Environment understanding, signage perception and safety education in Biscay beachgoers under the view of lifeguards

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Abstract

In Biscay beaches the Biscay Regional Council (BRC) is in charge of looking after the safety of beachgoers and its efforts are focused in the reduction of drownings and accidents to zero. Lifeguard services in summer are wide enough to reach this target, however it is also depending on the beach users who have to obey the rules for bathing. Moreover, the different activities in the surf area increase the hazards and the disputes between users. In this way, proactive actions as warning signage and environment education should be useful for beachgoers to widen their knowledge of the potential risks and the way to avoid them. The motivation for this study is to analyze the beachgoers' environment understanding, their signage perception and their behavior and safety education under the view of the lifeguards. Methodology is based on a main survey addressed lifeguards and a second survey addressed users. The analysis of these surveys brings to the necessity of a common safety educational plan and a standardized flag and signage plan supported by the Spanish Authorities.

Keywords:

beach signage

beach lifeguards

environment understanding

safety educational plan

1. Introduction

Beach is an area forming a shoreline or sloping bank at the edge of the sea or a river estuary or lake (ISO 20712-2, 2007). Beaches are conceived as recreational areas due to the existing demand for sunbathing and relaxing (Breton et al., 1996). Satisfying human leisure needs is considered to be one of the purposes of beaches (Ariza et al., 2008). This has increased the use of the beaches lately, especially in marine zones due to the growth of aquatic sports. The present study focuses on how different users manage the bathing (swimming) areas. Currently, bathers, who go into the sea for leisure, coexist with free practitioners of aquatic sports and those who hire the services of companies (the focus here being mainly on surf schools) to do different kinds of aquatic activities.

Safety is a priority for recreational activities at the beach (Dougherty, 1998; Bentley et al., 2001; Barton, 2007; Cheng et al., 2016). Beaches are places where unknown dangers may surprise a lot of users. Beaches also have a dynamic component and it is normal to find safety signs/notices at their access. These signs provide a lot of different information which usually includes a general description of the beach, beach rules, as well as information on what to do in case of an emergency. But beach conditions may change dramatically over the day due to the ever-changing environment. Therefore, it is important to have some knowledge of the bathymetry, rocks location, tides, waves, wind and swell conditions to be able to spot the most hazardous areas for users. Moreover, beachgoers might be aware of risks prevailing in the surf zone as rip currents if they know the morphodynamics of the beach (Short and Hogan, 1994; Benedet et al., 2004; Scott et al., 2008; Scott et al., 2009). For instance, sandbanks and channels are likely to generate rip currents (Wright and Short, 1984). The capacity of beach users to be aware of these beach conditions is defined as environment understanding in this document.

The Risk is defined by IPCC (2012) as a function of hazard, exposure and vulnerability. Beach hazards are difficult or impossible to eliminate; the exposure to risks goes hand in hand with the knowledge and identification of each risk in question; and the users' vulnerability with their profile. Risk is the sum of different types of hazards like the presence of rocks, rip currents and the number of people on the beach (Short, 1999; Berribilli et al., 2007; Albuquerque et al., 2010; Basterretxea-Iribar et al., 2019). Risk, in the same way, can increase or decrease depending on people's exposure to the dangers (Dal Cin and Simeoni, 1994; Dolan and Walker, 2004; Cervantes et al., 2015).

Visitors often ignore the variety of dangers associated with the beach. Therefore, they are exposed to an inherently risky environment (Short and Hogan, 1994; Ballantyne et al., 2005; Scott et al., 2009). Users must satisfy their own expectations in terms of social experience and they should do it in a safe way, if possible. It is necessary that beaches present adequate resources to improve the beachgoers' overall safety. For instance, signs warning bathers of rip currents or submerged rocks (Jiménez et al., 2007; Morgan et al., 2008; Williams and Micallef, 2009; Bordehore et al., 2016).

Warnings must be designed to alert the potential audience, to provide information about the potential or actual hazards, the potential consequences and about appropriate behavior to avoid those consequences (ANSI Z535-4, 2011b). If the potential hazards and consequences are clearly displayed on the warning signs, this should increase the users' obedience towards those warnings. Warnings should comply with the rules of design and symbols related with safety (ANSI Z535.3, 2011a; ISO 3864-1, 2011; ISO 3864-3, 2012). In this way, the ethic committee of ISO has designed water safety signs and safety flags at beaches (ISO 20712-1, 2008a; ISO 20712-3, 2008b). The flags used at the beach are a primary safety strategy.

When analyzing the psychology of risk perception, warnings must be designed to follow mental models (for a detailed review, see Riley, 2014) as well as to be effective for all receivers, without forgetting the elderly (McLaughlin and Mayhorn, 2014) and children (Esra Bas, 2014).

To address the environmental hazards, knowledge communication experts advocate the hazard control hierarchy, or the so-called safety hierarchy, where they define the priorities to address the risks in question (Haddon, 1973; Sanders and McCormick, 1993; Wogalter et al., 1999; Laughery and Wogalter, 2014). It is better to have design and other engineering controls in opposition to signs, the latter being lower in the control hierarchy. Signposting as communication, namely as a warning, is destined to provide information to the audience to whom it is addressed (Laughery, K., 2006). Even though it is a lesser step of control, if the information is received and understood, it could be considered a success (Cox et al., 1997). Due to the nature of the beach environment, where it is impossible to implement design controls for the hazards, the use of warnings could be one of the few solutions when it comes to hazard control, together with the public awareness and danger related campaigns (Matthews et al., 2014). Educational campaigns have been very successful so far (Hatfield et al., 2012).

2. Method and material

The methodology follows the diagram shown in figure 1. After the bibliography and the legal framework review, the compilation of the general information associated to the study area was carried out. The University of the Basque Country (UPV/EHU) approved the study methods.

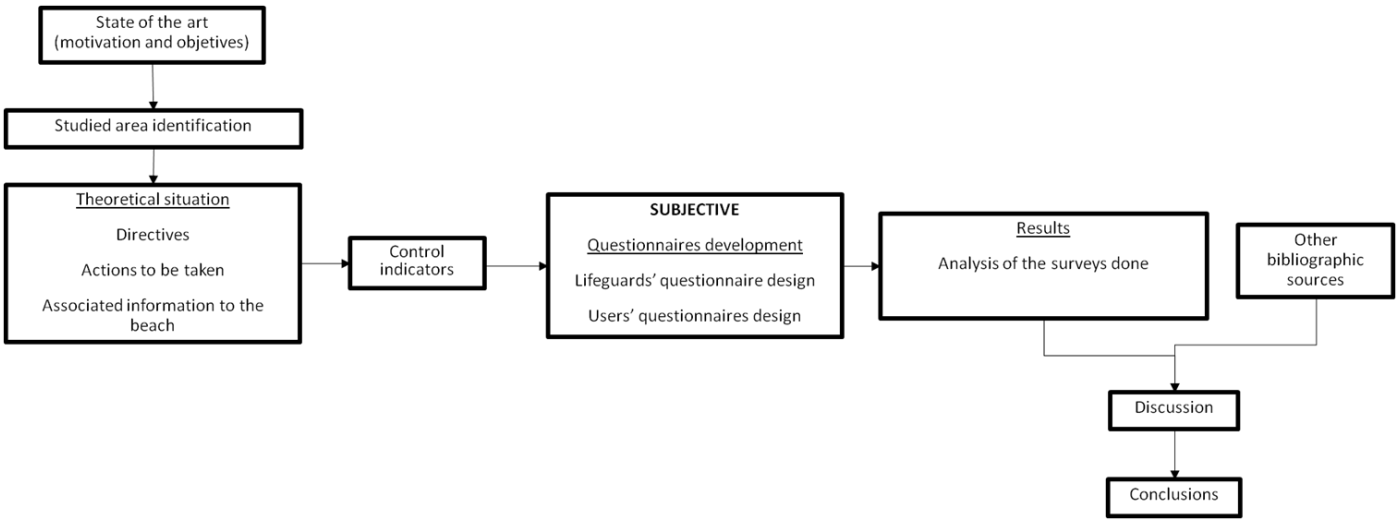


Fig. 1. Used methodology diagram.

2.1 Study area identification

The province of Biscay reaches ten per cent of northern coastline of Spain and there are more than twenty beaches under the control of BRC. The beaches are small and mainly opened to North-Northwest seas. Although the Surf Schools are operating in only nine beaches, surf and other aquatic sports are usual in all beaches. The BRC pushes for the service of rescue and first aid for all its beaches, the policy being to have one company in charge of all the necessary services at all the beaches where first aid is offered, allowing a standardized management system. However, these services are not similar along the North of Spain coastline and, consequently, the signage and system of rescue and first aid may change radically in beaches separated a little less than a few kilometers.

2.2. Surveys designs

Once the different variety of flag signage systems used along the beaches was surveyed, a database was generated in order to develop the indicators to be control via the surveys (table I). This will be the base for the questionnaire. The University of the Basque Country (UPV/EHU) designed the surveys.

Table I. Indicators to be controlled

I	Lifeguard/Beachgoer profile
II	Understanding of one's environment
III	Flag signage system
IV	Citizen beachgoing education plan

2.3. Questionnaire to lifeguards

The survey that was distributed to 149 lifeguards out of 154 who do the rescue and first aid service in the province of Biscay. All the lifeguards' answered the questionnaire (Annex I) at the end of the summer season once having realized rescue and first aid service on Biscay beaches.

2.4. User questionnaire

The user surveys were done by Red Cross volunteers who asked people who were on the beach, using a questionnaire designed for this purpose (Annex II). Beachgoers were chosen at random to carry this out. The survey was carried out on 119 users at 21 beaches in the province of Biscay providing rescue and first aid service. The purpose of this questionnaire is to increase and compare the results of lifeguards' survey concerning the users' environment and signage perception.

3. Results

3.1. Lifeguard survey

3.1.1. Lifeguard profile

Q1-Q2-Q3-Q4-Q5-Q6-Q7-Q8

The lifeguard profile at Biscay beaches is that of a 23-24 year old male (mean). Coordinators must prove to have 5 years of experience or more and are male. The age range among females is between 18 to 33 years old, while male's is wider, from 18 to 43 years old. Figure 3 shows a lifeguard classification by age and experience, dividing male/female, coordinator/ non coordinator.

