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Drowning Incident Rescuer Characteristics: Encoding the First Component of the 4W Model

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Drowning Incident Rescuer Characteristics: Encoding the First Component of the 4W Model

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The aim of the present study was to identify the rescuer characteristics. Qualitative content analysis was utilized to analyze drowning incident videos (n = 41) and semi-structured interviews of those involved in drowning incidents (n = 34). The rescuers were mainly but not exclusively males between 20–30 years old, physically strong, fit, with good vision, and swimming ability; they tended to hold an updated lifeguard qualification and had previous work experience as a lifeguard; they knew the dangers of the aquatic area. Most of them worked as a member of a lifeguard team, cooperated with other emergency services, were able to visually detect and recognize a drowning casualty and reacted fast despite the lack of response by bystanders.

Drowning is the third leading cause of unintentional injury death after motor vehicle collisions and falls (World Health Organization, 2004). As prevention is the most effective means of coping with drowning, a lifeguard presence that supervises the aquatic area and ensures that all the safety rules are maintained by the bathers is vital. If the preventative measures fail, then the rescue intervention by lifeguards or other professional rescue services is often required to avoid drowning.

Lifeguards cannot be completely effective for a number of reasons. First, lifeguard vigilance usually cannot be maintained on an optimum level for more than 30 minutes, and the detection of critical signals indicating a drowning in progress is never perfect (Coblentz, Mollard, & Cabon, 2001). The quality of visual scanning decreases during the day, due to a host of factors including fatigue, monotony, stress, heat, noise (Coblentz, Mollard, & Cabon, 2001; Ellis & Poseidon, 2001), the number of swimmers in the aquatic environment (Harrell, 1999) socializing, schoolwork, and even ancillary maintenance duties (Griffiths, 1995, 1998; Pia, 1984). Second, as lifeguarding is the first job that many young people ever hold, they may not have developed an appropriate work ethic to guarantee

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optimal safety (Griffiths, Steel, & Vogelsong, 1996, 1999). Third, because lifeguarding around the world often is not a highly paid job, the standards for qualifying someone as a lifeguard (e.g., in swimming speed) have dropped significantly through the years in an effort to find cheap labor (Brewster, 2007; Wood, 1999). Finally, the lifeguard presence cannot guarantee safety because poorly designed laws in some countries allow academic graduates who have specialized in aquatic sports to work as directors of lifeguard schools, beach lifeguard instructors and beach lifeguards without having an academic education in lifeguarding (Avramidis, 2003; Colman, Avramidis, Pascal Gomez, Vervaecke, & Persin, 2006a, 2006b; Decree-Law, 2000; University of Athens, 2001).

This inability of water safety professionals to prevent or cope with a drowning incident leads to a number of consequences. First of all, drowning survivors or even the rescuers might suffer from post traumatic stress disorder with negative consequences for their psychological health, especially when the nonfatally drowned person is a child, because the drowning event often evokes particularly strong emotions (Alonzo, 2000; Bouwer & Stein, 1997; Chemtob et al., 1998; Goleman, 1995; Grosse, 2001; Howsepian, 1998; Hildalgo & Davidson, 2000; Meyer, Theodorou, & Berg, 2006; Shannon, 1991). A near-death experience can some times produce distressing feelings and symptoms such as terror, horror, isolation, sleeplessness, depression, or guilt (Bush, 2006). Second, a pediatric water-submersion injury is a devastating situation that impacts all family members including parents, siblings, grandparents, and other members of the extended family. Such events can alter a family's functioning and its ability to carry on after the crisis. Indeed, it has been shown that 90% of all marriages break up within 5 years of the death of a child (Borta, 1991). Third, a drowning death might have implications for the lifeguard, the facilities or the employer, and the local authorities because of the legal repercussions and the financial liabilities (American Red Cross, 1995; Mone, 1980; Morizot, 2002). Fourth, both fatal and nonfatal aquatic incidents have high costs of medical care, especially when drowning casualties survive (Ellis & Trent, 1995; Walters et al., 1993). In the USA the annual cost of care per year in a chronic care facility for an impaired survivor of a drowning event was calculated at approximately $100,000 (American Academy of Pediatrics, 1993).

