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PROTOCOLS OF INTERVENTION FOR INDOOR POOLS OF THE REGION OF MURCIA

Protocolos de intervención en las piscinas cubiertas de la Región de Murcia

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ABSTRACT: The deaths by drowning is the worst result that human interaction with the aquatic environment can have. The aim of this study was to study the safety of the indoor swimming pools in the Region of Murcia, from the point of view of the possession of a protocol in case of accident. 26 swimming pools were surveyed. Following the revision of the legislation, an interview was prepared in order to gather information on the human and material resources available to facilitate an intervention in the event of an incident. It is compulsory for the swimming pools to have a self-control protocol of the facility in which to collect the measures available for the safety of it. 19.23% of the swimming pools surveyed did not have an accident procedure. The main conclusion is that there is no obligation to have a protocol of action in the event of an accident, and it is necessary to create a protocol that covers the greatest number of situations and establishes the coordination between staff and rescue actions to be carried out.

KEY WORDS: Security, Prevention, Swimming Pool, Drowning, Coordination of Lifeguards.

RESUMEN: *Las muertes por ahogamiento son el peor resultado que se puede dar de la interacción del ser humano con el medio acuático. El objetivo de esta investigación fue estudiar la seguridad de las piscinas cubiertas en la Región de Murcia, desde el punto de vista de la posesión de un protocolo en caso de accidente. Se encuestó a 26 piscinas. Tras la revisión de la legislación, se preparó una entrevista para recopilar información sobre los recursos humanos y materiales disponibles para facilitar una intervención en caso de incidente. Es obligatorio que las piscinas tengan un protocolo de autocontrol de la instalación en el que recopilar las medidas disponibles para su seguridad. El 19.23% de las piscinas encuestadas no tuvieron un procedimiento de accidentes. La conclusión principal es que no existe la obligación de tener un protocolo de acción en caso de accidente, y es necesario crear un protocolo que cubra la mayor cantidad de situaciones y establezca la coordinación entre el personal y las acciones de rescate llevadas a cabo.*

PALABRAS CLAVE: *Seguridad, prevención, piscinas, ahogamiento, coordinación de socorristas.*

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1. Introduction

The aquatic environment is an place where numerous activities can be carried out, not only as a recreational resource, but as a place in which to do sports, and improve health (Rubio et al., 2015). In the 1980s Camus (1986) noted that water activities were not only focused on teaching swimming, but that the aquatic environment has been a challenge to dominate for humans from the beginning. Later, Abraldes (2014a), joins this idea, stating that most authors and historians attribute the birth of swimming to the moment when the human being tries to dominate his body in a medium to which he is not used to.

The activities carried out in the water, carry a level of risk, known and accepted in many cases, and unknown and unexpected in others. The accidents of bathers are one of the worst results that comes with the use of aquatic facilities, since they can cause serious injuries that leave aftermath, and are also a cause of morbidity (Gámez & Padilla, 2016). Each year, 372,000 drowning deaths occur worldwide, with drowning deaths among the top 10 causes of mortality (World Health Organization [WHO], 2016).

According to the National Report of Drownings produced from 1 January to 31 December 2017 of the Royal Spanish Federation of Rescue and lifesaving (RFESS, 2018a), in the last year, the number of drowning deaths throughout Spain reached 481, 44 more than in the last year (2016) (RFESS, 2018b). The Region of Murcia, ranked the tenth along with the Basque Country, contributing the figure of 18 drowned out of the 481 nationals (3.7%). Currently, according to the National Drowning Report from January 1 to April 30, 2018, there have been 69 deaths from drownings (RFESS, 2018c).

Numerous authors insist that the prevention of the risks related to the aquatic environment can be prevented and propose or point towards prevention measures (Arango-Posada, 2005; World Health Organization [WHO], 2016, 2017, 2018a Palacios & Barcala, 2012; Rubio et al., 2015; Sanz-Ups, 2011). The knowledge of the installation and the risks to which users are exposed, facilitates the prevention of these, providing the opportunity to establish the appropriate measures of prevention against all types of accidents (Abraldes, 2014b; Gámez & Padilla, 2017).

Preventive measures in the aquatic environment are "those measures that aim to eliminate, decrease or minimize the severity or likelihood of an incident occurring, and which are activated before the triggering of it" (Ministry of Health, Social Services and Equality [MSSI], 2014, p.28). Palacios (1996), defines prevention in the aquatic environment as the "set of preparations that are arranged in advance to warn, avoid or prevent an unpleasant event or accident, in any type of aquatic spaces (natural or artificial), in its immediacies and related activities" (quoted in Palacios & Barcala, 2012, p.51).

Even taking into account the prevention manoeuvres, the number of interventions is not reduced to zero, that is why Sanz-Arribas (2011) indicates if after carrying out the surveillance, prevention and control, the accident has not been prevented, an action must be performed that enable to rescue with as few sequels as possible.