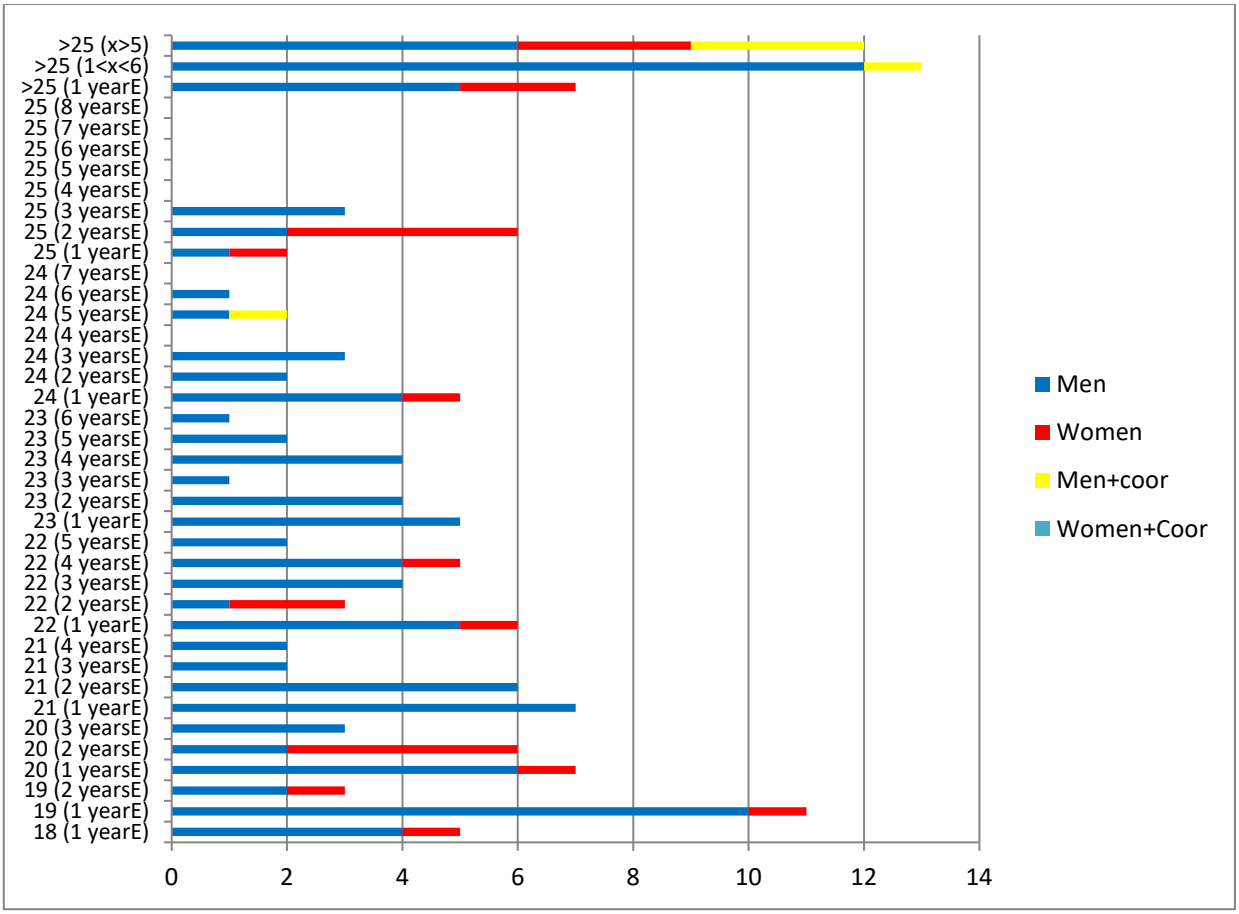


Figure 3. Lifeguard profile frequencies table.

91% of the lifeguards go to the beach the rest of the year as opposed to 8% that do not (1% do not answer).

48% are surfers, 24% do other aquatic activities and 27% are not surfers nor do they do any kind of aquatic activity (1% do not answer).

67% have not had to do rescues outside the rescue and first aid schedule whereas 32% had to (1% do not answer). A total of 48 lifeguards had to rescue someone outside the rescue and first aid schedule (33 of them are surfers). 39 out of the 48 lifeguards do aquatic activities including surfing. Rescues were carried out on all kind of age groups as well as occurring at any time of the year. The number of rescues effected by each lifeguard outside the rescue and first aid schedule are as follows: 37% have done 1 rescue, 19% have done 2 rescues, 17% have done 3 rescues and 27% have done more than 5 rescues. Therefore, over 142 rescues were effected outside of the lifeguard schedule.

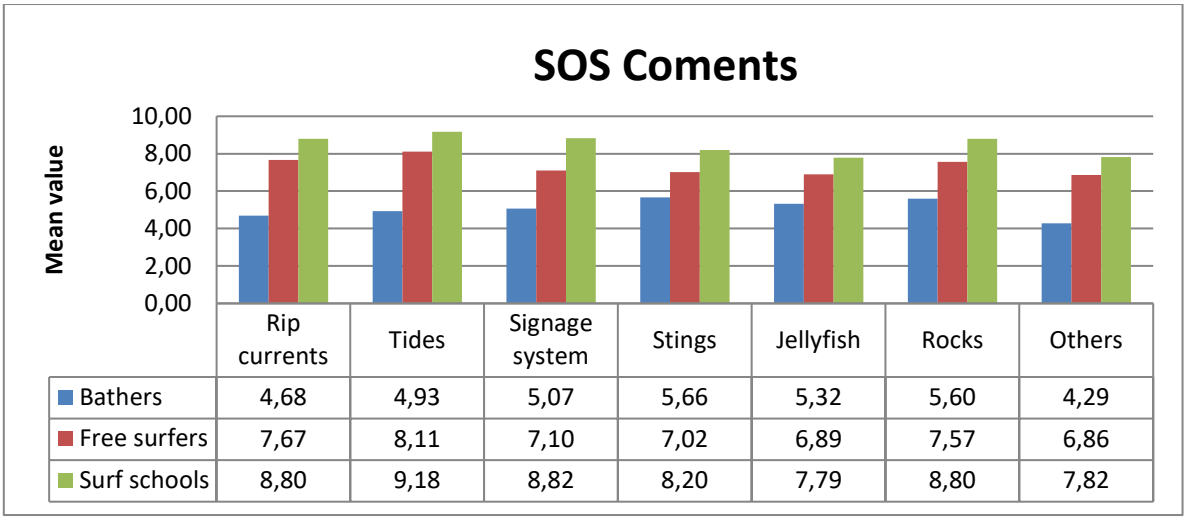
3.1.2. Enviroment understanding

Q9. Score that lifeguards give to users (bathers, free surfers and surf schools) regarding their knowledge of rip currents, tides, flag signage system, rocks and spider fish and jellyfish stings (fig.3).

The score obtained by each group after analyzing all data is: bathers 5.21; surfers 7.4 and surf schools 8.6.

Bathers fail in rip current and tidal understanding according to lifeguards while hardly obtaining just a pass in the flag signage system.

The number of lifeguards not answering questions related to the knowledge of surfers and surf schools increases due to the fact that surfing is not done at all the beaches on the Biscay coast.



	Rip currents	Tides	Signage system	Stings	Jellyfish	Rocks	Others
Bathers	4,68	4,93	5,07	5,66	5,32	5,60	4,29
Free surfers	7,67	8,11	7,10	7,02	6,89	7,57	6,86
Surf schools	8,80	9,18	8,82	8,20	7,79	8,80	7,82

Fig. 3. Score given by the lifeguards to the users.

Q10. Score and suggestions that lifeguards give to the users regarding their respect to the bathing area (Fig. 4).

The average scores are: bathers 6.6; surfers 6.5; and surf schools 8.1. The number of lifeguards who do not score surfers or surf schools increases due to the fact that not all beaches offer the possibility to practice the sport of surfing.

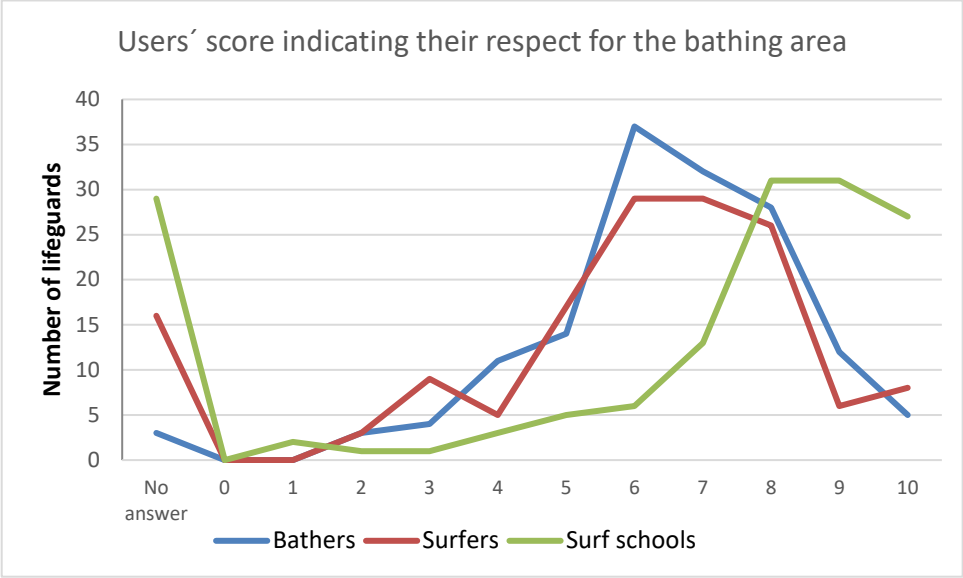


Fig. 4. Score and suggestions that lifeguards give users on how much they respect the bathing area

Among the suggestions that lifeguards made to bathers are:

- Providing general information to users pointing out that it is a recreational place with dangers associated to a natural environment.
- Adding or completing the information with informative posters (explaining the meanings of the flags, signs and regulations).
- Separating information about which areas of the beach could be affected by rip currents.
- Specifying under what conditions bathing is prohibited and which users are affected by this prohibition.