When taken together, the above facts raise several questions. What are the qualities that lifeguards and rescuers should possess to both prevent drownings and to perform effective rescues? Although employing someone as lifeguard or rescuer is a crucial step in the reduction of drowning incidents, it does not completely eradicate the problem. Research that reveals the critical characteristics of the most effective water safety professionals is clearly needed.

According to the 4W model of drowning, the most important contributing factor in determining the outcome of a drowning incident may be the rescuer and also the most important interaction among factors is how the rescuer interacts with the casualty (Avramidis, 2004b; Avramidis, Butterly, & Llewellyn, 2007). The rescuer characteristics that determine the outcome of an aquatic rescue, according to the 4W model of drowning, are age; sex; training; current level of experience, expertise, physical strength, vision, health, and swimming speed; knowledge of the particular dangers of the aquatic area; professionalism; the ability to do risk assessment, deal as educators, recognize a drowning victim, remain

alert, react ignoring bystanders' lack or response; and the presence or absence of others (Avramidis, Butterly, & Llewellyn, 2007).

Therefore a further examination of the rescuer is important for a number of reasons. First, it may reveal the key characteristics that a professional rescuer or lifeguard should possess, allowing rescue services and local aquatic facilities to make a more quality screening and judgment of the abilities of their potential employees. Second, it may show the qualities that should be possessed by the rescuers in order that a rescue may have a successful outcome. Taking into account the above, the authors undertook two studies to investigate who is most likely to be an effective rescuer. The methodological procedures were consistent with a previously published study (Avramidis, Butterly, & Llewellyn, 2007).

Method

Study 1

Data Sources. We used a criterion-sampling method (Patton, 1990) to obtain drowning-incident videos ($N = 41$) that were freely available in the public domain (BBC1, 2000, 2001, 2002; ITV, 2001; Mega Channel, 2001, 2002a, 2002b; Pia, 1970; Royal National Lifeboat Institution, 1994; Twenty First Century Films Production, 1998; Waga News, 2001). This method facilitated the identification of variables and their relations that would not otherwise be available for fatal or nonfatal traumatic drowning events. These visual narratives ranged in length from 30 to 720 s ($M = 345.0$, $SD = 2.8$).

Apparatus and Procedures. The authors observed the videos using a JVC television (CM31720–003) and a Panasonic videocassette recorder (AG-MD830). We watched videos and reduced data using NVIVO software (QSR, 2002) to perform appropriate qualitative analysis. One of the first things established was the length of each video narrative, because the aquatic emergencies were usually on video cassettes that contained other audiovisual narratives. Therefore it was not always clear when each narrative started and ended. This had to be defined to guarantee reliable and objective measurements during the two independent observations. The reset time button of the VCR was pressed as soon as the first visual or audio message related to the aquatic emergency appeared on the screen. For example, in some videos the audio narrative started before the actual visual portion, and in other cases, the visual video started before the audio narrative. In all cases the actual start point of the video was determined to be the appearance of the very first visual scene or audio narrative on the video. In cases in which the video was connected with transition effects (e.g., fade in) with the next or preceding video segment on the tape, the starting and finishing points were when the whole scene covered the whole TV screen.

As soon as the start and end points of the video were established, we watched the videotapes in real time, so that we could get overall impressions of the aquatic emergency and take rough notes. We then noted the objective and subjective content of the video. Objective content was defined as the observations of audio or visual information on which every person watching the video would agree (e.g., the type of rescue a lifeguard did, the aquatic environment in which the drowning