The security measures of a swimming pool, are established according to the regulations to which the installation is subject, which in the case of Spain, is specific

to each in region. At the national level, Royal Decree 742/2013, of 27 September, laying down the technical-health criteria of swimming pools, implements the general guidelines for the whole of Spanish territory. Thus, the Region of Murcia is governed by both Royal Decree 742/2013, and Decree No. 58/1992 of 28 May, which approves the regulation on sanitary hygiene conditions for swimming pools of public use within the Region of Murcia , since there is no correction of the national, and the regional decree is more restrictive.

Therefore, this study aims to collect information on the existence or not of a protocol of action in case an accident could not be avoided, regulated by state and/or autonomous legislation, in the aquatic facilities of the Region of Murcia.

2. Method

2.1. Sample

This study involved 26 indoor public covered swimming pools in the Region of Murcia of the 51 registered. The definition of swimming pools for collective use used for this work, is that set out in Article 3 of Decree No58/1992, of 28 May, which approves the regulation on hygienic and sanitary conditions of the swimming pools for public use, in the Region of Murcia , "swimming pools for collective use shall be considered as swimming pools which can be used by the general public, either free of charge, by price or any other type or system of economic collaboration" (p. 3944). Therefore becoming exclusionary features of this study: swimming pools for private use, and swimming pools for public use not covered.

2.2. Materials

To gather information on the safety of swimming pools, a semi-structured and targeted "ad hoc" interview was conducted as a data collection technique (Annex 1).

The interview was confidential. The questions asked in each phase were as follows; in the first phase, they wondered the socio-demographic variables were: localization; type of management (municipal or private); and influx of users; in the second phase: the number of lifeguards and whether this number depended on the number of users or the number of vessels, and the rescue and immobilization materials available at the facility; and in the third phase, he wondered whether or not there was a protocol of action in the event of an accident at that facility. For the recording of the information, a registration sheet and annotations were used.

2.3. Procedure

The aim of this study arises from the concern to see how safe the indoor aquatic facilities of the Region of Murcia are safe. In order to close and specify the objective, a literature review of the legislation by which these entities are governed by both national and regional levels was carried out first. As a result of this review, this study focused on whether or not an accident protocol was present, and the material of rescue and immobilization resources available to the lifeguard personnel to complete the former.

Secondly, the best data collection technique was chosen for this topic. As a result the interview was chosen.

Thirdly, once the topics that provided relevant data were established, information and opinion were requested from those responsible for the indoor pools of the Region of Murcia.

All this information was compared with current legislation:

Royal Decree 742/2013, of 27 September, laying down the technical-health criteria of swimming pools.

Article 4(4) . Actions and responsibilities.

"The competent authority shall make available to the holders, adequate guidance to its territory for the design of the pool self-control programme or failing that, a programme of health surveillance of swimming pools for its territorial area." (p.83126).

Article 11, Point 5. Quality control.

"The pool holder must have a pool-specific self-control protocol, which will always be in the pool itself available to the maintenance staff and the competent authority, and must update it as often as necessary in each Case. This self-control protocol shall include at least the following aspects: (a) Water treatment of each vessel. b) Water control. c) Pool maintenance. d) Cleaning and disinfection. e) Safety and good practices. f) Pest control plan. (g) Management of suppliers and services." (p.83127).

Points 1 and 2 of Article 13.Incident situations.

"1. The situations of incidence are those described in paragraph 7 of Annex V.

2. Once the incident situation has been detected, the operator shall take appropriate steps to know the causes, as well as to take preventive corrective measures." (p.83128).

Article 16. Sanctioning Regime. Additional first layout. Actions of the Ministry of Health, Social Services and Equality.

"(b) To develop disclosure material on sun protection and prevention of drownings, head trauma and spinal cord injuries; guides on good practices in the maintenance of swimming pools; as well as a guide to the design of the self-control program" (p.83129).

Annex V. Notification of incidents in swimming pools.

Point 7. Type of incident: (p.83135).

a) Drowning.

b) Drowning resulting in death.

c) Spinal cord injuries.

d) Cranioencephalic trauma.

e) Severe burns.

f) Electrocution.

g) Chemical poisoning.

h) Other.

– Guide to the development of the pool self-control protocol. Ministry of Health, Social Services and Equality, 2014.

Introduction:

"This guide is structured in 7 chapters corresponding to the 7 headings of Article 11.5 of the Royal Decree 742/2013. Each of these chapters provides guidance for the development of the plan or procedure for each of the aspects to be addressed by the Self-Control Protocol. In no case is it intended to impose the structure, contents or form of presentation and includes only one of the possibilities to carry out such a protocol." (p. 2).

Chapter 5. Safety and good practices.

"The aim of the Plan is on the one hand to minimize the risk of accidents that could arise from the use of the facilities and ensure the safety of the users of the same and on the other hand to report those circumstances of interest to their health and Security. The scope of this plan affects all activities aimed at achieving these objectives." (p. 19).

"As regards the analysis and risk management of swimming pools, the safety plan and good practices should include aspects such as: [...] Risk management: Potential risks and assessing the most vulnerable populations, such as trauma, drowning, cuts, chemical poisoning, electrocution, etc., and applying measures to prevent or minimize them, such as the presence of a lifeguard, an emergency action procedure, proper custody and storage of chemicals and other materials, information to the public of specific risks and rules of conduct for their security, etc." (p. 20).