Lifeguards suggest and point out regarding the surfers that:

- To have a poster displaying the meanings of the general flags and seashore flags plus surfer codes and possible sanctions if regulations are ignored.
- Improving the coexistence with other users, respecting the flag signage system independent of the wave's trajectory, or the opportunity of catching a good wave.
- Implementing actions for the sanctioning of breaches of obligations.

In relation to surf schools the suggestions given by lifeguards are as follows:

- There are times when they do not obey or respect the signs and, consequently, sanctions may be imposed.
- It would be good to improve the coordination between the institutions involved in the management and safety at the beach during the summer season. Having a meeting with all of them at the beginning of the summer may be useful.
- Mark two areas for expert surfers and beginners.

Others suggestions given by lifeguards are related to marking an area for bathers instead of surfers because it simplifies the flag signage work and it would be easier for users to understand.

Q11. Danger situations that lifeguards notice depending on the users (Fig. 5).

Four indications that can cause risk depending on the profile of the user (bathers/ free surfers/ surf schools) were analyzed. Lifeguards marked the box with an X if they thought that there are dangers associated to the profile of the user, if not, they left the box empty. This indication is as follow:

Sea conditions: lack of understanding of the sea conditions, rip currents, tides…
General flags: lack of knowledge of the flags
Seashore flags: lack of knowledge of the signage system.
Daring /reckless behaviour

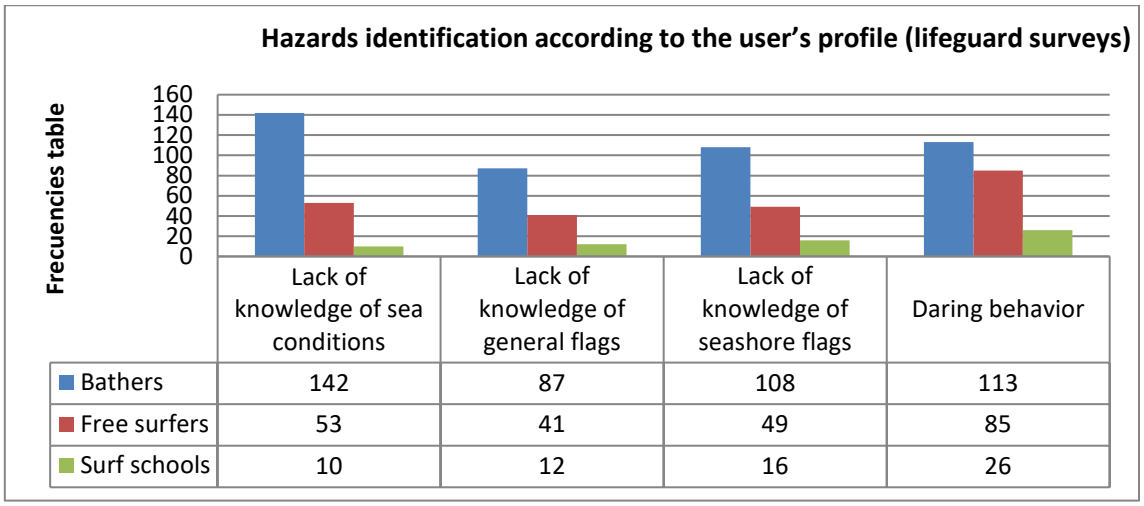


Fig 5. Danger situations lifeguards see depending on the user.

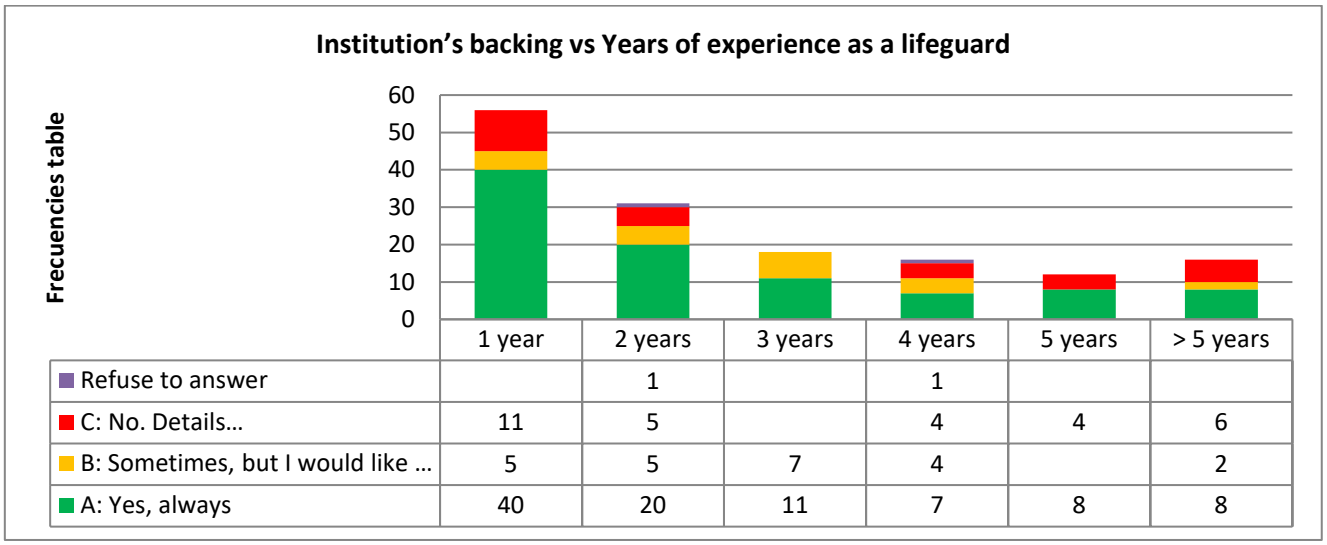
Q12. Issues lifeguards have upon giving indications to users.

130 of the lifeguards (87%) do not have usually problems upon indicating where users may bathe. Only 19 (13%) have problems with the user that include, as detailed below, all types of users. The sample of users is small (19 surveys) but as the survey is so diverse it proves that any user may cause problems when the

lifeguards have to give orders related to the bath area. At this respect, the survey respondent covers all types of users, like:

- in the case of free surfers: youngsters, beginners, locals or foreigners;
- in the case of surf schools, the issues usually are incidental and normally with an instructor in particular;
- in the case of bathers: the young, the elderly, people with children, regular users, foreigners or people who go for a day out to the beach ("Sunday users").

Q13. Institution's backing to lifeguards when a user ignores bathing advice.



	1 year	2 years	3 years	4 years	5 years	> 5 years
Refuse to answer		1		1		
C: No. Details...	11	5		4	4	6
B: Sometimes, but I would like ...	5	5	7	4		2
A: Yes, always	40	20	11	7	8	8

Fig. 6. Institution's backing

Figure 6 shows data spanning the years of experience as a lifeguard as well as the answer in Q13. As the years of experience increase, so does the age of our respondent. These can offer a more critical view of the management of the beach due to their day to day experience. 63% of the lifeguards feel supported by institutions compared to 36% that feel they are sometimes little or not at all supported. Only 1% do not answer.

74% (17 survey respondents) who chose the B option indicate that they would like to have more authority and would welcome greater police presence.

83% (25 survey respondents) who chose the C option would also like to have more authority or police presence and capacity to sanction.

Almost 30% (42 survey respondents) of all the lifeguards estimate it would be necessary to have more authority, capacity to sanction and demand a greater police presence on the beaches.

Q14. People's profile when bathing.

Lifeguards in the questionnaire have a list with the profiles of the bathers. They have to recognize the profiles given and afterwards order them by giving each one a value. As shown in figure 7, all the profiles of the bathers have been recognized by the lifeguards. The value that each bather profile has obtained is observed, 11 being the most repeated value and 1 the least.

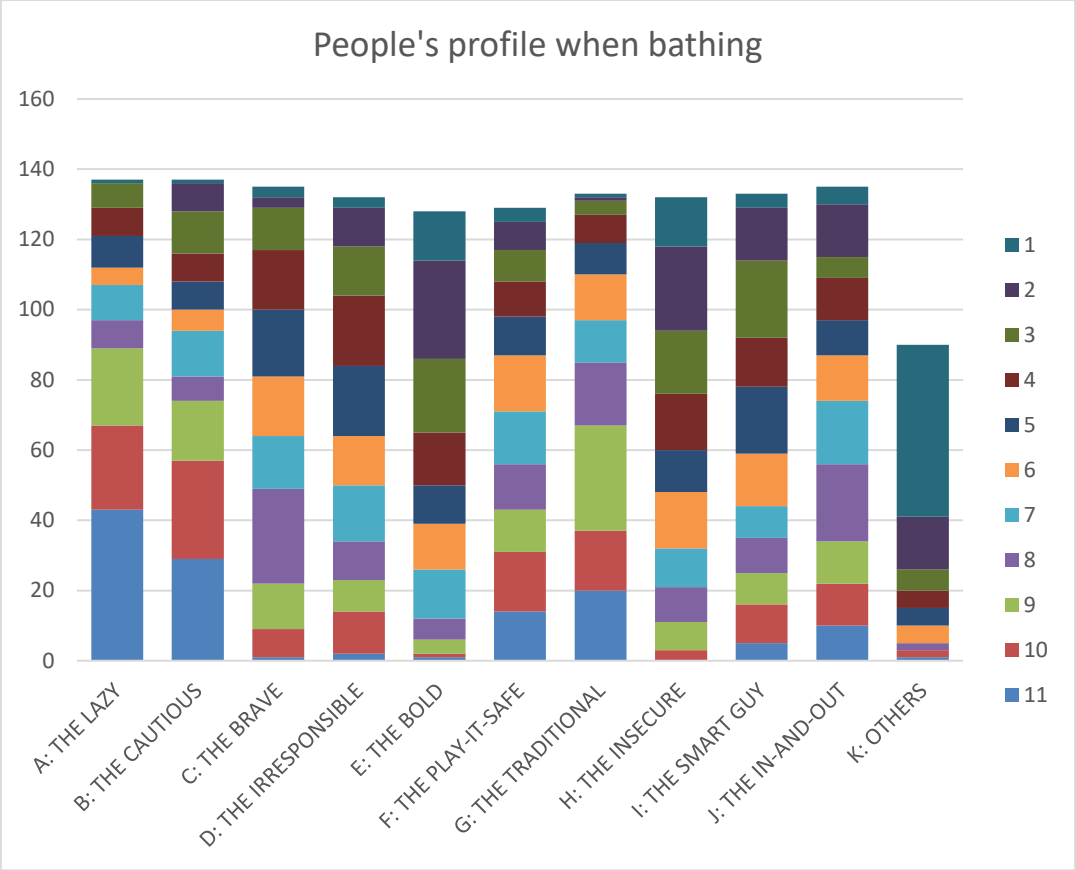


Fig. 7. People's profile when bathing

3.1.3. Flag signage system

Q15-Q16-Q17-Q18-Q19. Recognition by the lifeguards of the flag signage system used in the Bay of Biscay and possible changes to introduce.