occurred, what persons said). We avoided recording unsupported assumptions and editorial comments. (An example of an objective description is "Mr. L.H. was immersed in the river. Mrs. L. McD was shouting to him to hold on to the collar of the dog that approached to rescue him." We avoided reporting that Mr. L.H. could not hear Mrs. L. McD because he was deaf or saying that the dog that rescued him was a Newfoundland unless those things were confirmed as facts on the video.) We defined subjective content of records as the responsive interpretations of the psychosocial dynamics of the scene. Subjective content might be information that could vary depending upon the number of times that the researcher observed the video or could be influenced by their age, gender, or personal history. (An example of subjective content might have included different interpretations persons might have drawn such as "After being saved by the dog, Mr. L.H. was very scared" or "After being saved by the dog, Mr. L.H. appeared to be depressed." A researcher's observations could therefore be influenced by his or her own age, gender, personal experiences, and number of times viewing the video.) The researcher could misunderstand what was being observed, resulting in mistaken interpretations of the situation (Gratton & Jones, 2004).

To minimize observer bias we observed each video twice during a period of 3 months. Any information that was common across each observation was recorded and saved as the final narrative. During the two independent observations, each story was transcribed twice, first to analyze all the audio messages in the video and second to describe what could actually be seen. This ensured that enough information about each story would be available for analysis instead of relying completely on the narrator's comments. Finally, each aquatic emergency narrative was divided into manageable sections (30 s long) so specific observations could be precisely located in the transcribed text. NVIVO also allowed the notation of the exact location of the coded text in the transcribed narrative by document number, paragraph, and line (Rich & Chalfen, 1999). Because the participants of the current study were the casualties shown in the videos, they had no direct communication with the researcher, and therefore threats to reliability such as participant error and participant bias were not present (Gratton & Jones, 2004).

Once the transcriptions were complete, they were converted into Rich Text Format (.rtf) files and imported into the software NVivo. Nvivo and all the procedures that are required for making a project, creating a proxy document (with video data), making and managing nodes (codes), and reporting the results were used as instrumentation of the content analysis following the guidelines of the manufacturers (QSR, 2002). *Node* is the word that NVIVO uses for "code" and it is intended to represent anything that project users may wish to refer to (Neuendorf, 2001). A data collection instrument (coding tree) was developed for describing different behaviors (Coleman, Stevenson, & Wilson, 2000) based on factors that were found in the literature review and seemed to contribute to a drowning incident (e.g., Table 1).

Nvivo software allowed the examination of the coded text by using the coding stripes (a procedure of identifying differently coded sections visually) or using the Node Browser that compared internally all data that were similarly coded. Reviewing the coded text twice enabled the establishment of new relationships between nodes and structuring free nodes into tree nodes. As the coding procedure

Table 1 The Frequencies of the Variables that Constitute the Factor "Rescuer" in the First Study (*n* = 41)

The Rescuer	Subscales
Gender	Male 37, 90.2% Female 1, 2.4% Animal rescuer 3, 7.4%
Age	Middle aged (20–30 years old) 26, 86.7% Youth (below 20 years old) 4, 13.3%
Current level of. . .	Experience 25, 61% Physical strength 20, 48.8% Vision 10, 24.4% Swimming speed 21, 51.2%
Knowledge of the dangers in the aquatic area they supervise	Dangers related to bathers 16, 39% Dangers related to lifeguards 8, 19.5%
Professionalism	Adequate number of Lifeguards and Surveillance 6, 14.6% Visible appearance and clothing 3, 7.3%
The ability to. . .	Do risk assessment 21, 51.2% Recognize instinctive drowning response 13, 31.7% Remain alert 29, 70.7% React ignoring bystanders' apathy 10, 24.4%

progressed, Nvivo was used to find areas in which themes overlapped by performing Boolean searches with matrix intersection to find the intersection of the various variables. Once the nodes had been consolidated and structured, they were ready to be entered into the Nvivo Modeler for conceptual model building (Rich & Patashnick, 2002). Document Text Reports were made for each aquatic emergency including information about the project, the user, the data, document title, when it was created, modified, brief description, and a document text.

Observational content analysis of the video-recorded incidents enabled us to examine the drowning experience "from the inside out." The objective data that the videos captured were rich in information that other forms of data could not duplicate. An example of the rich information was the audiovisual record of a girl being submerged under the water for 4 minutes, as she wheezed and gasped for breath with her hair caught in the water suction valve of a whirlpool. Content analyses were dependent on the careful observation of the videos, the categorization of the frequency and nature of the verbal interactions, the data analysis, and the writing of a brief report with recommendations for future practice (Booth, 1998).