"Control of execution: The Royal Decree 742/2013 lays down the technical health criteria of swimming pools establishes the procedure to be followed in the case of incidents in swimming pools, defining them as those listed in paragraph 7 Annex V. This procedure provides that once the incident situation has been detected, the operator shall take appropriate steps to assess the causes, as well as take corrective and preventive measures.

It may be advisable, in the face of the plan, that measures are taken in the case of more common incidents, considering these as events that may pose a risk to the safety of users, such as situations in which the maximum capacity of the ins is reached (or vessel, frequent accidentality) associated with an area, conduct and/or specific situation, non-compliance with internal rules by the user, etc." (p. 20).

– Decree No. 58/1992 of 28 May approving the regulation on sanitary hygiene conditions for swimming pools for public use in the Region of Murcia.

Article 14.

"In all the vessels, and optionally in the children's, there will be at least two life jackets, which will be placed in the storage area near the platform or promenade that surrounds the vessel, and one on each side of it, in places easy to access for bathers. They shall be provided with a rope longer than the maximum width of the pool plus 3 m." (p. 3945).

Article 37. 1.

"The swimming pools for collective use will have a lifeguard with accredited experience in rescue and first aid that will remain in the facility during the entire

operating hours of the pool, establishing a system of shifts, if this were necessary, to cover that timetable. If the separation between the vessels does not allow adequate surveillance, the presence of a lifeguard in each of the vessels shall be mandatory.

Accreditation, which determines the experience required in rescue and first aid, shall be in the lifeguard's possession during the performance of his duties." (p. 3949).

Article 37. 2.

"Such personnel shall be responsible for the use and maintenance of an independent and adequate premises within the premises and intended for the provision of first aid. This place will have a table of first assistance instructions for accidents, as well as the minimum equipment and equipment indicated in Annex III." (p. 3949).

– Guide to the design of a self-control program in swimming pools. Ministry of Health and Social Policy of the Region of Murcia, 2014.

Section: 6. Safety and good practices.

"The pool owner must carry out a risk assessment of his establishment considering the design of the facility, the type of users, activities that are carried out at the same time and the levels of supervision available, in order to know the aspects of the operation of the pool that may pose a risk to bathers." (p. 5).

"It should contain aspects such as: [...] Hazards related to protective measures, whether or not there are: rescue and lifeguard or first aid training (accredited training, number, location), nursing, medical facilities, telephone, appropriate rescue equipment (aids to flotation, throwing ropes, poles,...) available in the vicinity of the pool, etc." (p. 6)

After this process, a data analysis, classification of all open answer questions, and the elaboration of tables with the Microsoft Excel program were carried out.

3. Results

In order to know which rescue and immobilization materials are needed for intervention in the event of an accident, and what is the train of action in case of incident, a review was carried out on the legislation governing these facilities Region of Murcia

For all this work, it was considered as "protocol of action in case of accident", those guidelines, written or not, that set out the risks and the steps to be taken in the event of an accident.

The data shown below refers to the legal requirements necessary for the management of safety in indoor pools, to what it regards to rescue and immobilization materials and procedure of action.

The sample of swimming pools in possession of an accident procedure was classified into two groups based on the self-definition of the facility coordinators as specific or basic.

Thus, the first group concreted further its method of action (n= 7), from now on: PAE, Group Procedure for Specific Action; and the second group, described his intervention as basic (n=14), Basic Acting Procedure group, from now on PAB.

Table 1 reflects the results that respond to the variable "possession of procedure of action in case of accident".

Table 1. Variable possession of procedure of action in case of accident

HE DOES HAVE		**HE DOESN'T OWN**
Specific	**Basic**	
26.92	53.85	19.23

Note: %-Percentage.

The 80.76% of respondents claimed to have an accident procedure in the event of an accident inside the pool vessel.

The acting procedure from the group in possession of a more specific action procedure (PAE) is set out below.

Table 2. PAE Group.

Pool 1	The number of lifeguards is conditioned by the influx of users. In those time slots where the installation is busiest, you can find up to 3 lifeguards. Each of them will have a function depending of been lifeguard 1, lifeguard 2, and/or lifeguard 3. The work of the first lifeguard will be to intervene and help the injured first; the lifeguard No.2 will be responsible for providing the necessary materials for instrumentalized cardiopulmonary resuscitation; and the lifeguard No.3 will call emergencies from reception. In case there is no lifeguard no.3, the lifeguard No.2 will make the emergency call as well. While the accident is being taken care of, the pool monitor team will be responsible for keeping the users of their classes under control. The position is not given to a fixed lifeguard, as the factors of boredom and lack of attention are more likely.
Swimming pools 2, 3, 4 and 5.	This group of swimming pools is coordinated by the same company. The number of lifeguards is fixed, i.e. there will be no more or less even if the influx of users varies. This facility provided data on the area from which the lifeguard will exercise surveillance. In the large vessels, 2 lifeguards will be placed in the guarding chairs; and a lifeguard doing the round.I n the rest of the vessels 2 more lifeguards will be located. Each lifeguard will be 30 minutes in each position, resulting in a rotational shift system preventing fatigue.
Pool 6	The number of lifeguards is fixed, there are 2 lifeguards. The procedure for acting in this facility involves lifeguards and monitors. While a lifeguard attends to the injured; the second lifeguard notifies the reception to make the call; and monitors control the swimming pool users, and even evict the pool to protect the privacy of the injured user.
Pool 7	In this facility, the monitors are the lifeguards of their own class, there is no one in charge of making the round. It can be found from 4 to 8 monitors. In the event of an accident, the monitor responsible for the user will be the one with the singing voice, and the rest of his colleagues will be in charge of helping and notify the administration to call 112.