The seashore flag signage system changes along the coast of the North of Spain. 26% of the lifeguards in Biscay believe that the same system is used throughout, 31% do not know if the same system is used in all the provinces and 38% know that the system is not the same (5% do not answer).

Figure 8 shows the answers of the lifeguards regarding the meaning of two flags of the same color on the seashore (the flags asked about are the ones found on the visits to the beaches in the North of Spain). In Biscay the system used to signal the seashore is by two red flags (bathing prohibited), two yellow flags (cooling off area) and 2 two-tone red and blue flags (aquatic activity area).

In Biscay, when there is a general red flag, an area is always signaled with two yellow flags where the bathers are allowed to cool off. This happens at all the beaches and no matter what the conditions are. 93% of the lifeguards think there are conditions when bathing should be prohibited for bathers.

Surf schools in Biscay have to teach classes in the aquatic activity area together with the rest of the free surfers. 69% of the lifeguards think it would be safer marking separate areas for free surfers and 24% think it is not necessary (7% do not know).

82% of the lifeguards agree with the current signage system. 15% do not agree and the suggestion made by the lifeguards that who do not agree with the signage system is to always mark the bathing area for the bathers.

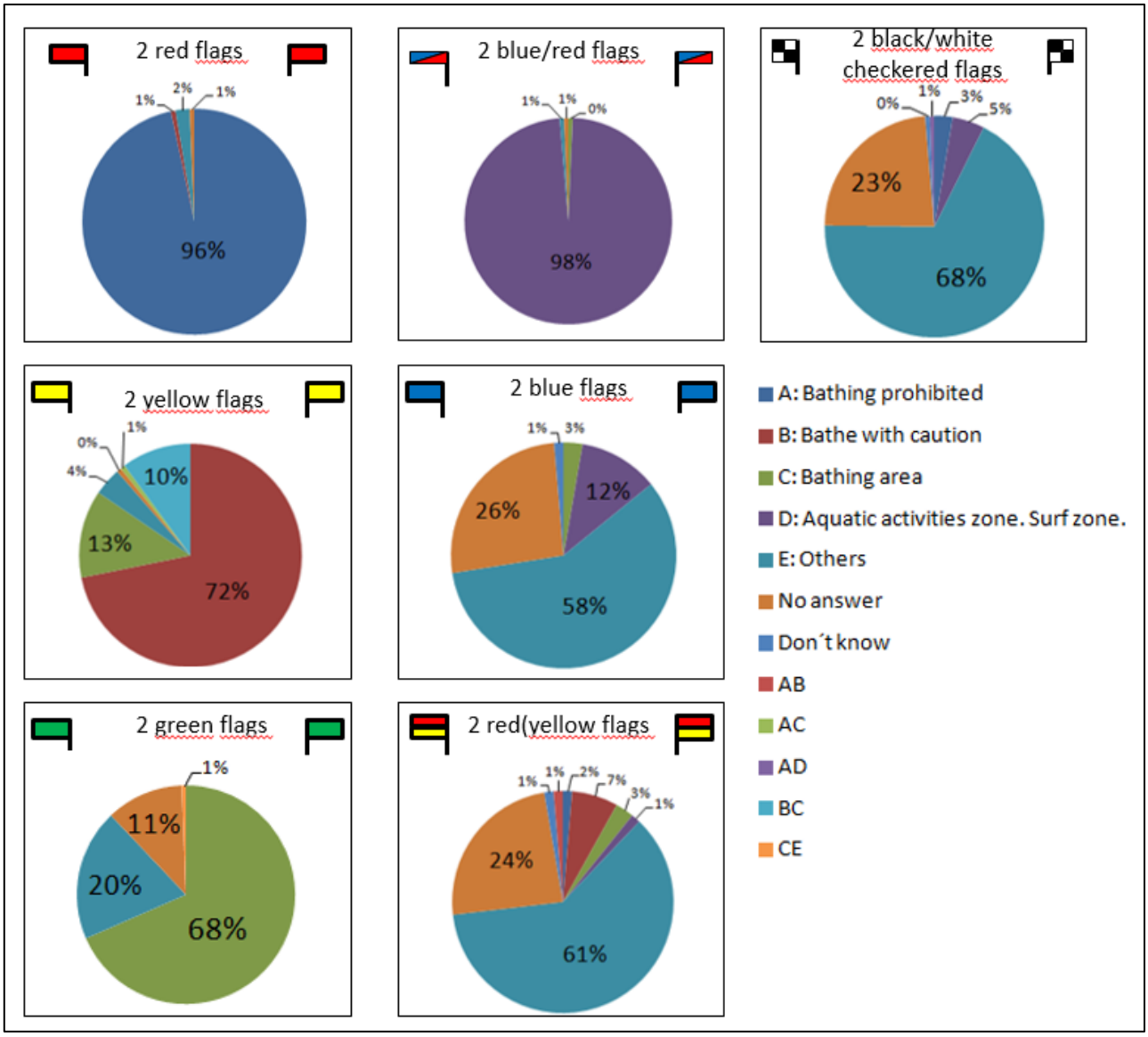


Fig. 8. Meaning of the seashore flags according to the lifeguards of Biscay.

3.1.4. Beachgoer aquatic education plan

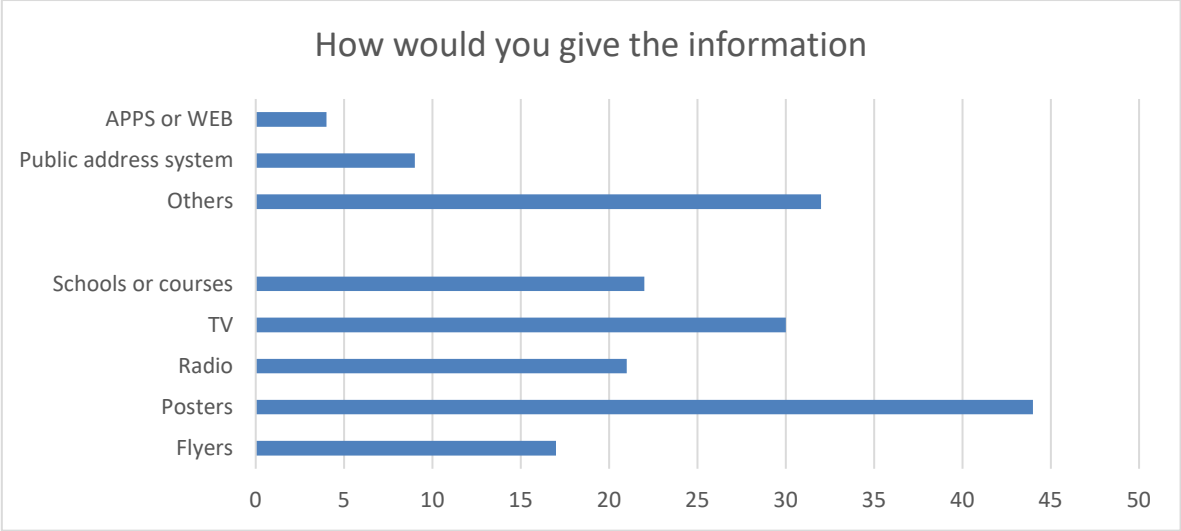
Q20-Q21. User information regarding the dangers related to the beaches and the need of a beachgoer aquatic education plan.

70% of the lifeguards believe that users are lacking information on the risks related to the beaches, as opposed to 28% who believe that they do not (2% do not answer).

Among the things that lifeguards would say to users, the following stand out (70 out of 105 that think users are lacking information would tell them some of the things named below):

- Information on rip currents, flags and an explanation of the beach risks and dangers
- To pay attention to the indications of the lifeguards
- To ask before bathing
- How to escape from a rip current
- To take a look at the poster information before entering the beach
- That the sea is not a swimming pool
- That it is the users' job to be informed.

The lifeguards' opinion regarding how to inform them is shown in figure 9.



Fi. 9. Means used to inform users.

90% of the lifeguards believe that a beachgoer aquatic education plan is needed, as opposed to 9% who do not (1% do not answer).

3.2. User survey

3.2.1. Survey respondent's profile

Q1. 92% of the survey respondents live in Biscay, 3% in the province or autonomous community with no coast (5% will not answer). 52% of the survey respondents were women, 45% men (3% do not answer). The survey respondents are of all ages, 18 being the minimum age. The survey was taken during the summer season.

Q2-Q3. The surveys have been carried out on all types of users, regardless of how frequently they visit the beach, that is, there are survey respondents that go every day (24%), 2 to 3 times per week (30%), once per week (15%), once every fifteen days (2%), occasionally (28%), today in particular (0%) (1% do not answer).

Q4. 69% will visit some beach in another community on the North Coast of Spain, 16% will not, 14% do not know (1% do not answer).

