquatics. If aquatic directors are willing to apply and follow these seven steps in their aquatic centers, it will not be difficult to see major improvements and a reduction in the accident rate in the aquatic centers.

The aquatic center industry assumes greater responsibility when assisting aquatic directors in conducting activities in a safe manner and environment. While policies and procedures must be established and enforced for the effective employment of programs and for the health and safety of participants, rules and regulations cannot be perceived by participants as too restrictive or controlling. In an ideal world aquatic center administrative personnel would work together to promote aquatic programs that are educationally inviting and legally defensible while maintaining the delicate balance between participant autonomy and institutional jurisdiction.

Legal Considerations in Aquatic Facilities and a Review of Court Cases in the United States and in Taiwan

Negligence and Liability. Negligent conduct and thus liability occurs when an individual or entity creates unreasonable risk of harm to another individual. Negligence can also be defined, according to Black's Law Dictionary (Garner, 2000), as the quality or state of being legally obligated or accountable or legally responsible to another or to society. The following cases provide a picture of how potential risk will harm aquatic programs and facilities as well as reemphasize the importance of risk management and legal considerations. Most of these cases were direct results of negligence, inexperienced staff, lack of training, and poorly organized aquatic classes. United States case law was applied to Taiwan's swimming pools because the study of aquatic incidents/accidents and the use of risk management in the United States are similar to that in Taiwan. The following cases provide an in-depth analysis in the area of risk management practice in aquatics.

In the case of *Wu v. Huang* (2002), Huang was sentenced to two years imprisonment for negligence in his lifeguard duties leading to the death of a four-year-old boy. The Taiwan high court suspended the sentence for three years, as Huang agreed to settle with the victim's family. The drowning death occurred when Huang, then a 19-year-old student, was on duty at a private residential complex in Keelung, Taiwan. Three teachers from a day care center had taken 15 children, ages three to six, to the pool for an activity. Wu took the children from the pool to the parking area to board the buses. She then returned to help her colleagues collect toys, unaware that one of the students had followed her back and jumped into the adult pool. The boy was later found in a comatose state and subsequently died at the hospital. Wu was charged with occupational negligence and had her 18-month sentence suspended by the high court, as she agreed to pay the victim's family \$1 million NT (equivalent to about \$30 thousand U.S. dollars) to settle the case. Huang, the lifeguard, failed to notice the child entering the pool; he was busy teaching a person to swim. The court stated that Huang should not have been distracted from his lifeguard duties by teaching someone to swim. He should not

have left his post unexpectedly. The lesson is to maintain your assigned role as a lifeguard.

In *Robinson v. Chicago Park Dist* (2001), Ralph Robinson and three of his friends went to the Carver Park pool to swim. Not long after entering the pool, Robinson's friend saw Ralph jump off the diving board into the deep end of the pool, swim to the edge, and exit the pool. Then he saw Ralph jump off the diving board a second time and go under water toward the shallow end of the pool. At that time one of the lifeguards was on the telephone and another one was sitting on a bench engaged in conversation. When Robinson's friend walked to the deep end of the pool, he saw Ralph lying on the bottom of the pool. Both of Robinson's friends testified that when the accident happened, they were waving and yelling for a lifeguard, but the lifeguard, who was looking in their direction, failed to respond. Eventually, one lifeguard responded and dove into the pool, retrieved Ralph, and began administering CPR. At the same time, another lifeguard brought an oxygen tank for Ralph. Finally, Ralph was resuscitated, but unfortunately, died several days later. The final verdict of the Appellate Court held that the city park district was immune from liability under The Local Governmental and Governmental Employees Tort Immunity Act for a minor's accidental drowning death because it was an undisputed fact that two lifeguards were present on the pool deck.

Aquatic management tends to involve a number of lawsuits, including seemingly trivial issues such as wet floors in locker rooms, the injury of children by broken underwater tiles, and lack of supervision. By reviewing these cases, liability issues associated with swimming pools can be better understood.

Facility and Equipment Liability. An evaluation of several cases over the past 35 years pertaining to liability and aquatic centers was conducted. In *Thomas v. Wyndham Hotel* (2003), guest Cameron Thomas brought a suit against a Wyndham Hotel for injuries sustained while entering the pool by way of the pool's ladder. He claimed that the second rung of the ladder was loose and wobbly causing him to lose his balance, fall, and sustain an injury. The defendant succeeded in the Court by arguing that there was no evidence or constructive knowledge of the hazard. This case alerts the professional to check all attachments to the pool daily.

In *Anderson v. Claiborne City Rec. Club* (2002), six year old Alisha Anderson climbed through a hole in a chain-link fence surrounding a swimming pool owned by the Claiborne County Recreation Association/Claiborne County Recreation Club, Inc., entered the pool, and accidentally drowned. The pool was closed at the time of the incident and the gate was locked, consequently making it difficult to determine who should be held responsible for the tragedy. Finally, the court found that the trespasser should be fully responsible for the "duty of care" and must refrain from willful and wanton conduct. In fact, even though Anderson's death was ruled her own fault, the Claiborne County Recreation Club management might have avoided this tragedy by immediately repairing the hole in the fence when the administration found out it existed. If the management of the Recreation Club would have checked their building and equipment regularly, this kind of tragedy could really be avoided. It is obvious from these cases, that effective risk management and administration management in aquatic centers is essential.