Note: Doing the round comes from the verb Rondar: circling something; walking around someone, or following them continuously, to get something from them (Real Académica Española, [RAE]). In lifeguarding "do the round" is known as the action of watching while walking around the pool beach (area surrounding the swimming pool).

To what it regards the materials available to both the lifeguard service and the monitors of the installation, to attend to possible accidents, the data reflected in table 3 was found.

Table 3. Rescue materials (in %).

Ring	100
Tube	26,92
Buoy	3,85
AXILIARES	3,85

Note: %-Percentage.

Table 3 notes that the rescue tube is the second most frequently found material in these facilities.

Table 4. Immobilization materials. (%)

	Yes	**No**	**T.A.F.A.D.**
SPINAL BOARD	50	46,15	3,85
Collar	30,77	65,38	3,85

Note: %-Percentage; T.A.F.A.D. Higher Technician in Animation of Physical and Sports Activities (VET degree).

One of the 26 swimming pools surveyed, claimed to have these materials in the facility due to the classes given of the Higher Technical Degree Cycle in Animation of Physical and Sports Activities, as a resource to use in case of emergency.

The percentages between the using or not of the spinal board, in the installation, were very evenly matched.

4. Discussion

Analyzing the data of the literature review of the legislation at a national level, the owner of the installation must have a protocol of self-control specific to the pool. For the elaboration of this protocol, the Royal Decree establishes the competent authority as responsible for providing guidance for the elaboration of such a protocol, in order to offer suggestions to include in it; and responsible for knowing the causes of incidence and taking appropriate actions, to the owner of the installation. To what it regards to the number of personnel with lifeguard qualification. However the rescue and immobilization materials are not specified.

Under this legal framework, the Ministry of Health, Social Services and Equality published a guide for the development of the pool self-control protocol in 2014. In chapter 5 of this guide, on safety and good practice, it is aimed to "minimize the risk of accidents that could arise from the use of the facilities and ensure the safety of users in the facilities" (Ministry of Health, Services Social Affairs and Equality, 2014, p. 19).

At a regional level, the Decree 58/1992 does not include in any of its articles, the need to develop the self-control plan of the pool set out above. On the other hand, in 2014 responding to the legal requirements of the Royal Decree 742/2013, the

competent authority developed a guide for the design of the pool's self-control program in the Region of Murcia, in which it can be seen the absence of an epigraph recommending an accident protocol.

And to what it regards to personnel with a degree in rescue, Article 37.1 expresses the obligation to have a qualified lifeguard. It also adds, the application of a shift system, and the need to employ one more lifeguard, if the distance between vessels diminished the surveillance work. However, it does not establish what is the area per lifeguard, and therefore when it would be appropriate to have a lifeguard per vessels; nor does it regulate the shift system taking into account the fatigue resulting from the surveillance work (Federation of Rescue and Lifeguarding of the Region of Murcia [FSSRM], 2012). Regarding to rescue materials, the ratio of two life-saving floats per vessel is established, being optional in children.

Taking all this into account, these results and some of the coordinators interviewed, agree with the view that the requirements demanded to ensure the safety of users in this type of facility are insufficient and may raise doubts in their interpretation, undermining the quality of the lifeguarding service offered and the safety of users (Gámez & Padilla, 2016; Sanz-Ups, 2011). The variations of interpretation presented by the legislation, has the consequence of the creation of multiple systems and training programs to ensure safety in aquatic facilities (Gámez & Padilla, 2017). The result of this wide variations is reflected in the tables in the Results section.

The results of Table 1 reflect a high percentage of swimming pools that have some type of protocol of action, defined as specific or basic by the coordinators of the installation. However, any installation submitted a document explaining such a process, but verbalized by the coordinators.

By studying the data in Table 2, it is noted that each protocol has considered it relevant to define some factors or others: the number of first responders; ratio number of lifeguards-users or number of lifeguards- vessels; the pool area that corresponds to each lifeguard, and how to carry out the surveillance work; how to avoid or control the occurrence of fatigue during surveillance using a defined shift system or not; the functions of each of the first responders when intervening in the event of an accident; coordination with the rest of the facility staff (other lifeguards and monitors); and the actions concerning other users, whether or not they consider evacuating, among others. It should be noted that both the pools that verbalized and concreted their protocol, how those who merely answered that they had a basic procedure of action, present a type of common action: Protect-Warn-Aid, Proteger-Avisar-Socorrer (P.A.S.). One way or another, all these facilities are clear that the actions in the event of an accident should not endanger the life of the lifeguard or that of the other users; however, no specific form of action in the intervention of the accident is presented.