Q5. 96% of the survey respondents know how to swim; only 4% confirm they do not know how to swim. The score they give themselves is from 1 to 7 (from 1 being an awful swimmer to 7 an excellent swimmer) (Fig. 10).

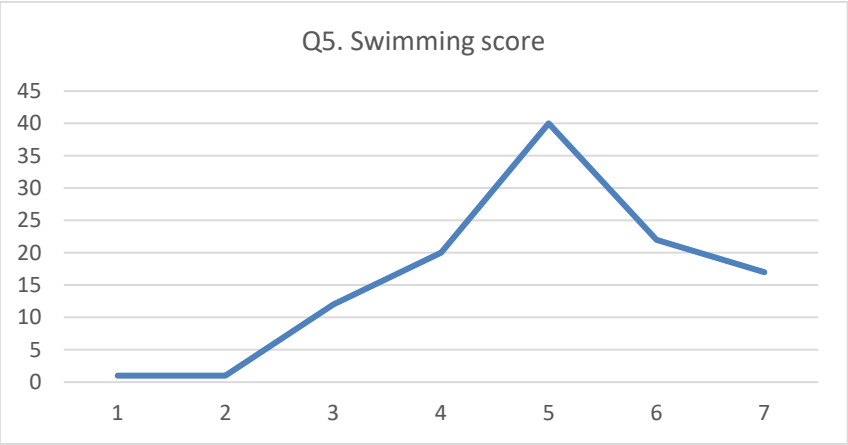


Fig. 10. Swimming score

Q6. 44% take part in aquatic activities on the beach all year round, 55% do not (1% do not answer).

Q7. Activities they are going to do during their stay at the beach (Fig. 11).

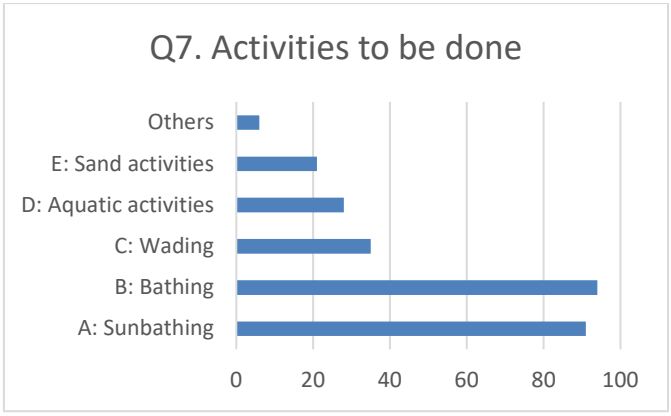


Fig. 11. Activities they are going to do

Q8. 42% have had problems while bathing on the beach on some occasion, 49% have not, 7% cannot remember (2% do not answer). Figure 12 shows the problems they encountered.

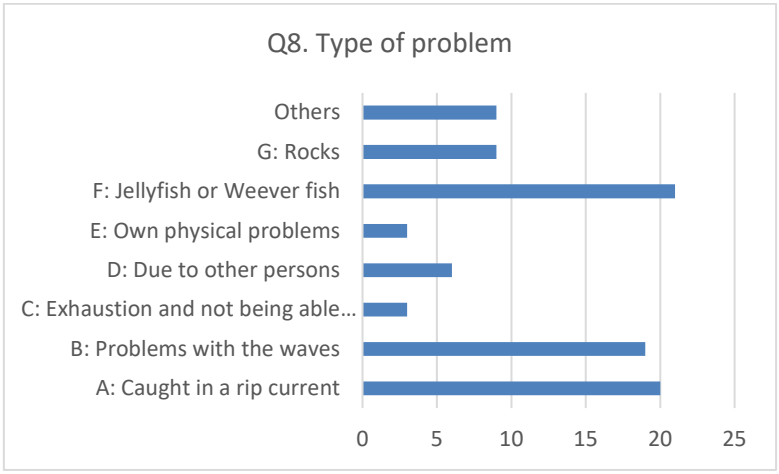


Fig. 12. Bathing problems on the beach

Q9. 82% of the survey respondents have never had to be rescued, 11% have had to be rescued on some occasion, 3% cannot remember (4% do not answer). Figure 13 shows who did the rescues.

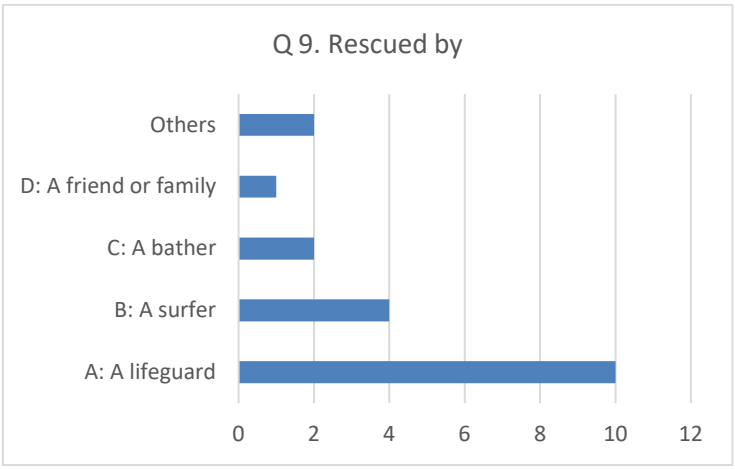


Fig. 13. Rescuers

Q10. 70% have never had to rescue anybody, 24% have had to rescue somebody sometime (more than 100 people have been rescued in total) (6% do not answer).

3.2.2. Environment understanding

Q11. Survey respondents generally associate beaches with rip currents and the danger of waves as shown in figure 14. Areas producing rip currents are generally associated with areas that have less swell, which fool people who associate waves with danger into thinking they are safer areas to bathe as rip currents are less visible than waves. Inadvertently these users may find themselves caught in a rip current while bathing in what they believe to be a safer area (Li 2016; Silva-Cavalcantia et al. 2018).

When answering question Q11, the survey respondent may give more than one answer. For example, of the 51 people who see danger in waves, 16 (31%) also see danger in rip currents; and, of the 82 people that see danger in rip currents, 46 (56%) also do in waves.

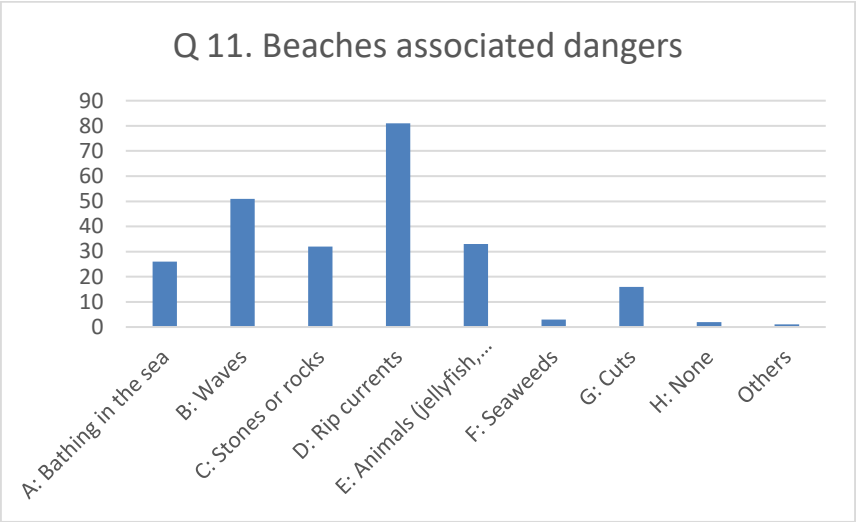


Fig. 14. Beach associated dangers

Q12. When asked if they had ever heard of the existence of rip currents at beaches: 58% said yes, 33% said no, 7% said they did not know (2% do not answer).

Q13. When asked if they could identify a rip current: 26% said yes, 51% said no, 20% said they did not know (3% do not answer).

Q14. 33% have been caught in a rip current at some time, 52% have not, 13% do not know (2% do not answer).

If the answers of those who have been caught in a rip current are analyzed, it is observed that:

- 82% of the victims said that they knew of the existence of rip currents. They are part of the 46% of the survey respondents that are aware of the existence of rip currents on the beaches.
- 58% of the victims said that they would know how to identify a rip current. They make up 62% of the survey respondents that say they would know how to identify a rip current.

Q15. Asked what they would do in the case of finding themselves being taken out to sea (fig. 15);

- 24% mentioned that they would try to swim towards the shore depending on their physical condition, their capability to swim and their capability to stay calm, and they would be able to reach the shore

depending on the strength of the rip current. Usually this is the kind of action you should not be taken when caught in a rip current.

- 78% mentioned that they would swim parallel to the beach and then head to shore. They would swim on a diagonal course to the beach or they would let it drag them out to sea while staying afloat and asking for help. In principle, keeping in mind their physical condition, their capacity to swim and stay calm, they would have more options to reach the shore depending on the strength and width of the rip current. Above all, it is essential to stay calm at all times when caught in a rip current and then being able to reach the shore on your own or with other's help.

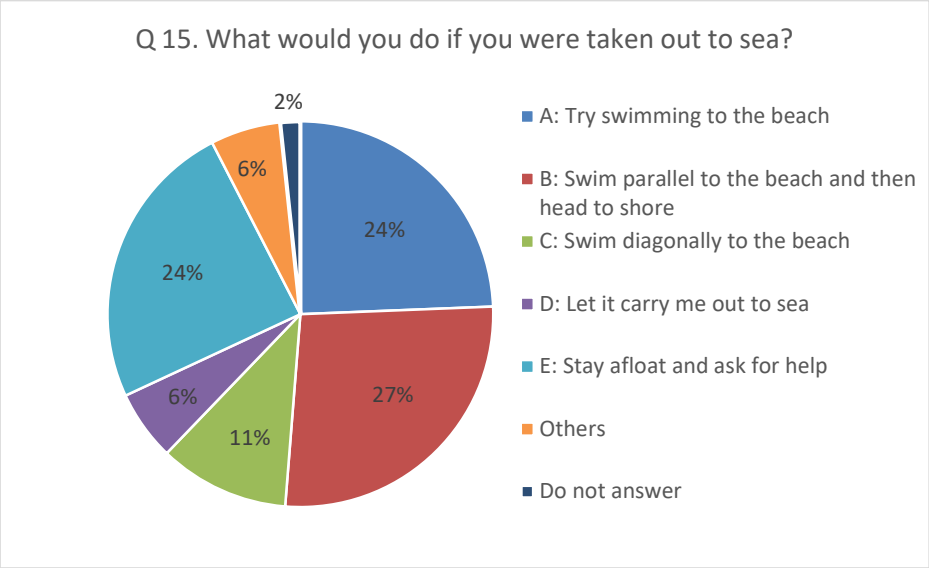


Fig. 15. What would you do if you were taken out to sea?