Liability in Swimming Classes. In *Roberson v. San Diego Unified School District* (2002), 15-year-old Frederick Roberson drowned in the Jackie Robinson YMCA pool. He was enrolled in an Alternative Learning for Behavior and Attitude (ALBA) program, conducted at the YMCA. When the drowning occurred, the ALBA instructional aide was not stationed by the swimming pool, and the YMCA lifeguard was not sitting on the elevated lifeguard chair. The lifeguard testified that when he saw Frederick showing signs of distress, he thought Frederick was fooling around. Eventually, the lifeguard realized that Frederick was indeed in distress. Two off-duty lifeguards rescued Frederick and tried to resuscitate him but it was too late. The parties stipulated that Frederick's death was caused by drowning.

Shower Room. The shower room is a place full of potential risk and because of this, an important consideration in swimming pool management. Hill became a member of a fitness facility in San Francisco by signing a club membership agreement that included an exculpatory clause (release) on the first page of the agreement, above the signature line (*Hill v. 24 Hour Fitness, USA Inc.*, 2003). Basically the release stated that members expressly released 24 Hour Fitness from liability for any injury arising from its negligence in the use of the facilities, e.g., the use of exercise equipment, weights, racquetball courts, aerobics classes, the pool, sauna, steam room, and shower.

On January 21, 2001, Hill was walking through the shower area in the facility when the mat he stepped on slipped out from under him, causing him to fall, landing on his back, and sustaining a serious injury. Hill sued 24 Hour Fitness alleging that 24 Hour Fitness was liable for his injury based on the negligent maintenance of the facility. Hill argued that the release was ambiguous and that the manner of injury he sustained was not within the reasonable contemplation of the parties. The court determined that there was no direct evidence that the action of 24 Hour Fitness, placing a mat in the shower area, created a greater risk of slipping or injury than one would normally expect in the absence of a mat. Eventually, the court decided that 24 Hour Fitness demonstrated that it was entitled to judgment as a matter of law based on the signed release.

From a review of relevant literature, as well as from Clement's risk management models and systems (Clement, 2004), risk management is seen as an essential element for all areas of sport. Knowing how to prevent and otherwise reduce the potential for risk is critically important. The practice of risk management should be considered an indispensable practice. The professional aquatic director should not only recognize the importance of risk management and related legal issues, but should also either establish or diligently follow the risk management plan of his/her institution. Anything less than following the risk management plan strictly invites litigation. Those concepts gleaned from the review of literature that are pertinent to the proposed subjects are the following:

- Accidents occur in aquatics.
- Many of these accidents result in death or severe debilitating injuries.
- A number of these cases resulted in litigation.
- Aquatic directors should be aware of the implementation of risk management and understand the risk management models.

- Comprehensive risk management exists and has been used for many years.
- The concept of a safe environment should be highlighted.
- The application of risk management models in aquatics is highly important.

Risk management programs are inclined to enhance aquatics safety. These risk management programs are based on a range of methods. The best way for implementing risk management is to provide a safe environment and continue to provide practical risk management education to all aquatic directors in Taiwan.

Method

After reviewing the literature on risk management, Clement's conceptual framework, discussed in the review of literature, was selected to guide the research questions and survey content selection. The basis for choosing Clement's system was that it is simple, concise, and easy to apply in a practical application. In this study, the researcher applied Clement's three-step system (identification, evaluation, and control) as the fundamental theory in designing the survey questionnaire and applied these concepts in developing the seven research questions for the study. Aquatic directors using this model may more easily understand, accept, and apply the concepts of risk management to their swimming facilities. It is the desire of the researcher that the concepts and model be accepted and applied by aquatic directors so that the root of risk management can be planted and cultivated in aquatic directors' minds. A quantitative research design using survey techniques was selected for the study.

Research Design

Survey technique was selected as the best method to gain answers to the research questions, as survey research is the most frequently used mode of observation in social sciences and in sport management. According to Babbie (1992), "Survey research is probably the best method available to the social scientist interested in collecting original data for describing a population too large to be observed directly" (p. 262). The primary objectives of this study were to (a) measure and understand the relationships of risk management practices and legal issues among aquatic directors within their swimming pools/aquatic centers and (b) determine whether selected demographic factors (i.e., gender, years of experience as an aquatic director, age of the facility) had an effect on the risk management practices.

The survey questionnaire, using the conceptual risk management system of Clement was designed to yield data on the risk management practices of aquatic directors in six areas: facilities and equipment, maintenance, emergency care/medical, participant forms, participation education, and staff. Evaluative risk management survey questions and demographic information were used to obtain the data.

The 50-item survey was distributed to a total of 1,850 aquatic facilities in Taiwan (The R.O.C. Yearbook, 2003; National Council on Physical Fitness and Sport; Government Information Office), including but not necessarily limited to aquatic centers found in schools, YMCAs, public/ private communities, hotels,

and theme parks. Directors were asked to indicate the level of risk management implementation at their aquatic facilities. Once the data were collected, descriptive, MANOVA, and Spearman Correlation comparative statistics were used to establish relationships between the different survey items.

Instrument

Earlier, a pilot study was conducted to test for validity and reliability of the survey. The initial survey created for the pilot study had 54 items, with 4 demographic items, 11 general information items, and 39 risk management/legal consideration items. A 50-item self-developed questionnaire was developed to ascertain aquatic directors' risk management status and practice.