On the other hand, it should be noted that one of the groups at high risk of drowning of the population and therefore susceptible to drowning are children (Bierens & Warner, 2013; Gámez & Padilla, 2016; Salomez & Vincent, 2004; Taneja et al., 2008, quoted in Petrass & Blitvich, 2014); drowning is the second leading cause of death from unintentional injuries in children (Arribas-Sánchez, Bardón-Canchoa, Rivas-García, Mintegi, & Marañón-Pardillo, 2018; Gatica et al., 2017; WHO, 2018b). The highest global records in drownings are for children aged 1 to 4 years, followed by children aged 5 to 9 years (WHO, 2018c).

As to what regards to immobilization materials, the reason for requesting information about their use lies in the absence of such materials in either of the two documents of the legislation, but it is provided for in Annex V, Royal Decree 742/2013 , spinal cord injuries and head trauma as possible incidences. In a study conducted by Bárbara-Bataller, Méndez-Suárez, Alemán-Sánchez, Sánchez-Enríquez, and Sosa-Henríquez (2017), with the aim of knowing the epidemiological and clinical characteristics of patients with secondary to zambully spinal injury, 17.4% of cases occurred in swimming pools. It adds, that the standard handling of this type of injury is the full mobilization of the body, keeping at all times the cervical spine aligned, and cervical immobilization by the use of a rigid collar (Bárbara-Bataller et al., 2017). Likewise, the immobilization of the victim in case of cervical injury should be carried out only when there are clear indications of this, since unnecessary immobilization would delay the rescue and hinder the resuscitation maneuvers (Szpilman & Soares, 2004; Szpilman et al., 2014). And to do this, it would be necessary to have the specific material to perform the immobilizations within the water. Despite not being a mandatory material, the results obtained reveal that half of the pools have a spinal board, and 30% of these, with collar. On the other hand, Sanz-Arribas (2010) points out in his work "Rescue of accidents with possible spinal injury in the aquatic environment" that immobilization with this material, requires at least two people, that is why even though the availability of these materials, many facilities do not have the necessary rescue staff to perform the immobilization.

Gámez and Padilla (2017), described the pools for collective use, as one of the facilities with the highest percentage of drowning deaths, and these accidents have made numerous claims to the pool owners (Gámez & Padilla, 2016). In the past year 2017, of the 481 deaths by drowning throughout the national territory, 46 occurred in swimming pools (RFESS, 2018a). In the Region of Murcia, in the last 3 years, 10.4% of drowning deaths occurred in swimming pools (RFESS,2018d).

Although the collection of data on resuscitation is complex (Bierens & Warner, 2013), and some querys about drownings and their causes are unknown, while further research is being made to which measures and techniques are the most efficient and present increased chance of survival, proven prevention strategies should continue to be adopted (WHO, 2016).

Drowning differs from other injuries, in that when the drowning process begins, the result is usually fatal, and survival is conditioned by numerous factors unique to the place where the accident occurs. Among some of these factors are: the water temperature, the immersion time, the response time of the Emergency Services (Bierens & Warner, 2013), how quickly the rugged is extracted from the water, and the speed with which it is resuscitation begins (WHO, 2016).

Numerous items define the survival rate in warm and hot waters, as lower than cold waters (Arango-Posada, 2005; Deakin, 2012; Truhlá et al., 2015), unless the rescue is carried out within 4 to 6 min (Arango-Posada, 2005). A characteristic of the water of the pools, is the non-salinity, and this offers a disadvantage in resuscitation since the chances of success are lower in fresh water than in saltwater (Arango-Posada, 2005).

As regards to the duration of the dive, Truhlá, et al., (2015), associated in their studies, durations of less than 10 minutes with high probabilities of positive results; and the immersion durations longer than 25 minutes with low possibility. Quan et al. (2016), reduces the duration of a dive with favorable results for durations of less than

5 minutes, and agrees with the contribution that dives greater than 25 minutes have fatal results.

To what it regards to the response time of the emergency services, Claesson, Lindqvist, and Herlitz (2014), provide data that reveals that the arrival of the Emergency Services is a factor that conditions survival per month. So the delay of activation and the consequent delay in the arrival of these, increases the risk of unfavorable results (Szpilman et al., 2014).

By extrapolating these concepts of survival to the actions to be performed by the rescue staff in a facility, the survival of the users will be positively or negatively affected by the response speed of the lifeguard on duty. The deaths of bathers in swimming pools with rescue service are unusual (Gámez & Padilla, 2016). In 2017, 2,487 were registered alive in front of the 481 deceased, meaning that at least five people were rescued alive for each death. The rescue actions were carried out both by lifeguards who were part of the surveillance devices of these spaces, and by other users of them. According to the data collected by the Royal Spanish Federation of Rescue and Socorrism, in the Region of Murcia 35 rescues were carried out against 18 deaths, the relationship of 2 people rescued alive against 1 who died (RFESS, 2018e).