3.2.3. Flag signage system

Q16. 63% of the survey respondents think the flag signage system used to indicate bathing is the same at all beaches on the North Coast of Spain while 11% do not think so and 26% do not know.

Q17. As figure 16 shows, answers A, B and C should be on the same level because the possibility of using the three types of flags exists at all beaches. It was checked if, by chance, the non-matching of the three columns was caused by the fact that inland beaches do not receive swells, so they rarely have to use the red flag, but that is not the case.

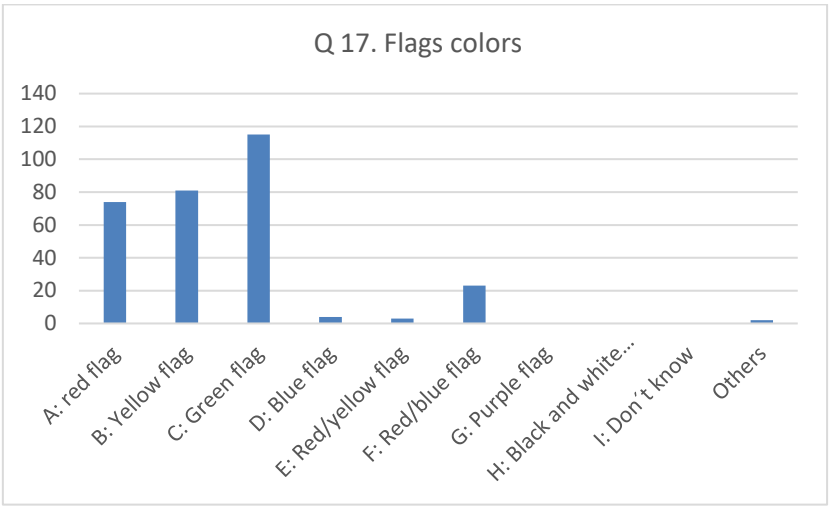


Fig. 16. Flag color

Q18. All the respondents except one associated the general red flag of the beach with prohibited bathing; the general yellow flag of the beach with bathing with caution and the general green flag of the beach meant bathing was allowed.

Q19. When asked about the flags of the shore percentages degrees notably with respect to the general flags on the beach (fig. 17).

78% recognize that two red flags on the seashore mean that bathing is prohibited.

78% recognize that two yellow flags on the seashore mean caution when bathing.

In the province of Biscay two green flags are never used on the shore and 39% of the respondents identify them as a safe area for bathing (In the province of Gipuzkoa they are used to indicate a safe bathing area), 27% say they never use them (true in Biscay) and 31% say they do not know.

57% recognize the flags used in Biscay to indicate the aquatic activities area, 7% say they are never used and 32% say they do not know. However, if this question is asked only on the beaches where this type of signage for aquatic activities is used, 35% of users recognize the two-tone red and blue flag.

Q20. In Biscay, a cooling off area (bathing with caution) is signed when there is a general red flag on the beach. However, it is not signed when a yellow is flying. The users' opinion in respect of marking a safe bathing area when this flag are flying is as follows: 66% is agreed, 10% is not agreed and 23% is indifferent.

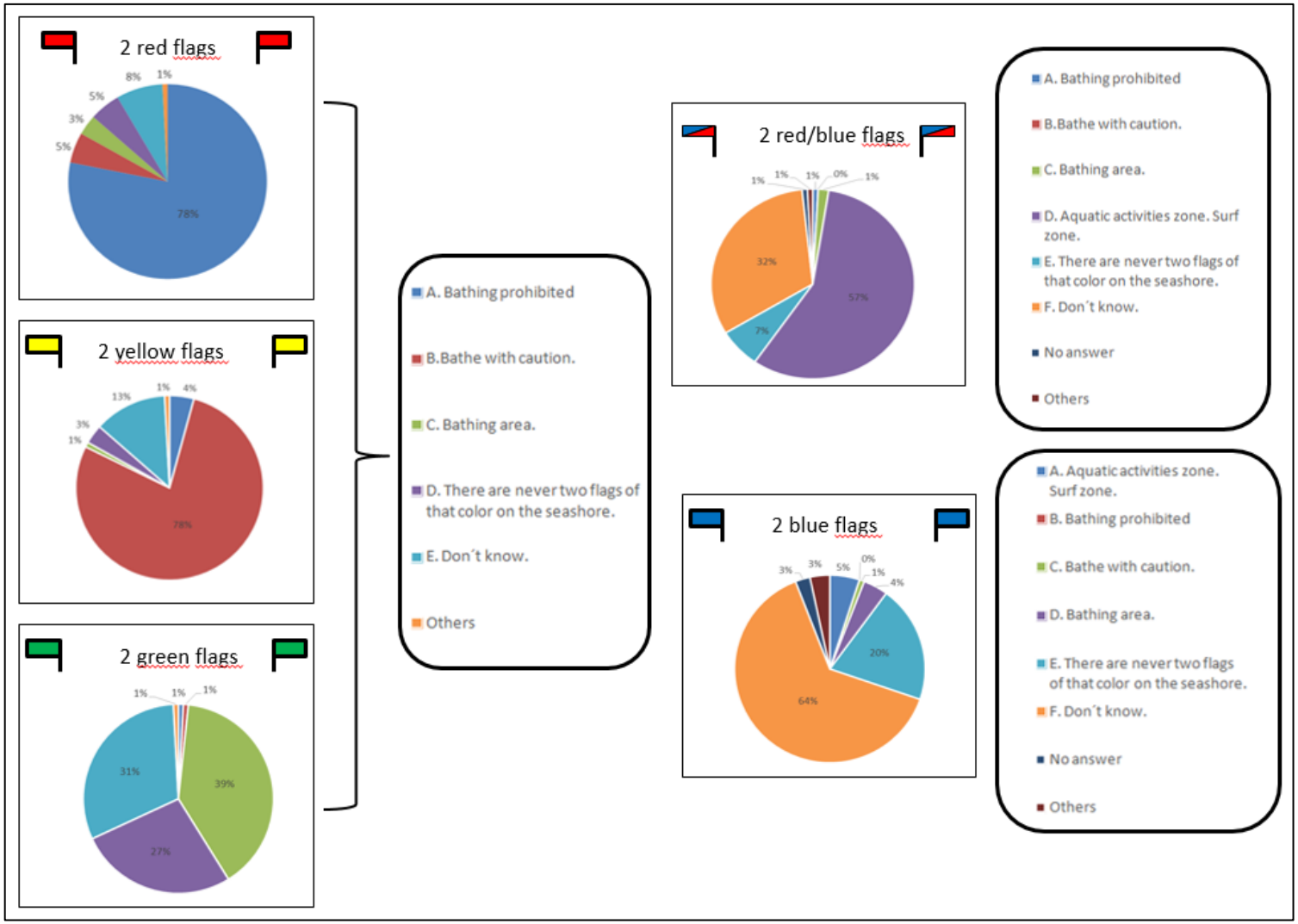

2 red flags
78%
5%
3%
5%
8%
1%
2 yellow flags
78%
13%
3%
1%
1%
4%
2 green flags
39%
31%
27%
1%
1%
1%
A. Bathing prohibited
B.Bathe with caution.
C. Bathing area.
D. There are never two flags of that color on the seashore.
E. Don´t know.
Others
2 red/blue flags
57%
32%
7%
1%
1%
1%
1%
0%
1%
A. Bathing prohibited
B.Bathe with caution.
C. Bathing area.
D. Aquatic activities zone. Surf zone.
E. There are never two flags of that color on the seashore.
F. Don´t know.
No answer
Others
2 blue flags
64%
20%
3%
3%
5%
0%
1%
4%
A. Aquatic activities zone. Surf zone.
B. Bathing prohibited
C. Bathe with caution.
D. Bathing area.
E. There are never two flags of that color on the seashore.
F. Don´t know.
No answer
Others

Fig. 17

3.2.4. Beachgoer education plan

Q21. 48% of the respondents do read the information posters while 52% do not. 72% of the ones, who read the information posters, also read the general poster at the entrance to the beach.

Q22. 83% of the respondents have gone bathing without the surveillance of the life guards compared to 14% who have not (1% remain indifferent and 2% will not answer).

Q23. On choosing a beach where to go bathing, users bear in mind: water quality, proximity, beauty and nature (the aim, very importantly, is to seek out the peculiarity of the natural environment), sand quality, followed by being safe and overseen by lifeguards. This is shown on figure 18.

Once on the beach, when they decide to go bathing, what they keep in mind is (fig. 19): swell conditions, beach flag (of utmost importance), lifeguards' indications and seashore flags.