The survey was designed to assess the extent to which aquatic directors comply with, rather than how well they understand, risk management plans. All data were ordinal, except for two demographic items referring to information on (a) activities offered by the swimming pool and (b) areas in which most injuries had occurred. Variables for these two items were nominal. The survey questionnaire, using the conceptual risk management system of Clement was designed to yield data on the risk management practices of aquatic directors in six areas: facilities and equipment, maintenance, emergency care/medical, participant forms, participation education, and staff. Evaluative risk management survey questions and demographic information were used to obtain the data.

A Likert scale was used to indicate the range of responses, with the following values assigned: 5 = *always*, 4 = *frequently*, 3 = *sometimes*, 2 = *rarely*, and 1 = *never*. For demographic items, responses were open-ended, allowing respondents indicate a number and the trend related to past accident/injuries.

Participants

The total population (1,850) of directors of aquatic facilities in Taiwan was selected to participate in this study. They were identified by consulting the 2003 directory of schools (Department of Higher Education of Ministry of Education, 2003); the YMCA Taipei website; the Taiwan telephone directory; Chen-Chun Cheng, the editor of the 2003 R.O.C. Yearbook; and Hsiang-Chieh Chan, assistant researcher at the National Council on Physical Fitness and Sports in Taiwan.

Data Collection

To increase the survey response rate, the 50-item survey questionnaires were e-mailed and mailed directly to the 1,850 aquatic directors, requesting them to indicate the level of risk management implementation in their aquatic facilities. Each aquatic director also received an e-mail and personalized envelope containing (a) a cover letter explaining the purpose of the study, (b) instructions on how to complete the survey, (c) directions on how to return the survey once finished, (d) the 50-item swimming pool risk management survey with a demographic data/general information section, (e) a stamped, self-addressed return envelope, and (f) a return e-mail address. No space was provided for identification of the aquatic director; therefore, the survey was completely anonymous. All survey variables

were expressed as general risk management principles. It was not posited that these variables would be important in Taiwanese swimming facility operation in any prespecified way. Rather, the variables simply measured performance on a range of risk management practices to provide a descriptive analysis of the status of Taiwanese aquatic facility management.

Data Analysis

Descriptive Statistics. Once the data were collected, descriptive statistics were calculated for each factor in the demographic data/general information section of the survey for the trend of incidents of accidents/injuries and lawsuits, the composite scores for each item on the survey, and for the composite scores of each conceptual area (i.e., facilities and equipment, general practices).

Spearman Correlation Coefficients. A Spearman rank order correlation was then used to test for significance among the demographic data/general information variables, the risk management practice survey items, and the six major categories of the survey questionnaire.

MANOVA. MANOVA was used to see the main and interaction effects of independent categorical variables on multiple dependent interval variables (selected demographic factors, aquatic director's gender, age, years of experience and status of the aquatic center-public or private). Significance was set at $p < .05$ level.

Results

The study was designed to investigate the risk management status, risk management practice, and associated legal concerns in aquatic centers in Taiwan. Data were obtained through a 50-item questionnaire administered to 1,850 directors of aquatic facilities in Taiwan. A return of 51% (937) was received.

Analysis of Data

Demographic Data. Demographic data included gender and age of the aquatic director completing the questionnaire. Aquatic directors were asked the length of time they had been in their present positions. The data shows that the population was primarily male and only 161 or 17% of the 937 participants were women. Of the aquatic directors, 60% were below 40 years of age (average 39 ± 10 years old) and over 25% of the aquatic directors had at least 10 years experience in their current positions (average experience was about 8 ± 6 years). The average age of the aquatic centers was 13 years.

General Information. The general information requested included the activities offered, the existence of a risk management plan, and legal and injury information. Type of institution, gender ratio of participants using facilities, and swimming participation numbers were also gathered. The data indicates activities most often found in the pools in Taiwan were basic swimming classes (offered by 838 institutions) and water aerobic classes (offered by 223 institutions). Risk management plans existed in only 47 (5%) of the facilities.

Nearly 42% of the institutions reported three or more accidents/injuries per year. The majority of the incidents occurred in the locker room or the pool deck. Only 5% or 47 incidents occurred in the water. Despite the fact that nearly half of the institutions had accidents, only 16% had been sued with 3.9% having been sued three or more times.

Of the institutions returning questionnaires, 75% were private (versus public) institutions. Female daily participants exceeded male daily participants by an average of 10. Table 2 shows the ranked means and corresponding standard deviations for each of the 35 survey items from all aquatic directors. A 5-point Likert scale was used to represent the degree to which the aquatic director believed that s/he performed the risk management practice in his/her swimming pool/aquatic center using the following criteria: 1 = *never performed*, 2 = *once in a while performed*, 3 = *frequently performed*, 4 = *usually performed*, and 5 = *always performed*. The results of the analysis indicated that the means ranged from a high of 4.33 to a low of 1.81 on the 5 -point Likert scale. The standard deviation range was from 1.04 to 1.74.

Seven of 35 survey items had a mean score exceeding 4.0 on a 5-point scale. These risk management practices were *usually* being performed within aquatic directors' swimming pool/aquatic center. The risk management practices relating to the question 23 (aquatic program use of a participant waiver agreement; 2.92); question 16 (have a medical doctor on the premises; 2.88); question 24 (use of an acknowledgment of risk form for participants; 2.73) and question 25 (waiver clauses and forms approved by legal counsel; 1.81) fell below 3.0 on the 5-point Likert scale (Table 2). Means for the grouped areas under facilities and equipment of inspections and maintenance and under general practice of emergency care/medical, participant forms, participant education, and staff are reported in Table 3. Only the "participant forms" (2.883) category fell below 3.0 on the 5-point Likert scale. The results indicated that risk management practices were only being performed *once in a while* within the aquatic director's swimming pool/aquatic center (Table 3).