However, last year, in a study conducted by Gámez and Padilla (2017) with the aim of knowing the characteristics of the drowning process and its connection to the safety conditions of swimming pools for collective use, a total of 56 drownings in swimming pools, of which 49 died; and they got the events more commonly located in municipal pools (46.4%), alarmingly that among the most common causes of drowning, the highest percentage was the lifeguard's fault with 19.64%. In addition, this study identified, among other risk factors, insufficient or inadequate availability of water rescue and rescue equipment.

For these reasons, it would be necessary to establish a number of lifeguards based on the factors that influence the proper performance of the lifeguard's work. Pascual (1997), considers criteria to be taken into account in determining the number of lifeguards, the dimensions of the space to be monitored; characteristics of the area; the number of bathers; activities to be carried out; existing equipment; the type of surveillance that is carried out (static or dynamic); visual control of the area; and the potential risks of accidents (quoted in López-García, Abelairas-Gómez, Moral-García, Barcala, & Palacios, 2016). Other points to consider would be, coordination between first responders and monitors, and establishing the role that each plays in the event of an accident. Some swimming pools interviewed ensure that coordination with monitors is also a key to the success of situation management. This will speed up the process of removing and attending the victim, as well as warning time to the emergency services and thereby increasing the chances of success in the rescue.

In order to carry out all the steps and actions that involve a salvage chain, the staff of rescue professionals must be equipped with the necessary training to prevent accidents, monitor the bathing area from points with easy access to it (FSSRM, 2012), and act in an emergency; and must have the necessary materials to accelerate and facilitate rescue, extraction and care actions for the injured user (Palacios, 2012). To date and with the results of this work, there seems to be no doubt about the need for rescue personnel and qualified lifeguarding personnel in the facilities (Sanz-Arribas, 2011), however, the legislation makes no reference to what the proper

training would be to do this kind of work. Chamberlain and Hazinski, (2003), demanding the need to establish clear principles and provide useful and relevant knowledge in training courses, as the likelihood of resuscitation, not only depends on the quality of the education imparted, but that of the chain of survival working well. Considering also, wasted the potential of a lifeguard if the education guidelines are not effective or correct. The measures taken by the people present at the site of the emergency, may involve life or death (Truhlá et al. 2015).

All the data provided in the previous sections, together with the analysis of the data obtained in this work reflects the importance of studying all and each one of the risks and accidents that could occur in this type of facility, and establishing some preventive measurements including the development of a protocol of action in the event of any type of accident. This protocol should provide for the greater number of situations likely to appear in these facilities, and appropriate actions to deal with all of them, with the aim of minimising improvised interventions; acting time; possible aftermath; and to provide extensive incident experience to first responders.

In short, establish guidelines, to improve the safety of users and facilitate the actions of rescue personnel, since these drowning events are described mostly as fast and silent, and the ability of staff to prevent drownings and watching all bathers is limited (Gámez & Padilla, 2016). "The inherent risk of any activity cannot be increased by other factors, or third parties, by action or omission of actions of whether or not there should be performed" (English & Followed, 2012, p. 92).

With the creation and regulation of a protocol it is intended to join criteria, and propose an organization and management common to all facilities of the same territory, even if each facility has specific characteristics depending on the audience to which they offer services, number of vessels, influx of users, age of users, free swimming or group activities, etc., also have common and equal characteristics in all (López-García et al., 2016).

"Drowning requires several layers of protection" (Szpilman et al., 2014 p. 92), and the creation of a protocol of action would be one of them.

5. Conclusion

The legislation of Spain, which governs the indoor swimming pools, does not regulate, nor establishes the need to develop and possess a protocol of action in case of accident as a minimum requirement for the opening of such installation. Despite not being required to have such a protocol, 80.76% of the interviewees claim to have in their installation measures of action in case of incident. In all cases, these measures depend in large part on the training received by the lifeguards who form the rescue squad of that facility, resulting in a wide variety of procedures of action, which are mainly incomplete.

As far as rescue materials are concerned, the life ring is present in all installations thanks to regulation, however, it is optional in small pools despite children being a susceptible population. On the other hand, several respondents refer to the inability of this type of material in swimming pools. The rescue tube is located in 26.92% of the facilities surveyed, probably its availability on the premises is in order to replace the life-saving float. Regarding immobilization materials, although not a legal requirement, 50% of the facilities had a spinal board, and 30.77% had a collar.

Finally, based on all the data provided on the percentages of drownings, and the influence that actions have either they are applied or not, at the time of the accident, the main conclusion is reached of the need to equip the facilities with a protocol of action indicating the steps to be taken for each member of the rescue and lifeguard staff, in coordination with the staff of monitors, in the case that they have not been able to avoid an accident.

Many factors influence the presence of an accident, and the creation of a unified protocol is intended to know and solve all of them. Taking into account the results of this work, here are some of the points that should be reflected in a protocol of action in this type of installations:

– This document should include all possible incidents and actions that are required to guarantee life and the least possible consequences to the accident. For example, it should be taken into account that there is the possibility of head trauma, and that one possible treatment would be immobilization. In order to perform a freeze, a number of materials and personnel are required, all of this must be added in this document.