Results

Table 1 summarizes the results of the study. Rescuers were found to be represented by both genders and age groups. In terms of gender, male rescuers far outnumbered (37, 90.2%) the females (1, 2.4%). Also a small sample of animal res-

cuers was present (3, 7.4%). In terms of age, the majority of the rescuers was aged between 20–30 years old (26, 86.7%) and only a small percentage of them was below 20 years old (4, 13.3%).

The current level of the rescuers on certain abilities necessary for the bather supervision and an effective rescue varied. For example while they were experienced in terms of working years (25, 61%) and remained alert in most cases (29, 70.7%), only in about half of the cases did they undertake the appropriate risk assessment (21, 51.2%), were physically strong (20, 48.8%), and fast swimmers (21, 51.2%). When evaluating their ability to visually detect the casualty (10, 24.4%), their professionalism (6, 14.6%), whether they were wearing visible and appropriate clothing (3, 7.3%), were able to recognize the drowning victim (13, 31.7%), and reacted ignoring the bystander's apathy (10, 24.4%), we found the levels of appropriateness to be lower again.

Study 2

Participants. With a combination of snowball and convenience sampling methods (Patton, 1990), we conducted semistructured interviews with 30 male and 4 female participants who were water safety or aquatic professionals (e.g., lifeguards, lifesavers, scuba divers, and athletes of aquatic sports) from various countries (Table 2). Participants provided institutional ethical informed consent to participate in semistructured interviews investigating the factors involved in drowning incidents.

Apparatus and Procedures. We used a Sanyo M-1110C audiotape recorder and 2-hr Maxell commercial audio cassettes to record the interviews. The people interviewed described the specific drowning incidents they had experienced. We employed a snowball or chain sampling method to locate information-rich key informants and critical cases who discussed their own experience (Patton, 1990). We distributed an information sheet to potential participants before the interviews explaining the nature and objectives of the study and obtained voluntary informed consent (Gratton & Jones, 2004). We conducted interviews using a semistructured interview outline, which included points relating to each of the four factors of interest associated with the 4W model (i.e., the rescuer, the casualty, the location,

Table 2 Demographic Information of the Participants in the Interview (*n* = 34)

Gender	30 males (age 16–65 years, M = 28.4, SD = 11.3) 4 female (age 19–65 years, M = 37.5, SD = 19.5)
Nationality	Greece (*n* = 25, 71.4%) United Kingdom (*n* = 2, 5.7%) United States (*n* = 1, 2.8%) Cyprus (*n* = 6, 17.1%)
Place of reported drowning	Sea (above the water surface; *n* = 23, 67.6%) Sea (under the surface of the water surface; *n* = 5, 14.7%) Lake (*n* = 2, 5.9%) Swimming pool or water park (*n* = 4, 11.8%)

and the circumstances). Confidentiality and anonymity were maintained throughout, and individuals were not identifiable from the raw data (Patton, 1990). Data were transcribed and entered into NVIVO for indexing and qualitative content analysis (Wengraf, 2001). The procedures adopted were consistent with those used in Study 1. All hard copies were kept in a locked cabinet, and electronic data were password protected.

Results

Table 3 summarizes the results of the second study. As in the first study, males dominated the lifeguard or rescuer profession (30, 88.24%), far outnumbering their females counterparts (4, 11.76%). In terms of age, most of the rescue workers and the lifeguards were between 20–30 years old (28, 93.3%) and only one case was below 20 years old (3.3%).