Relationships Among Demographic and Risk Management Variables

Spearman correlations were used to analyze the associations among institutional characteristics and risk management practices. Table 4 shows the results of the bivariate pairings of each institutional demographic variable with each risk management variable. Statistical significance of the Spearman correlations at the $p < .05$ level can be seen (Table 4).

A MANOVA statistical analysis was used to obtain an understanding of the impact of an aquatic director's gender, age, and/or years of experience on his/her risk management practice. Significance was set at the .05 level. A Tukey HSD Post Hoc Test was then used to find out where difference exists among the variables that produced the significance. The result shows the analysis by gender (Significance compared by mean score; Appendix A), while Appendix B shows the analysis by age. Appendix C shows the analysis by years of experience. Appendix D shows the analysis by institution's status (public or private).

Table 2 The Ranked Composite Means and Standard Deviation For All Individual Survey Items

Rank	Descriptor	Mean	SD
1	5. Inspect equipment on the premise	4.33	1.05
2	20. Full-time and part-time instructor requires first-aid, CPR	4.32	1.04
3	29. Give safety instructions to participants	4.14	1.25
4	26. Inform participants the dangers inherent in the activity	4.07	1.28
5	32. Permit participants to bring a friend to use the facilities	4.02	1.44
6	33. Identify national standards for instructional duties	4.02	1.37
7	19. Update first aid and emergency medical care credentials	4.02	1.29
8	1. Conduct regular facility inspections	3.98	1.29
9	6. Regularly inspect the premises for unsafe conditions	3.95	1.40
10	7. Water quality within the national aquatic standards	3.81	1.34
11	27. Provide instructions on proper use of the facilities	3.67	1.29
12	30. Use warning signs	3.61	1.57
13	11. Interior of the swimming pool well lighted	3.58	1.29
14	3. Use checklists when conducting safety inspections	3.58	1.55
15	35. Lifeguard performs their duties according to manual	3.42	1.42
16	4. Check for foreign substances and keep floor dry	3.54	1.50
17	13. Stocked first aid kits readily accessible for activities	3.45	1.35
18	17. Report injuries sustained to management	3.41	1.35
19	2. Keep inspection reports on file	3.37	1.56
20	31. Post procedures concerning the safe use of equipment	3.34	1.67
21	15. Concerned about possible liability	3.33	1.36
22	10. Keep a chart of maintenance performed on the premises	3.25	1.46
23	9. Prevent participants from using the defective equipment	3.25	1.35
24	28. Provide safety education to participants	3.21	1.74
25	14. Prepared for emergency medical service	3.16	1.41
26	12. Swimming pool clean	3.15	1.46
27	18. Insist an injured participant seek medical attention	3.15	1.39

(continued)

Table 2 (continued)

Rank	Descriptor	Mean	SD
28	8. Use building and equipment maintenance schedules	3.10	1.46
29	34. Have sufficient personnel to supervise patrons	3.09	1.56
30	21. Require participants to take a physical examination	3.60	1.48
31	22. Fill out a medical history report form prior to use facility	3.06	1.53
32	23. Aquatic program use a participant waiver agreement	2.92	1.51
33	16. Have a medical doctor on the premises	2.88	1.54
34	24. Use an acknowledgment of risk form for participants	2.73	1.51
35	25. Waiver clauses and forms approved by legal counsel	1.81	1.49

Research Question 1: What Is the Use, Accident, and Litigation Status of the Aquatic Facility? The results provide the use, accident, and litigation status of the aquatic facilities surveyed. The result also shows that less than 200 participants use the pool daily with the females using the pool more often than the males. One third of the professionals reported three injury incidents in the past year while over 40% reported one or two injury incidents. Only 16.2% had been sued. Three and nine tenths percent reported being sued three or more times.

Research Question 2: What Institutional Demographic Factors Are Most Closely Associated With Risk Management in Aquatic Centers in Taiwan? Table 4 indicates a correlation for demographic variables. For example, the demographic variable of the length of operation of the aquatic center is highly correlated with Q8 (Does your aquatic center use building and equipment maintenance schedules?; $sc = .084^*$), Q18 (Does your aquatic center insist that an injured participant seek medical attention?; $sc = .085^{**}$), and Q21 (Does your aquatic center require participants to take a complete physical examination before using your facilities?; $sc = .106^{**}$).

Research Question 3: Does an Aquatic Director's Gender, Age, and Years of Experience Affect His/Her Risk Management Practice in the Aquatic Center? Appendices 1, 2, and 3 can be used to answer research question 3. For example, Appendix 1 shows that males scored significantly higher than females on survey question 14: "Is your aquatic center prepared for emergency medical service?" on survey question 18: "Does your aquatic center insist that an injured participant seek medical attention?" and on survey question 30: "Does your aquatic center use warning signs?" The male mean score was higher than the female mean score by .295, .292 and .334, respectively. The results indicated that aquatic directors' gender did affect his/her risk management practice in his/her aquatic center on survey question 14, question 18, and question 30.

Table 3 Means and Standard Deviations for the Grouped Areas of the Survey Questions

Group Area from the Survey	Mean	SD
Inspections	3.793	.598
Maintenance	3.267	.595
Emergency care/medical	3.383	.466
Participant forms	2.883	.691
Participant education/instruction	3.664	.619
Staff	3.549	.831

Research Question 4: Does an Aquatic Center's Status (Public or Private) Affect an Aquatic Director's Risk Management Practice?