– For the creation of a protocol, it is necessary to determine the number of lifeguards that the installation has to carry out quality surveillance, and the necessary rescue actions. Surveillance will be of quality and effective provided that in the event of an accident, the lifeguard is able to assess the situation, decide and act, as quickly as possible, so it would be advisable to divide the facility into areas to be monitored according to the characteristics of making sure the area is adequately sized to rescue as quickly as possible. Rescue actions should be assigned to the personnel responsible for the intervention, i.e. each of the first responders must know in advance what their role is. Once the number of lifeguards required by the installation is known, a system of shifts and rotations should be established to avoid boredom, or work fatigue, to ensure continuous vigilance and safety.Another point to keep in mind is that in case the lifeguard has to take care of a user, someone should keep an eye on the rest of the people who are in the facility. Therefore, it is necessary to coordinate all personnel responsible for users and assign pre-accident functions. At this point, the evacuation or not of the vessels, and the functions to be performed by the monitors should be considered.

References

Abraldes, J. A. (2006). Water rescues using the life ring. In J. A. Abraldes, (Ed.), *Rescue and Lifeguard. Rescue Sequences in the Aquatic Environment* (pp.69-77). La Coruña: Federation of Salvamento e Socorrismo de Galicia (FESSGA).

Abraldes, J. A. (2007). Rescue techniques with material. In J.A. Abraldes, (Ed.), *Aquatic Rescue. Student Guide* (pp.241-268). Murcia: Catholic University of Murcia.

Abraldes, J. A. (2014a). Origins and historical evolution of aquatic activities. In J. A. Abraldes, (Ed.), *Swimming Foundations. Teaching Manual* (pp.13-33). Almería: Associations of Teachers of Physical Education of Almería.

Abraldes, J. A. (2014b). Aquatic installation. In J. A. Abraldes, (Ed.), *Swimming Foundations. Teaching Manual* (pp.33-53). Almería: Associations of Teachers of Physical Education of Almería.

Arango-Posada, C. (2005). Drowning and almost drowning. *Archives of Medicine (Col),*10, 42-50.

Arribas-Sánchez, C., Bardón-Canchoa, E.J., Rivas-García, A., Mintegi, S., & Marañón-Pardillo, R., representing the Unintentional Injury Observatory group of the Spanish Society of Pediatrics Emergency Society (RiSeup-Sperg) (2018). Inquiries related to unintentional injuries in emergencies in Spain: series of cases. *Anals of pediatrics*. https://doi.org/10.1016/j.anpedi.2018.02.003

Bárbara-Bataller, E., Méndez-Suárez, J.L., Alemán-Sánchez, C., Sánchez-Enríquez, J., & Sosa-Henríquez, M. (2017). Secondary spinal injury to diving in the Canary Islands. *Neurosurgery*, *28*(4), 183-189.

Bierens, J., & Warner, D. (2013). Drowning resuscitation requires another state of mind.*Resuscitation, 84*(11), 1467-1469.

Camus, Y. (1986). The aquatic environment: Practice, objectives and pedagogical approach. *Apunts: Physical Education*, 5, 27-36.

Chamberlain, D., & Hazinski, M. (2003). Education in resuscitation. *Resuscitation, 59*(1), 11-43.

Claesson, A., Lindqvist, J., & Herlitz, J. (2014). Cardiac arrest due to drowning-changes over time and factors of importance for survival. *Resuscitation*, *85*(5), 644-648.

Deakin, C. (2012). Drowning: more hope for patients, less hope for guidelines. *Resuscitation, 83*(9), 1051-1052.

English, E., & Seguí, J. (2012). Civil liability in activities in the natural environment in the autonomous Community of Catalonia. Prevention measures. *You're anot. Physical Education and Sports,* 109,89-97.

Gámez, J. J., & Padilla, A. (2016). Examination of swimming pool safety requirements associated with accidents through jurisprudence. *Sports Medicine Archives:Spanish Federation of Sports Medicine, 33*(171), 29-35.

Gámez, J. J., & Padilla, A. (2017). Drownings associated with swimming pools involved in court cases in Spain, 2000-2015. *Andalusian Journal of Sports Medicine, 10*(3), 106-111.

Gatica, C., Dri, J., Cortesi, V., Miranda, D., Ubeda, C., & Waisman, I. (2017). Opinions, practices and knowledge of pediatricians about the prevention of unintentional injuries. *Argentine pediatric saifiates*, *115*(6), 601-607.

General Subdirectorate of Statistics and Studies, General Technical Secretariat Ministry of Education, Culture and Sport (2017). Yearbook of Sports Statistics 2017.

López-García, S., Abelairas-Gómez, C., Moral-García, J.E., Barcala, R., & Palacios, J. (2016). Coordination of professional water lifeguards in natural aquatic spaces (beaches). *International Journal of Medicine and Sciences of Physical Activity and Sport, 16(*63), 403-422.

Ministry of Health (1992). Decree No. 58/1992 of 28 May approving the regulation on sanitary hygiene conditions for swimming pools for public use in the

Region of Murcia. *Official Gazette of the Region of Murcia(BORM)*131 of June 6, 1992, 3943-3949.

Ministry of Health of the Region of Murcia (2014). Guide to the design of a self-control program in swimming pools. Autonomous Community of the Region of Murcia.