The rescuers showed some variation with regard to experience, speed of swimming, visual detection capability, and vigilance. About half of the aquatic safety professionals were experienced (17, 50%) and were fast swimmers (19, 55.9%); slightly fewer could visually detect the victim (16, 47%) but more could remain alert while on duty (22, 64.7%). A lower percentage, however, was proficient in physical fitness (14, 41.2%) and had the ability to react, ignoring the bystander's lack of response (14, 41.2%). Also the rescuers were more often aware about the dangers that were related to the bathers (13, 38.2%) and less often aware

Table 3 Frequencies of the Variables that Constitute the Factor "Rescuer" in the Second Study (*n* = 34)

The Rescuer	Subscales
Gender	Male 30, 88.24% Female 4, 11.76%
Age	Below 20 years old 1, 3.3% 20–30 years old 28, 93.3%
Current level of. . .	Experience 17, 50% Physical fitness 14, 41.2% Health 4, 11.8% Vision 16, 47% Swimming speed (of action) 19, 55.9%
Knowledge of the dangers in the aquatic area they supervise	Dangers related to bathers 13, 38.2% Dangers related to lifeguards 2, 5.9%
Professionalism	Adequate no of lifeguards and surveillance 13, 38.2% Visible appearance and clothing 7, 20.6% Record keeping and written operating procedures 4, 11.8%
The ability to. . .	Do risk assessment 5, 14.7% Deal as educator 1, 3% Recognize instinctive drowning response 9, 26.5% Remain alert 22, 64.7% React ignoring bystanders' lack of response 14, 41.2%

about the dangers that were related to themselves (2, 5.9%). In terms of professionalism, in some reported cases the number of the lifeguards on duty and the surveillance they maintained was adequate (13, 38.2%), they wore visibly identifiable clothing (7, 20.6%) and kept records maintaining written operating procedures (4, 11.8%). Finally only in a few cases did lifeguards state that their health was important in allowing them to perform their job (4, 11.8%), that they did the appropriate risk assessments in their facilities (5, 14.7%), that they had to deal as educators (1, 3%), or that they were able to recognize a drowning casualty to perform a rescue (9, 26.5%).

Discussion

Rescuer Characteristics

In terms of gender, we identified male, female, and animal rescuers in the current studies. Although females do work as lifeguards, life guarding and other rescue services are male dominated professions. On the other hand, animal rescuers like dolphins or dogs (trained and untrained) appeared to perform rescues in the current study (e.g., two cases of dogs saved casualties from drowning and one person reportedly was saved by a group of dolphins). The use of animals in rescue is documented in the literature (Avramidis, 1997, 1999, 2002; Avramidis & Avramidou, 2008). In particular, Newfoundland dogs have been taught to respond when a person is in difficulty in the water (Aberman, 1979; Edie, 1996; Drury & Linn, 1997) and dolphins have been reported to save distressed people (Cousteau, 1975).

In terms of age, our findings were different to what has previously been reported in the literature. Previous research has shown that 50% of the lifeguards to be aged 19 years or under (n = 3,000; Griffiths, Steel, and Vogelsong, 1996), in the current study most of them were between 20–30 years old and only occasionally were younger than 20 years old. This difference might be because in the earlier study most of the lifeguards had worked in a pool (70%) and a water park (18%) and only a few had worked in open water, while in the samples that were used in the current study most of the incidents occurred in open water (e.g., beach, lake, river, steam, harbor). It seems possible that the people choosing to work in open water are usually older and working on a full time basis, compared with their pools/water park colleagues, possibly because the younger ones work as part time lifeguards (Griffiths, Steel, & Vogelsong, 1996) in less demanding conditions and environments. An unspecified sample where the age was not established was also present (16, 21.3%).

Level of Experience and Expertise

Both studies involved professional lifeguards. Over half of the lifeguards and the rescuers could be labeled "experienced" in terms of years of employment, a very similar finding to that of a USA national survey that found that 40% of the lifeguards had worked for up to 2 seasons (Griffiths, Steel, & Vogelsong, 1996). Varied types and levels of expertise were demonstrated in some occasions. (e.g., In one rescue a pool lifeguard initiated underwater mouth-to-nose resuscitation on

a girl who remained in a whirlpool 4 minutes. In another scene reporters tried to rescue the stowaways in a river by throwing the cable of their video cameras. In another, bystanders tried to stop a car drifting away in a flooded river by using a rope. In yet another, a helicopter carried two divers who jumped into the water try to save the crew of spaceship Apollo 13, etc.)