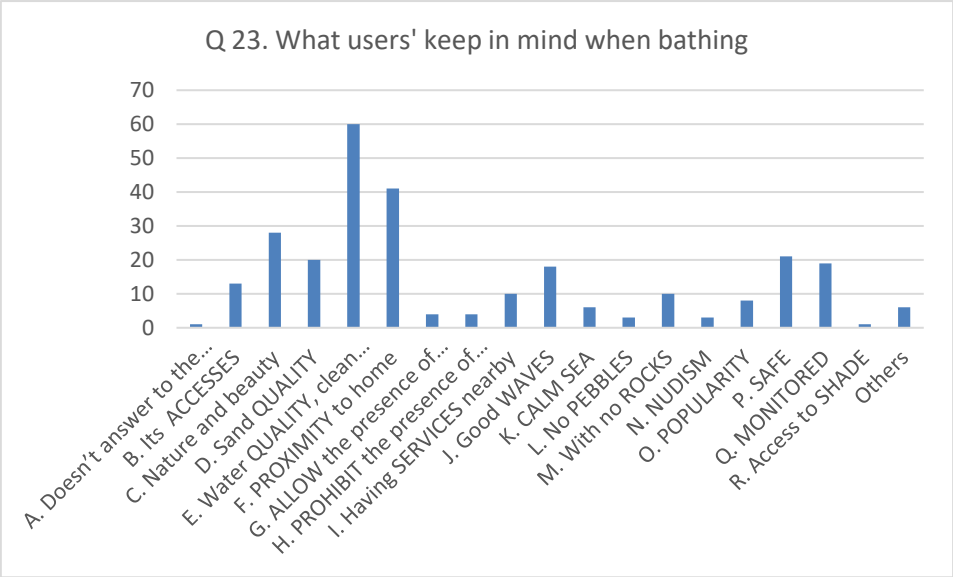


Fig. 18.

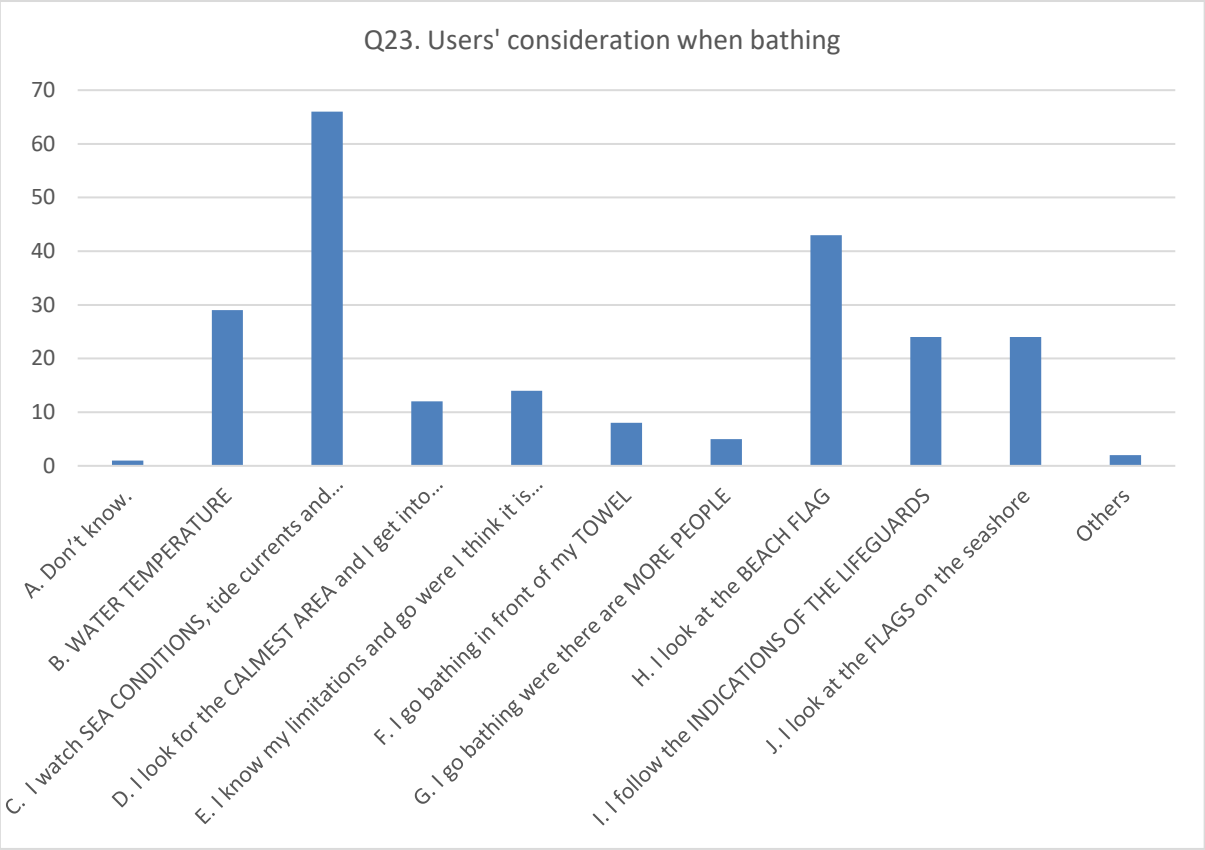


Fig 19.

4. Discussion

This study has been based mainly on a lifeguard survey. The large number of lifeguards that have taken part in the study in the autonomous community (96.75%) must be emphasized. The users' survey is allocated basically to provide information on the beachgoers profile regarding their knowledge in respect of the beach dangers and signage.

The study reveals that 70% of the lifeguards think that users do not have information on hazards associated to the beach.

Survey respondent profile

The familiarity with a product reduces hazard awareness, the tendency to read warnings, the warning's credibility, the intention to take precautions and its compliance, according to the revision made by DeJoy (1996) (Karnes et al., 1986; LaRue and Cohen, 1987; Goldhaber and deTurck, 1988a, 1988b; Otsubo, 1988; Andrews et al., 1991; Wogalter et al., 1991, 1993, 1995). According to the study carried out, around 70% of the survey respondents go to the beach at least once per week. The familiarity with the environment makes it more likely not to adhere to the warnings (Laughery and Wogalter, 2014). The regular users think they have enough knowledge and ability to avoid or deal with any kind of danger and, therefore, think there is no need to pay

attention to the risk related signage (Matthews et al., 2014). On the other hand, it is a curiosity to observe that the water quality is the users' priority to choose the beach rather than the safety.

People tend to do what others do (Laughery and Wogalter, 2014). On the beaches one may know the dangerous bathing zone and go there because he/she knows his/her physical and mental capacities and thinks he/she is in no danger. Nevertheless, what may occur here is that other person, without the capacity to bathe in that place, by imitation, may end up bathing in that same place. In the study on 5 users, they say consideration is taken when bathing where there are other people. It is very important to follow the indications in cases where the beach has signage.

44% of the user respondents do aquatic activities at the beach all year round. It is a group of people that uses the beaches all year round and also during the summer time when there are no lifeguards around. As for surfers, they can be considered 'bystander' rescuers. Their capacity to rescue is associated to their years of surfing experience and with the aquatic safety training received. Inexperienced surfers may not know their own limits and therefore not be aware of their capacities to make a successful rescue. On the other hand, experienced surfers know their limits and evaluate the conditions before the rescue, as they do before surfing (Attard et al., 2015). Nowadays, the *Gipuzkoako Surf Federazioa* –Gipuzkoa Surf Federation in the Basque language- teaches surf courses where first aid and water rescue are included.

Most of survey users go to the beach for bathing and sunbathing, they take into account the flag and waves before bathing, however, 83% of them admit to do at any time without surveillance. 24% of them have had to rescue someone at sometime and the total number of people they have rescued is over 100. The percentage of rescuers exceeds the percentage of the ones being rescued (11%) just like in another research carried out on Biscay university students (Sotés et al., 2018). The overestimation of the rescuer's own skills or the impulsive acts without a complete risk evaluation can lead to high risk situations for the rescued as well as for the rescuer (Franklin and Pearn, 2010; Pearn and Franklin, 2012; Turgut and Turgut, 2012; Moran and Stanley, 2013).

One of the problems found by lifeguards is that some users ignore their suggestions promoting danger situations even for other bathers. Lifeguards' actions are thus limited because they have not authority. Some of them (30%) are not agreed with that lack of power in front of the users and, consequently, they demand capacity of penalizing them or a larger presence of police on the beach. Although the general opinion of beachgoers regarding the task of lifeguards is positive such as it is stated in other researches (Kim et al. 2014), 10% of survey users state to have had arguments with the lifeguards.

Environment understanding

More than 40% of the user survey respondents ignore the existence of rip currents and only 25% would be able to identify one. 27% of survey users know how to behave in a rip current and 24% would try to escape in a wrong way. Nevertheless, user's responses

on rip currents understanding should be taken with a pinch of salt according to some researches (Drozdzewski 2012).Under the lifeguards' opinion, the users fail in understanding of rip currents.

Basic understanding of the rip currents significantly prevents users from swimming in them. Beach users need to know what a rip current looks like and how to behave in case you are caught in one. Thus, the need arises for intervention and investigation programs of the attitudes, behavior and understanding of beach safety and rip currents for the beach user (Brander and MacMahan, 2011; Sherker et al., 2010; Clifford et al., 2018).

According to the Biscay province lifeguards, surfers have adequate understanding of the rip currents. Still, it is very important to teach and mark on the information posters the existence of rip currents for surfers; they are the most exposed to this kind of danger, especially novices and those whose ability has improved from the beginner stage (Woodward et al., 2015). Surfers with knowledge on water safety are more likely to carry out rescues (Attard et al., 2015).

Signage

52% of the survey users state that they do not read the informative posters found at the beach access. In another study carried out by Matthews et al. (2014) only 45% of beachgoers said they had noticed any kind of signage when they arrived to the beach. 96.4% noticed danger symbols but as to the flags on the beach, this percentage dropped to 31%. Even though users generally do not read the posters, the surveyed lifeguards would choose to inform users by means of posters.

In respect of the separation of a specific area for other aquatic activities in the surf zone, only 15% of lifeguards think that it would be more appropriate to mark the zone free of aquatic activities between two flags. The rest are of the opinion of marking the aquatic area as it is done so far. They also think that the area for aquatic activities should be separated, in turn, depending on the users' skill. In this way, 69% of lifeguards agree in a exclusive area at the disposal of Surf Schools.