Appendix 4 shows that public aquatic centers scored significantly higher than did private aquatic centers on survey question 22: "Does your aquatic center ask participants to fill out a medical history report form prior to use of any facilities?" ($p = .019$). Private aquatic directors scored significantly higher than public aquatic centers on survey question 34: "Does your aquatic center have sufficient personnel to supervise patrons on the premises at any given time?" ($p = .045$).

Research Question 5: What Is the Relationship Between Incidents of Accidents/Injuries and Lawsuits in Aquatic Centers in Taiwan?

The statistical data indicate that 84.8% of 937 aquatic facilities reported at least one incident/accident in the past 12 months, and 16.2% (278 peoples) were involved in lawsuits. This data showed enough evidence to prove the relationship between incidents/accidents and lawsuits. The result shows us from the group of respondents that 15.2% of the participants reported that no accident/injury occurred in the past 12 months, 3.6% of the participants indicated that five accidents/injuries occurred, and about 84.1% of the participants reported the same amount of accidents when compared with the previous year. Respectively, 7.4%, 4.9%, 3.5%, 0.2%, and 0.2% of the aquatic facilities involved in the study have been the subjects of 1, 2, 3, 4, and 5 lawsuits while 83.8% had never been the subject of lawsuits. The data also indicate that about 86.9% of aquatic facilities had been in operation for less than 20 years.

Research Question 6: What Risk Management Practices Are Associated With the Aquatic Centers in Taiwan?

The results indicate the strongest Spearman Correlations between all items. The correlations on all survey questions, for example, between Q1 and Q2, Q1 and Q15, Q1 and Q23, Q1 and Q26, Q1 and Q28 and Q1 and Q33 ($sc = .073, .130, .100, .072, .017, \text{ and } .128$), Q2 and Q3, Q2 and Q5, Q2 and Q6, Q2 and Q7, Q2 and Q16, Q2 and Q22, and Q2 and Q29 ($sc = .132, .105, .70, .162, .203, .064 \text{ and } .112$) can be seen. More detailed explanations are as follows: Q1: Does your aquatic center conduct regular facility inspections? (i.e., check underwater pool walls, check ladders, and check if the lasers are anchored securely to the diving mount) is highly related with Q2: Does your aquatic center use checklists when conducting safety inspections? and Q15: If a participant sustains an injury, is your aquatic center concerned about possible

Table 4 The Result of Bivariate Pairings of Institutional Demographic Variables With Risk Management Variables

Age	Length in position	Length of operations	Risk Management Plan	Number of accidents in past Year	Number of times institution has been sued	Daily average number of male participants	Public/Private	Gender
Q8 .075* Sig .021	Q4 .073* Sig .010	Q8 .084** Sig .006	Q1 .090** Sig .000	Q5 .135** Sig .000	Q25 .136** Sig .000	Q2 .066* Sig .043	Q34 .084* Sig .010	Q4 .065* Sig .046
Q13 .109** Sig .001	Q7 .082 Sig .012	Q8 .085** Sig .009	Q12 .110* Sig .001	Q6 .127** Sig .000				
Q15 .079* Sig .015	Q13 .084** Sig .010	Q21 .106** Sig .001	Q19 .239** Sig .000	Q7 .091** Sig .005				
Q17 .081* Sig .013	Q14 .067* Sig .040		Q20 .106** Sig .001	Q14 .126** Sig .000				
Q18 .089** Sig .002	Q15 .101** Sig .002		Q26 .085** Sig .010	Q15 .159** Sig .000				

(continued)

Table 4 (continued)

Age	Length in position	Length of operations	Risk Management Plan	Number of accidents in past Year	Number of times institution has been sued	Daily average number of male participants	Public/Private	Gender
Q21 .083* Sig .011	Q17 .212** Sig .000		Q35 .70** Sig .033	Q21 .146** Sig .000				
	Q18 .099** Sig .002			Q24 .066* Sig .044				
				Q26 .077* Sig .019				
				Q27 .159** Sig .000				
				Q28 .064* Sig .049				
				Q35 .072* Sig .027				

* Correlation is significant at the .05 level (2-tailed).

** Correlation is significant at the .01 level (2-tailed)

liability? and Q23: Does your aquatic program use a participant waiver/exculpatory agreement? and Q26: Does your aquatic center inform participants in specific terms of the dangers inherent in the activity? and Q28: Does your aquatic center provide safety educations to its participants? and Q33: Does your aquatic center identify national standards or certifications required for instructional and supervisory duties and assign duties only to an individual who has met those standards? (Ex: American Red Cross Lifeguard Certification and Swimming Instructor Certification, etc.)

Research Question 7: What Are the Relationships of the Six General Practice Areas Under Facilities and Equipment: Inspections, Maintenance, Emergency Care/Medical, Participant Forms, Participant Education, and Staff? Spearman Correlations statistics were used to answer this question. The significant correlation relationships were found, for example, between the categories of facility/equipment and emergency care/ medical and emergency care/medical and participant education $p = .005$ and $p = .000$, respectively. Table 5 shows the relationships among the six major general practice areas.

Discussion

The purpose of this study was to investigate and understand the risk management practice and legal issues in aquatic centers in Taiwan. A series of seven research questions were raised to focus the investigation. Subjects returned a 50-item questionnaire, providing demographic and risk management information, to answer the selected research questions. A 51% return on the questionnaire was impressive.