Physical Strength and Swimming Speed

Physical strength and swimming speed was required by both amateur and professional rescuers in almost half cases of both studies. This is possibly the first time that the use of and importance of physical strength has been reported in the lifeguard literature; however, the 400m timed swim that most organizations worldwide (e.g., Avramidis, 2004a; Decree-Law, 2000; Wright, 2006) include as test requirement for certifying someone as beach lifeguard seems to be inappropriate. This is because 55% of drownings occur in water only just deeper than the person's height, and certainly in depths of no more than three meters (Stallman, 2008) and 90% of all drowning deaths occur within 10 m of safety (Orlowski & Szpilman, 2001). Instead, a timed swim in shorter distances should be included, because if the incident takes place up to only 50 m from the beach, the swimming speed of the rescuer over a shorter distance is more appropriate. When the distances from safety are greater, then the use of rescue board, power boat, personal watercraft, or other rescue method might be more appropriate.

Knowledge of the Dangers That Exist

Although accidents are caused by factors in the environment and must be recognized by the lifeguard if the accident is to be prevented (Hill, Howes, & Brown, 1973), in this study rescuers were only occasionally aware of the dangers that existed in the aquatic area for themselves (e.g., sloppy beach, cold water, etc.). This finding has a threefold interpretation.

First, some rescuers were aware of the dangers and this knowledge made them more careful of avoiding the risks (e.g., bystanders preferred to assist the casualty by making a human chain standing out of the cold water of the lake, and the fire brigade members used a ladder and later specialized scuba diving equipment in searching a submerged child below the ice. The professional rescuers of an old man trapped in the flooded river performed a throw rescue using a rope, instead of getting into the water to reach the casualty. A throw rescue with a rocket that connected a ship with the shore was used for saving the survivors of a shipwreck by professional rescue services).

Second, rescuers occasionally initiated a rescue although they knew the dangers, thus were acting out of altruism with, unfortunately, fatal consequences. Social conditions can make altruism more or less likely to occur in rescuers because it is not only a spontaneous or selfless expression of a desire to help (Wade & Tavris, 1993). Impulsive, altruistic behavior can therefore be fatal and an ability to perform risk assessment considering the dangers that might exist for the rescuer is needed (e.g., a father and son both drowned in a flooded river when the first tried to save the second).

Third, because the cases where rescuers took into consideration the dangers that existed during the rescue represented a relatively small percentage of the examined sample, this finding was discouraging, suggesting that the rescuers were often unaware and unprepared for the dangers that they would face in the aquatic area they supervised. This might have happened because not all the cases in the examined sample involved professional lifeguards. Indeed, more than half of the incidents occurred in areas without lifeguards, where amateur lifesavers or other emergency services (e.g., fire brigade, scuba divers, etc.) performed the rescue and thus it was not always possible to know the dangers of the area. On the other hand, this is again discouraging, because it shows that rescuers initiate rescues without perhaps being able to do the appropriate risk assessment, thus endangering their safety and the safety of the casualties.

Rescuers were occasionally aware of the dangers that existed in the aquatic area for the bathers and the casualties (e.g., holes, dangerous underwater life, sea currents, waves, tide, etc.). In those cases they performed a rescue in a way that would not jeopardize their safety by doing land based rescues (e.g., a lady trapped inside a car in a flooded river was rescued when bystanders who stayed on the land threw ropes to them. In another case, TV reporters threw the cables of their video cameras to save stowaways who were trapped by a river current when they were trying to cross the borders of their country).

Health

In some cases the health status of a lifeguard was reported as important in performing a rescue Some of the interviewees commented that their vision was "very good, so I can see easily a casualty and I am healthy, too" or "I was healthy and strong when I performed the rescue." Although only a few such cases were reported, the physical health and capability of the rescuer could be a key factor in a rescue and is worthy of further consideration.