According to the study done, general beach flags (red, yellow and green) are well identified by users. Nevertheless, bearing in mind the answers of the lifeguards and users in relation to the flags on the shore, it is necessary to make one unique design and criteria when it comes to the different shore areas. A lot of the lifeguards and users cannot identify the signage system used on the shore at other beaches along the coast. They do not become familiar with the standardized flag systems. The same system should be used to sign the safe bathing area for bathers on all the beaches, the rip current areas and the aquatic activity areas. In this way users would avoid erroneous interpretations at all the beaches and it would make the lifeguards' work easier. A single signage system would make interpretation and understanding of the environment easier for all users. However, the system used in Biscay beaches is not similar to the other nearby beaches in the North of Spain.

Obviously, there is evidence that bathing between flags is safer (Fenner et al., 1995; Hartmann, 2006). However, there are studies that prove that users, in spite of knowing the meanings of the flags that indicate a safe bathing area, ignore them and decide to bathe in areas with no flag signage (Ballantyne et al. 2005; Wilks et al., 2007; Sherker et al. 2010; White and Hyde, 2010). For example, it is well known that bathing outside the flag marked areas increases the risks of being caught in a rip current, however, 73% of the users that survived a rip current were in areas with no surveillance (Drozdzewski et al. 2012). On the contrary, users with children on the beach are more likely to choose bathing between flags due to the need of doing the right thing in front of their kids (Sherker et al., 2010). On the other hand, there are beachgoers in unsafe bathing areas because they are unsure of the meanings of the flags (Ballantyne et al. 2005).

Citizen beachgoing education plan

90% of the lifeguards find an aquatic education plan necessary.

According to a study done by Woodward et al., (2015), when judging who the most appropriate educators are, those who were educated by lifeguards (36%) had "good" knowledge of the rip currents. Biscay lifeguards think that the surf schools are also a great source of knowledge on the environment giving them a score of 8.6 out of 10. The authors have not found a study which analyzes the acquired knowledge related with rip currents by surf school users. But from the point of view of the Biscay lifeguards, surfers also obtain a good score in environment understanding (7.4 out of 10).

Having to choose the place to give the education, in the study by Woodward et al. (2015), 50% of the survey respondents think that any kind of education should be done on the beach, in the environment where the risks are visible to all.

The success of the educational campaigns should be pointed out (Klein et al., 2003; Hatfield et al., 2012; Woodward et al., 2015) and also the increase in public awareness thanks to related campaigns of the beach environments (Matthews et al., 2014).

A crash course in water safety significantly increases the safety knowledge and skills in aquatic environments. Swimming has no impact on the safety knowledge, skills or attitude in the water. However, swimming knowledge and water safety, combined with appropriate swimming and survival skills reduces the risk of drowning (Moran, 2008; Petrass and Blitvich, 2014).

4. Conclusion

Biscay beaches are watched by lifeguards only during the summer time when the beachgoers demand is high. Beach users during the rest of the year are usually surfers or swimmers. The little size of the beaches makes necessary a correct spatial distribution in different areas depending on the activities performed (surf, surf schools, swimming, wading, bathing and others) (Basterretxea-Iribar et al. 2019). At this respect, lifeguards think that there should be an exclusive area for surf schools separated from the skilled surfers. On the other hand, the lifeguards found difficulties in their job of keeping safety the bathing area when the users ignore their suggestions or flag signage. In these cases, the experienced lifeguards miss the presence of the police or their own capacity to sanction users' infraction. They are not only in favor of reactive measures based on punishment philosophy but they strongly support proactive actions as a safety educational plan. At this respect, the survey confirms that most of beachgoers have not environment and safety signage understanding. Moreover, the lifeguards only know the common flags used in Biscay beaches and lack the knowledge of other standardized flags. The reason has to be found in the variety of different flags used in all the Spanish beaches with the same meaning. In respect of the safety posters, a little less of a half of beachgoers does not read them which confirm other investigations on this matter.

In summary, a general safety educational plan and a standardized flag signage should be carried out by the Spanish Authorities as a right proactive action. Lifeguards should be rescuers and safety advisors for beachgoers. Nevertheless, they should be supported by the authorities before serious infractions of users in order to keep the beach safety.

Ethical statement

This research has been carried out in accordance with the ethical guidelines of the respective author's instructions. The research is original having not been previously published and is the result of the author's intellectual thought.

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Annex I. Questionnaire to lifeguards

	I. Survey respondent's profile
Q1	Age, Sex and Date
Q2	Are you a coordinator?
Q3	Number of years you have worked as a lifeguard on the beach
Q4	Beaches you have worked at during the summer of 2016
Q5	Beaches you have worked at and in which year
Q6	Do you go to the beach the rest of the year?
Q7	Are you a surfer? or Do you do other aquatic activities?
Q8	Have you ever had to rescue someone on the beach outside the lifesaving and rescue timetable?
	II. Environment understanding
Q9	What score (evaluate from 1 to 10) would you give to users (bathers, free surfers and surf schools) regarding understanding of rip currents, tides, signage system, stings (by weever fish), jellyfish, rocks and others?
Q10	What score (evaluate from 1 to 10) and suggestions would you give to users regarding the respect towards the marked areas for bathing?
Q11	Do you think most of the danger situations on the beach could be due to: lack of understanding of the sea conditions, rip currents, tides, etc; lack of knowledge of the flags; lack of knowledge of the general signage system; daring behavior, or others?
Q12	Do you have problems giving users the bathing orders?
Q13	Do you feel backed up by the institutions when a user does not listen to the bathing warnings you give him/her regarding safety?
Q14	What is the bather's profile when going for a swim?
	a. THE LAZY BATHER: I'll go bathing in front of the beach. b. THE CAUTIOUS BATHER: I pay attention to what the lifeguards say. c. THE BRAVE BATHER: has a lot of self-esteem and think he can have a swim wherever he/she wants. d. THE IRRESPONSIBLE BATHER: he/she goes for a swim wherever he/she wants because he/she says so. e. THE BOLD BATHER: Looks for the area that will provide him/her danger. f. THE PLAY-IT-SAFE BATHER: goes for a swim where there are people. g. THE TRADITIONAL BATHER: I've always gone for a swim here. h. THE INSECURE BATHER: He/she always asks where to go for a swim. i. THE SMART GUY: I know more than the lifeguards and I'm going for a swim here. j. THE IN-AND-OUT BATHER: but I'm only going for a quick dip k. OTHERS:
	III. Flag signage system

<table>
<tr><td>Q15</td><td colspan="3">Is the flag signage system the same for the bathing area at the seashore along the whole coast in the North of Spain (Gipuzkoa, Bizkaia, Cantabria, Asturias and Galicia)?</td></tr>
<tr><td>Q16</td><td colspan="3">Do you think there are red flag conditions where bathing should be prohibited for bathers?</td></tr>
<tr><td>Q17</td><td colspan="3">Do you think it would be safer to mark a specific area for surf schools, located away from free surfers?</td></tr>
<tr><td>Q18</td><td colspan="3">If you go to a beach and you find two flags on the shore in colors as indicated below, what are their meanings?
<table>
<tr><td>Flags on the shore</td><td></td><td>Possible meanings</td></tr>
<tr><td>2 red flags</td><td rowspan="8"></td><td>Bathing prohibited</td></tr>
<tr><td>2 yellow flags</td><td>Bathe with caution</td></tr>
<tr><td>2 green flags</td><td>Bathing area</td></tr>
<tr><td>2 blue flags</td><td>Aquatic activity area</td></tr>
<tr><td>2 blue and red coloured flags</td><td>Others</td></tr>
<tr><td>2 yellow and red coloured flags</td><td>Don’t know</td></tr>
<tr><td>2 black and white checkered flags</td><td></td></tr>
</table></td></tr>
<tr><td>Q19</td><td colspan="3">Do you agree with the current signage system through flags?</td></tr>
<tr><td colspan="4">IV. Citizen beachgoing education Plan</td></tr>
<tr><td>Q20</td><td colspan="3">Do you think users have a lack of information regarding the dangers associated to beachgoing?</td></tr>
<tr><td>Q21</td><td colspan="3">Do you think a citizen beachgoing education plan is needed?</td></tr>
</table>

Annex II. User questionnaire

	I. Survey responder profile
Q1	Place of residence, age, sex and date
Q2	How often do you visit the beach during the season in which the rescue and first aid service is provided (any beach)?
Q3	How often do you visit this beach during the season in which the rescue and first aid service is provided?
Q4	Have you visited or planned to visit other beaches in different provinces or communities along the North coast during the 2016 summer season? (June, July, August and September)
Q5	Can you swim? From 1 to 10 what score would you give yourself?
Q6	Do you do any aquatic activity at the beach during the year?
Q7	What kind of activities are you going to do at the beach during your stay?
Q8	Have you ever had any kind of problems while bathing at the beach?
Q9	Have you ever been rescued? Who had to carry out the rescue?
Q10	Have you ever had to rescue someone?
	II. Environment understanding
Q11	When you think about beaches in general, what kind of dangers do you associate them with?
Q12	Have you ever heard of the possible existence of beach rip currents?
Q13	Do you think you would be able to identify a rip current?
Q14	Have you ever been caught in a rip current?
Q15	Imagine that you went bathing and realized you were getting further and further out, away from shore, what would you do?
	III. Flag signage system
Q16	On the peninsula's North coast (Gipuzkoa, Bizkaia, Cantabria, Asturias and Galicia) do you think the flag signage system on the seashore is the same at all beaches?
Q17	Could you tell me what kind of colours are used to indicate the bathing at this beach?
Q18	General flag on the beach; what does it indicate? Red flag on the beach; what does it indicate? Yellow flag on the beach; what does it indicate? Green flag on the beach; what does it indicate?

Q19	Seashore flags: Two red flags on the seashore, what do they indicate? Two yellow flags on the seashore, what do they indicate? Two green flags on the seashore, what do they indicate? Two 2-tone red/blue flags on the seashore, what do they indicate? Two blue flags on the seashore, what do they indicate?
Q20	If you are on the beach when a green or yellow flag is flying, would you like the bathing area to be recommended by the use of two flags?
	IV. Citizen beachgoing education plan
Q21	When you arrive at the beach, do you read the information boards located at the entrance?
Q22	Have you ever gone swimming in the sea on your own with no surveillance from lifeguards?
Q23	When choosing a beach for bathing, what do you bear in mind?