Discussion of the Findings

A number of risk management studies have been conducted; however, no prior study exists in Taiwan that examines risk management practices in aquatics. Therefore, this study was explorative and descriptive in nature. Risk management models and a literature review provided the fundamental elements to develop this study. An analysis of court cases were conducted to understand the relationship between accidents/incidents and potential risk management.

The demographic information portrayed the professional as a male, under 40 years of age, who had 10 or less years of experience in aquatics. The average age of the pool where the professional was employed was 13 years with just over 10% of the aquatic centers considered new and the majority between 10 and 20 years of age. It would appear that there has been a significant decrease in the construction of new aquatic centers in Taiwan in the past five years. Swimming and water aerobic classes were the activities most often found in the aquatic centers. The daily number of participants in the aquatic center was between 50 and 100 with a higher rate of female than males.

The aquatic centers had an accident rate of three or less in the past year with the majority of incidents occurring on the deck of the pool and in the locker room. Of the accidents reported by aquatic directors, only 5% or 46 occurred in the water, which is unusual and does not compare with the drowning and accident

Table 5 The Spearman Correlations Among Six Major General Practice Areas From the Survey Question

	Facility & equipment	Maintenance	Emergency care/ medical	Participant forms	Participant education	Staff
Facility and equipment						
Maintenance						
Emergency care/ medical	.092** Sig.005					
Participant forms		.127** Sig.000				
Participant education	.085** Sig.009	.167** Sig.000	.189** Sig.000	.114** Sig.000		
Staff		.071* Sig.031			-.111** sig.001	

** Correlation is significant at the .01 level (2-tailed).

*Correlation is significant at the .05 level (2-tailed).

rates found in the literature. Drowning rates reported in the literature included open water and pools. This study covered swimming pools only. The drowning and accident rates reported are results of swimming pool incidents. The rate of accidents involving diving boards appeared to be similar to other parts of the world.

Even though institutions reported a total of 2,322 incidents and very few aquatic centers had risk management plans, only 16.2% or 152 professionals or their facilities had been sued. Taiwanese are either not litigious or are unaware of their personal rights. The researcher believes that injured parties are often given substantial settlements by an agency shortly after a severe injury has been sustained and that the population of the country is not inclined to rush to the courts, thus the low rate of litigations.

When professionals were asked to list the most important risk management concerns, they reported they were most concerned with the maintenance of the pool and deck and their legal protection should an incident occur. The same legal attitude influenced the response to the request for the most difficult risk management concerns. These responses were consistent with the professional responses to similar questions in the survey. Answers to questions regarding waivers were the lowest in the survey. Professionals may not be experiencing law suits and are ignoring risk management planning, but they are aware of what needs to be in place to protect their agencies from a law suit or to enable their agencies to succeed should suits occur.

This study highlighted the five most important and five most difficult risk management practice concerns among all aquatic directors. All aquatic directors surveyed seemed to agree that maintaining facilities is the most important risk management concern because three of the five questions that directors ranked as their most important risk management practices were related to facility maintenance. Aquatic directors' concerns focus more on facility liability issues, such as proper staff certification, asking participant's medical history, and use of participant waiver/ exculpatory agreements compared with other risk management practices.

The results indicate that public aquatic center directors pay more attention to obtaining medical histories than do private directors and that they show less interest in supervision than do directors of private aquatic centers. Older male aquatic directors were more concerned about participants' medical history and physical examination before participants used the aquatic center's facilities than female aquatic directors.

The results draw a certain pattern between incidents of accidents/injuries that suggests that even though accidents are common, few result in litigation. A total of 795 people from the 937 participating aquatic centers experienced at least one accident/injury in the last 12 months, but only about 17% of the total population was involved in lawsuits. Aquatic accidents/incidents do exist in the aquatic center setting in Taiwan, but litigation is infrequent. Providing basic knowledge about legal issues associated with accidents/incidents for citizens in Taiwan would probably increase litigation.

Answers to the following questionnaire questions were found to be above an average of 4.0: inspection of equipment, full and part time instructors with updated first aid and CPR, safety and risk instruction for participants, and familiarity with

national standards. Even though most professionals did not have a formal risk management plan, they were attending to pool inspections, credentials of lifeguards, and swimming instructors and the safety and risk awareness of participants.

The questionnaire responses averaging below 3.0 were waivers, medical doctor's presence, risk forms from participants, and waivers prepared by legal council. Preparation and use of waivers is usually a component of a written risk management plan and often occurs in response to litigation.

Conclusions

Several conclusions have been derived from the data. The following are provided as a summary of the findings:

- The average aquatic center professional in Taiwan is a male, under 40, who has held the position for less than 10 years.
- A significant decrease in the construction of new aquatic facilities exists in Taiwan.
- Swimming and water aerobics are the most common offerings in aquatic centers in Taiwan with between 50 and 100 people participating each day.
- Women have a higher rate of participation than men have.
- Water-related accidents in the research were low and did not compare with the rather high rate of drownings reported in Taiwan in general.
- Accidents occurring in the locker room and on the pool deck were higher than that found in other locations.
- Few aquatic centers have risk management plans.
- Few people in Taiwan sue for incidents occurring in aquatic centers.
- Even though professionals are not being sued, they are interested in risk planning to protect themselves in the future.