Ministry of Health, Social Services and Equality (2013). Royal Decree 742/2013, of 27 September, laying down the technical-health criteria of swimming pools. *Official State Gazette (BOE)*244 of 11 October 2013, 83123- 83135.

Ministry of Health, Social Services and Equality (MSSI, 2014). Guide to the development of the Pool Self-Control Protocol.

Palacios, J., & Barcala, R. (2012). Prevention of water accidents and drownings. *Digital Journal of Physical Education*, 19, 50-64.

Perkins, G. (2005). In-water resuscitation: a pilot evaluation. *Resuscitation, 65*(3), 321-324.

Petrass, L., & Blitvich, J. (2014). Preventing adolescent drowning: Understanding water safety knowledge, attitudes and swimming ability. The effect of a short water safety intervention. *Accident Analysis & Prevention*, *70*, 188-194.

Quan, L., Bierens, J. , Lis, R., Rowhani-Rahbar, A., Morley, P., & Perkins, G. (2016). Predicting outcome of drowning at the scene: A systematic review and meta-analyses. *Resuscitation*, 104, 63-75.

Rescue and Lifeguard Federation of the Region of Murcia (FSSRM, 2012). Lifeguard course notes.

Royal Spanish Federation of Rescue and Lifeguard (RFESS, 2018a). National report of drownings from 1 January to 31 December 2017.

Royal Spanish Federation of Rescue and Lifeguard (RFESS, 2018c). National report of drownings from 1 January to 30 April 2018.

Royal Spanish Federation of Rescue and Lifeguard (RFESS, 2018d). Comparative report of the Region of Murcia of drowning deaths 2015, 2016, and 2017.

Royal Spanish Federation of Rescue and Lifeguard (RFESS, 2018e). At least five rescues for each one drowning death in 2017.

Royal Spanish Federation of Rescue and Lifeguarding (RFESS, 2018b). National Report of Drownings Produced from January 1 to December 31, 2015, 2016 and 2017.

Rubio, B., Yague, F., Benítez, M.T., Esparza, M. J., González, J.C., Sánchez, F., Vila, J., & Mintegi, S. (2015). Recommendations for the prevention of drowning. *Anals of Pediatrics*, 82, 43.e1-43.e5.

Salomez, F., & Vincent, J. L. (2004). Drowning: a review of epidemiology, pathophysiology, treatment and prevention.*Resuscitation, 63*(3), 261-268.

Sanz-Arribas, I. (2010). Accident rescue with possible spinal injury in the aquatic environment. Library and files. Autonomous University of Madrid.

Sanz-Arribas, I. (2011). Coordination of lifeguards in swimming pools with large sheets of water. *International Journal of Medicine and Sciences of Physical Activity and Sport, 11*(44), 650-673.

Schmidt, A., Szpilman, D., Berg, I., Sempsrott, J., & Morgan, P. (2016). A call for the proper action on drowning resuscitation. *Resuscitation*, 105, e9-e10.

Szpilman, D., & Soares, M. (2004). In water resuscitation-is it worthwhile?. *Resucitation, 63*(1), 25-31.

Szpilman, D., Webber, J., Quan, L., Bierens, J., Morizot-Leite, L., Langendorfer, S. J., Beerman, S., & Lufgren, B. (2014). Creating a drowning chain of survival. *Resuscitation*, *85*(9), 1149-1152.

Truhláo, A., Deakin, C., Soar, J., Khalifa, G. E. A., Alfonzo, A., Bierens, J. J., ... Koster, R. W. (2015). European resuscitation council guidelines for resuscitation 2015: section 4. Cardiac arrest in special circumstances. *Resuscitatio*n, 95, 148-201.

World Health Organization (WHO, 2016). World report on drownings: preventing a major cause of death.

World Health Organization (WHO, 2017). Prevent drownings: practical guide.

World Health Organization (WHO, 2018a). WHO highlights the devastating global effects of droughts.

World Health Organization (WHO, 2018b). More than 2000 children die each day from unintentional injuries.

World Health Organization (WHO, 2018c). Drownings.

APPENDIX 1

IDENTIFICATION DATA

1. Location.
2. Municipal or private.
3. Influx.

– Normal in a day.

– Maximum per month, quarter or year (Depends on how they control their influx).

– Maximum number of users within the pool.

PROTOCOL AND MATERIALS

Data to be collected:

1. No lifeguards.
2. Lifeguards per vessel, or lifeguards per user.
3. Possession or not of protocol.
4. Rescue materials.
5. Immobilization materials.

Question Options:

– How many lifeguards are in the pool?

– If you don't point out how many per vessel, ask: How many per vessel, or does it depend on whether there are more users?

– Does the number of lifeguards vary or is it fixed? That is, does it increase if there are more users or decreases if there is less influx?

– In case of an accident, Do you have a certain protocol?, How would they act?, Who calls 112?, Does the pool evacuate?.

– What materials do first responders have for rescues? (it is linked to the one that asks whether or not it has a protocol).

– And do they have any immobilization materials?

OBSERVATIONS, OPINIONS AND MORE DATA

(Write down the name and number)