Adequate Numbers of Lifeguards and Adequate Surveillance

We found the number of lifeguards on duty and the maintenance of an adequate surveillance as factors for effective lifeguarding in less than half of the sample. This finding agrees with Wood, (1999) who reported a desperate need for greater lifeguard employment within the aquatic industry. In most cases of the examined sample of both studies, the lack of trained lifeguards may have arisen because people chose to work in other financially more attractive jobs (Avramidis, 2008; Brewster, 2007) or perhaps because the local legislation didn't require lifeguard presence or the local authorities didn't enforce the regulations. In Greece the Decree-Law (2000) requires one lifeguard per 600 m of beach. The result is that Greece is the country with the 7th highest mortality rates in all age groups within the 22 countries of the European Union; average drowning rates in EU are 1.27 per 100,000 of population while in Greece the average is more than double that, at is 2.69 per 100,0000 population (WHO, 2003). Fenner and Harrison's (2002) questionnaire study doesn't specify the exact methodological procedure that was followed, but their statement that the safest width of beach for one lifeguard to scan and therefore take responsibility is 106 m seems to hold some validity.

Visible Appearance

An early U.S. Navy study found that the mixture of yellow-red (orange) is most readily detected in the sea; the redder the color, the better the visibility within a given range (Malone, Sexton, & Farnsworth, 1951). Therefore, according to this finding, possibly the only one in the literature, lifeguards should wear uniforms with such colors while on duty. Only in very few cases within the current study did the lifeguards wear high visibility red-yellow uniforms. This might be because part of the current sample was from America in the 1970s (first study), while the second study involved Greece and Cyprus within the last decade. Within the time frame of the sample researched the recommendations of Malone et al. had not been formally adopted. Now, the International Life Saving Federation, through their website, is trying to establish red-yellow as the official lifeguard colors.

The Ability to React Despite the Bystander's Lack of Response

Social conditioning can make altruism more or less likely to occur (Wade & Tavris, 1993) and a crowd may cause a trained rescuer not to react quickly. A rescuer needs to overcome personal fear and nervousness. The ability to recognize the emergency, a willingness to accept the personal responsibility, and courage to overcome fear are very important variables for initiating a rescue (RLSS Australia, 1992). In the current study in nearly one third of the cases, professional lifeguards and other rescuers reacted while bystanders failed to do so, demonstrating also the formers' ability to do risk assessment and their willingness to take responsibility for the situation. A lack of response in untrained people is understandable and more or less expected. In professionals, however, it is unacceptable to hesitate in responding immediately to the casualties. To do so may indicate a lack of up-to-date quality education. Even in a developed country such as the USA, 100 qualified lifeguards in a sample of 2,281 felt unable to demonstrate an effective rescue in the water (Griffiths et al., 1997). This clearly demonstrates an urgency to provide more quality training, staff training, and requalification within 1–2 years from the first award.

The Ability to Recognize a Drowning Victim

Aquatic safety professionals and bystanders were unaware in most of the cases of the outward behavior of a drowning casualty. Even though the majority of the lifeguards remained alert while on duty, it was discouraging to note that only one-third of them were able to recognize someone who was drowning (see Pia, 1970). Lifeguards can't possibly see everything all of the time (Ellis and Associates & Poseidon Technologies, 2001); they are reported to watch the water effectively only 51% of the time while on duty (Griffiths, Steel, & Vogelsong, 1999) and apparently unfortunately they are not always trained in detecting the signs of the drowning person. The same finding was also evident in cases where members of the public were the only witnesses and, as expected, they were perhaps even less likely than an aquatic safety professional to recognize a drowning victim.

The Ability to Deal as Educator

Although a high proportion of lifeguards have been reported to consider themselves as educators (Griffiths, 1995) the findings of this study revealed the opposite. It is likely that this contradiction in the findings might be due to the different systems and practices followed in each country. In the USA (Griffiths, 1995) and in UK, there is an emphasis on prevention. In the present sample relatively few cases were from USA or UK. The interviewees were mainly from Greece and Cyprus, countries that don't include prevention strategies to the same extent within their lifeguard training program, and therefore, their lifeguards are trained only to rescue people and not to educate them. On the other hand, it should be said, most of the video recorded incidents were from USA. In this study, however, the limitation of the methodological procedures did not allow for an examination of whether an educator's role had been performed.