Implications

Aquatic center accidents have always been a concern throughout the world. Millions of people spend their time participating in water-related activities each year. Results of this study suggest that attention be given to incidents beyond the water to ensure a safe aquatic environment. Although Taiwan has a significant number of drowning and other water incidents they are not occurring in the over 50% of the aquatic centers returning the survey. These centers are experiencing incidents on the pool deck and in the locker rooms. A comprehensive risk management plan would give attention to all incidents and hopefully reduce those outside the water as well as those in the water.

Recommendations for Future Research

Based upon the findings of this research, there are several recommendations that should be considered for future research:

1. Since it was a national survey, an increase in response rate of the total participants would be beneficial to obtain the best understanding of the trends in swimming facilities in Taiwan.
2. Additional research should be conducted to determine the ways in which aquatic directors have handled potential risk. For example, how do directors' responses while dealing with emergency and potential risk? How do aquatic directors respond when they are sued by their clients?
3. The frequency of lawsuits against swimming facilities should be tracked, especially Taiwanese court cases associated with general aquatic center settings in Taiwan. By doing so, it would not be as difficult for us to figure out the relationships among lawsuits, the trend of incidents/accidents, and the highest accident rate location area, etc. Eventually, the data will help future researchers to understand and develop a more detailed risk management plan for aquatic centers.
4. The Taiwanese water-related litigation cases and all cases related should be filed and tracked. All findings can be applied and be reviewed and become very valuable sources for future study.
5. A well-development aquatic risk management plan and emergency action plan should be established and implemented into the real aquatic environment in Taiwan.
6. Later is better than never. The concept of risk management should be developed and included in the sport management curriculum in Taiwan.
7. The basic concept of law and the basic idea of lawsuit should be planted into citizen's daily life.
8. A qualitative study of Taiwanese aquatic directors to enhance the understanding of their experience, motivations and difficulties in practicing risk management within their aquatic centers should be completed.

References

- Anderson v. Claiborne City Rec. Club*. Miss. 812 So.2d 965 (2002).
- Babbie, E. (1992). *The practice of social research* (6th ed., pp. 262). Belmont, CA: Wadsworth Publishing Company.
- Clement, A. (1997). *Legal responsibility in aquatics*. Dania, FL: Sport and Law Press, Inc.
- Clement, A. (1998). Aquatics and the Law. In H. Appenzeller (Ed.), *Risk management in sport* (pp. 375–385). Durham, North Carolina: Carolina Academic Press.
- Clement, A. (2001). Children and Water Injuries. In J.L. Frost (Ed.), *Children and injuries* (pp. 333–372). Danvers, MA: Lawyers & Judges Publishing Company, Inc.
- Clement, A. (2004). *Law in sport and physical activity*. (3rd ed). Dania, FL: Sport and Law Press, Inc.
- Database of Citizen's Sport in Taiwan. (2003). *The prevention and handling of drowning accidents*. Retrieved July 19, 2003 from <http://www.hisport.net.tw/specialy/specialy48/specialy3.html>
- Department of Health Executive Yuan. Taiwan, R.O.C. (2003). *Health and national health insurance annual statistics information service—annual accidental drownings statistics in Taiwan*. Retrieved November 20, 2004 from <http://www.doh.gov.tw/statistic/index.htm>
- Department of Higher Education of Ministry of Education. (2003). *Council of academic reviewable and evaluation of the Department of Higher Education of the Ministry of Education*. Retrieved July 19, 2003 from <http://www.high.edu.tw/>

- Fletemeyer, J. (2003). Effective aquatic risk management: Seven steps to lowering your liability. *Parks & Recreation*, 38(2), 42–47.
- Gale Encyclopedia of Childhood & Adolescence. (1998). *Swimming*. Gale research. Florence, KY: Thomson Gale.
- Garner, B.A. (2000). *Black's law dictionary* (7th ed.). St. Paul, MN: West Group.
- Hill v. 24 Hour Fitness USA, Inc.* 2003 WL 21054726 (Cal. App. 1 Dist.)
- Hsiao, R. (2007). Analysis of risk management practices and legal issues in collegiate natoriums in Taiwan. *International Journal of Aquatic Research and Education*, 1(4), 341–362.
- Johnson, R.L. (2002). Aquatics. In N.J. Dougherty (Ed.), *Principles of safety in physical education and sport* (pp. 37–51). Reston, VA: National Association for Sport and Physical Education.
- Mills-Senn, P. (2000). *Water rescue sequence*. Retrieved July, 19, 2003 from http://www.usla.org/PublicInfo/library/Heimlich_Article_Mills-Senn_033000.pdf
- National Electronic Injury Surveillance System (NEISS). (2003). NEISS Data Highlights-2002. *Consumer Product Safety Review*, 8(2), 3–7.
- National Safety Council. (2003). *Fact sheet library: Water safety*. Retrieved July 20, 2003 from <http://www.nsc.org/library/facts/drown.htm>
- National Spa & Pool Institute (NSPI). (2003). *The economic impact of the pool and spa industry*. Retrieved Dec 19, 2003 from http://www.nspi.org/news_room/news_releases/825.cfm.
- Pediatrics. (2001, July). *Drowning dangers- statistical data included*. *Pediatrics for Parents*. Retrieved from <http://www.findarticles.com>
- Robison v. Chicago Park Dist.* 757 N.E.2d 565 (2001).
- Roberson v. San Diego Unified School District.* 2002 WL 997746 (Cal. App. 4 Dist.)
- Schwartz, D. (1998). Aquatic facilities: Managing risk in the physical environment. *Parks & Recreation*, 33(2), 68–73.
- Spannuth, J. (2001). *Don't call your swimming pool a lap pool!* Retrieved August 31, 2004 from <http://www.uswfa.com/forms/pressrelease1.pdf>
- US Bureau of the Census. (1995). *Statistical abstract of the United States* (115th ed.). Washington, DC: US Bureau of the Census.
- Wang, K.C. (2001). *Influences of sex, age, and water activities upon accidental drowning—application of log-linear model to model fitting*. Retrieved April 25, 2004 from http://practice.ntcn.edu.tw/mncc/v3_2/3_2_4.htm-9633-2001/08/31
- Wu v. Huang. Taiwan High Court* (2002). Retrieved from <http://www.chinapost.com.tw/detail.asp?onNews=1&GRP=A&id=20196>
- The, R.O.C. Yearbook. (2003). Sports and Recreation. Retrieved April 25, 2004, from <http://www.gio.gov.tw/taiwan-website/5-gp/yearbook/2001/chp23-1.htm#1>
- Thomas v. Wyndham Hotel.* 2003 WL 21040288(Ohio App. 6 Dist.)