Ability to Maintain Written Operating Procedures

In many countries with advanced safety procedures, lifeguard services design and implement a system of obtaining, storing, and retrieving information on the services rendered, special incidents, the population served, and other aspects of operations (Mc Cloy & Dodson, 1980). Although it was methodologically impossible to identify whether such procedures were maintained in the video recorded rescues, even in the interviews, only a few participants related such details with the outcome of the rescues when asked. Despite this finding, it seems that effective organization might play a role, at least to some degree, on the rescue. Indeed, when all possible likely causes of accidents are identified and the rules of the aquatic facility mean the lifeguards are familiar with them, then lifeguards will be more prepared when an incident occurs. Although only some of the interviewees reported the presence of such procedures, the numerical adequacy of the lifeguards on duty, the fact that they wore visible clothes, were able to deal as educators, and visually detect the casualty reinforced the need for all aquatic facilities to have some written safety operating procedures to cover any possible aquatic emergency. This is because all those variables constitute the content of the written operating procedures of an aquatic facility. Unfortunately, such operating procedures were not mentioned in the majority of the interviews.

The Ability to Visually Detect the Casualty

Lifeguards and other rescue professionals cannot save what they cannot see and therefore the ability to visually detect a casualty is vital. Although 80% of all information that a human receives from the environment is visual (Seiller, 1996, 1997), only one-third of the lifeguards/rescuers were able to visually detect the casualty in the current study. It should be mentioned, however, that in some of the incidents, visual detection was unnecessary due to the all too obvious nature of the incident (e.g., the surfacing of spaceship Apollo 13, an aircraft crash, shipwrecks, etc.). In those cases, other types of communication were or should be used, such as electronic or auditory signaling. Seiller's (1996, 1997) studies were based

exclusively on lifeguards who observed aquatic areas and did not refer to other aquatic emergencies. Therefore it is understandable why only one third of the rescuers visually detected the emergency; they either were made aware by bystanders about the urgency of the situation or realized it through other means of communication.

Further research is required to replicate the current findings. The current findings are subject to a number of different sources of potential bias. For example, those interviewed may struggle to accurately remember specific details about the drowning incident, and their perceptions are likely to have been influenced by the stressful nature of the situation. In some cases, considerable time had passed between the drowning incident and the interview.

These findings still have important implications for the lifeguard profession, as they show the characteristics that a potential rescuer and lifeguard are likely to have. The present findings suggest the importance of quality training, the need to belong to an organized team, and to have a high level of physical fitness, health, vision, and alertness. Clearly, factors have emerged from this study as being important and need to be considered during the lifeguard preemployment screening. Certification is important but not the only consideration.

Several questions were left unanswered. For example, although it has been found in the literature that the older lifeguard is normally the most experienced and therefore possibly more vigilant and effective, it has not been possible to determine which age group is the most effective as lifeguards. We found that lifeguards and rescuers from the age group of 20–30 years old were most often likely to perform a rescue, but this may simply represent that these are the most common ages for lifeguards. Age brings maturity but after a certain age there is also a decrease in physical functioning. Finally, although the educator's role is important for a lifeguard who works preventatively, in this study there was not enough evidence to support that this function actually takes place to any discernible extent within the sample observed.

Conclusions

Based on the findings of the current study, we concluded that the rescuers were mainly but not exclusively males between 20–30 years old, physically strong and fit, with good vision and swimming ability; they tended to hold an updated lifeguard qualification and had previous work experience as a lifeguard; they knew the dangers of the specific aquatic area. Most of them worked as a member of a lifeguard team rather than as a solo amateur lifesaver, and they tended to cooperate with other emergency services. Most rescuers were able to visually detect the casualty, they recognized various signals indicating a drowning, and reacted fast despite the lack of response by bystanders.

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