Appendix A

Analysis by Gender: Individual Survey Items

Q14. Is your swimming pool prepared for emergency medical service?

* $F = 6.602$; $p = .002$

Tukey HSD ($p = .041$)

* Males scored significantly higher than females.

Q18. Does your swimming pool insist that an injured participant seek medical attention?

* $F = 4.673$; $p = .010$

Tukey HSD ($p = .041$)

* Males scored significantly higher than females.

Q30. Does your swimming pool use warning signs?

* $F = 4.505$; $p = .011$

Tukey HSD ($p = .038$)

* Males scored significantly higher than females.

Appendix B

Analysis By Age: Individual Survey Items

Q16. Does your swimming pool have a medical doctor on the premise?

* $F = 2.846$; $p = .006$

(F value is significant ; $p < .05$)

Tukey HSD ($p = .011, .002, .006$ & $.029$)

* 21–25, 26–30, 31–35 and 36–40 years old scored significantly higher than 56–60 years old.

Q21. Does your swimming pool require participants to take a complete physical examination before using your facilities?

* $F = 3.291$; $p = .002$

(F value is significant ; $p < .05$)

Tukey HSD ($p = .022, .044$ & $.025$)

* 36–40, 41–45 and 51–55 years old scored significantly higher than 31–35 years old.

Q22. Does your swimming pool ask participants to fill out a medical history report form before use of any facilities?

* $F = 3.022$; $p = .004$

(F value is significant ; $p < .05$)

Tukey HSD ($p = .030$ & $.003$)

* 56–60 years old scored significantly higher than 26–30 & 46–50 years old.

Q26. Does your swimming pool inform participants in specific terms of the dangers inherent in the activity?

* $F = 2.468$; $p = .016$

(F value is significant ; $p < .05$)

Tukey HSD ($p = .012, .037$ & $.014$)

* 26–30, 31–35 & 46–50 years old scored significantly higher than 51–55 years old.

Q29. Does your swimming pool give safety instructions to participants?

* $F = 2.212$; $p = .031$

(F value is significant ; $p < .05$)

Tukey HSD ($p = .030$)

* 26–30 years old scored significantly higher than 41–45 years old.

Q32. Does your swimming pool permit participants to bring a friend to use the facilities?

* $F = 2.429$; $p = .018$

(F value is significant; $p < .05$)

Tukey HSD ($p = .010$)

* 56

60 years old scored significantly higher than 41

45 years old

Appendix C

Analysis by Years of Experience: Individual Survey Items

Q2. Does your swimming pool keep inspection reports on file?

* $F = 3.570$; $p = .007$

(F value is significant; $p < .05$)

Tukey HSD ($p = .007$)

* 1–5 years experience scored significantly higher than 6–10 years experience.

Q4. Does your swimming pool regularly check for foreign substances on its floor and keep the floor dry?

* $F = 3.343$; $p = .010$

(F value is significant; $p < .05$)

Tukey HSD ($p = .033$)

* 21–25 years experience scored significantly higher than 6–10 years experience.

Q5. Does your aquatic staff regularly inspect equipment on the premises?

* $F = 4.150$; $p = .002$

(F value is significant; $p < .05$)

Tukey HSD ($p = .001, .006 \& .003$)

* 6–10, 11–15 and 16–20 years experience scored significantly higher than 21–25 years experience.

Q13. Does your swimming pool have stocked first aid kits readily accessible for all activities?

* $F = 2.880$; $p = .022$

(F value is significant; $p < .05$)

Tukey HSD ($p = .025$)

* 6–10 years experience scored significantly higher than 1–5 years experience.

Q16. Does your swimming pool have a medical doctor on the premises?

* $F = 3.890$; $p = .004$

(F value is significant; $p < .05$)

Tukey HSD ($p = .038 \& .041$)

* 1–5 and 11–15 years experience scored significantly higher than 6–10 years experience.

Appendix D

Analysis by Status (Public or Private) of Aquatic Center: Individual Survey Items

Q22. Does your aquatic center ask participants to fill out a medical history report form before use of any facilities?

* $F = 3.648$; $p = .026$

Tukey HSD ($p = .019$)

* Public aquatic centers scored significantly higher than private aquatic centers.

Q34. Does your aquatic center have sufficient personnel to supervise patrons on the premises at any given time?

* $F = 3.144$; $p = .044$

Tukey HSD ($p = .045$)

* Private aquatic centers scored significantly higher than public aquatic centers.