



Knowledge of the Portuguese population on Basic Life Support and availability to attend training

Conhecimento da população portuguesa sobre suporte básico de vida e disponibilidade para realizar formação

Conocimiento de la población portuguesa acerca del soporte básico de vida y disponibilidad para realizar formación

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ABSTRACT

Objective: To evaluate the level of knowledge and the availability of the Portuguese population to attend training in Basic Life Support (BLS) and identify factors related to their level of knowledge about BLS. **Method:** Observational study including 1,700 people who responded to a questionnaire containing data on demography, profession, training, interest in training and knowledge about BLS. **Results:** Among 754 men and 943 women, only 17.8% (303) attended a course on BLS, but 95.6% expressed willingness to carry out the training. On average, they did not show good levels of knowledge on basic life support (correct answers in 25.9 ± 11.5 of the 64 indicators). Male, older respondents who had the training and those who performed BLS gave more correct answers, on average ($p < 0.01$). **Conclusion:** The skill levels of the Portuguese population are low, but people are available for training, hence it is important to develop training courses and practice to improve their knowledge.

DESCRIPTORS

Cardiopulmonary Resuscitation; First Aid; Knowledge; Health Education.

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INTRODUCTION

A medical emergency is the health sector activity comprising all the events happening from where an emergency situation takes place, until the moment of its conclusion with restoration of an adequate health level⁽¹⁻²⁾. In Portugal, those involved in the emergency medical integrated system are: the public, the emergency center operators (emergency number 112), the technicians of the emergency patients guidance center (CODU – Centro de Orientação de Doentes Urgentes), law enforcement officers, firefighters, ambulance crews, emergency ambulance technicians, doctors and nurses, technical and hospital staff, telecommunications and informatics technical staff⁽¹⁾.

Saving lives involves a sequence of steps that constitute the *chain of survival*, with four steps, namely: early access to integrated medical emergency; early initiation of basic life support (BLS); early defibrillation and advanced life support (ALS)⁽¹⁻²⁾.

The BLS under citizen responsibility⁽¹⁾ is a well-defined set of procedures with standardized methodologies and the following objectives: recognize life threatening situations; know when and how to ask for help; have the ability to start immediately and without aid of any equipment, maneuvers to preserve oxygenation and circulation until the arrival of specific teams and eventually, the restoration of normal cardiac and respiratory function⁽¹⁻²⁾.

The prevalence of accidents in Portugal has caused victims at home, at work and on public spaces, being a current health problem that reflects the way of life and the organization of spaces and society. In 2011, there were 32,541 road accidents in Portugal resulting in 42,851 casualties. The fatalities (30 day-period) amounted to 891⁽³⁾.

Ischemic heart disease is the leading cause of death worldwide. In Europe and the US, ischemic heart disease is the leading cause of sudden cardiac arrest⁽¹⁻²⁾. About a third of victims of acute myocardial infarction die before reaching the hospital, most within an hour of the symptoms onset. Data from various European countries show the annual incidence of cardiac arrest in the prehospital system is almost 40 per 100,000⁽¹⁻²⁾.

Sudden cardiac arrest is about 11% of deaths per year in Germany⁽⁴⁾. In this and other emergencies, a rapid intervention would save people and prevent complications. About 50 to 65% of cardiac arrests occur at home. In such cases, family members who are close have the power to intervene. Many of these people would be saved if they were rescued in the first 3-4 minutes after the critical event^(1-2,4). Given this fact, many authors stress the importance of including first aid training in school curricula⁽⁵⁻⁸⁾.

To provide proper care, people need sufficient and adequate knowledge on BLS, which sometimes does not happen, requiring training⁽⁸⁻⁹⁾ either in person or online⁽¹⁰⁻¹¹⁾. If the latter is of quality⁽¹²⁾, it can favor the increased number of trained people by reducing the need to travel to attend courses.

Given the above and the potential value of first aid training as a strategic element to reduce mortality and morbidity caused by accidents and emergencies⁽¹¹⁾, this study aimed

to: assess the knowledge level on BLS of the Portuguese population; know their willingness to carry out training in BLS and identify some factors (age, gender, frequency to a BLS course and previous experience in BLS) related to the level of knowledge about BLS.

METHOD

We conducted an observational descriptive and correlated study. The population comprised Portuguese residents in continental Portugal, the Azores and Madeira islands, aged 18 years or over, able to read and write and who were working in public and private institutions. The selection of data collection sites and sample was conducted as follows:

- We made a list of all public and private institutions to which we had access in the yellow pages;
- Two public or private institutions in each city of Portugal, including the islands of Azores and Madeira were selected by lot;
- The study protocol and its respective applications for authorization were submitted to the board of directors and ethics committee of the chosen institutions;
- After authorizations were granted, the employees of each institution in charge of instruments application were defined. They were sent instructions for data collection;
- The instruments were applied to respondents in a room chosen for this purpose, before the start or in the end of the work activity.
- After filling out the questionnaires, respondents put them in a ballot box in the room to maintain anonymity;
- The employees returned the completed questionnaires to researchers by mail.

The non-probabilistic sample consisted of 1,700 respondents of both genders (55.6% women and 44.4% men), mean age of 37.7 years (SD = 10.5), who exercised functions in 250 of the 318 institutions selected (participation rate of 78.6%).

The applied instrument contained three parts, described below:

Sociodemographic and professional data: residence; age; gender; marital status; educational level and profession.

Training and interest in BLS training: frequency to any BLS course; experience in performing BLS; any citizen can help a victim in life-threatening situation: who should have knowledge about BLS; opinion about beginning BLS training in a teaching program; BLS training in the workplace; BLS training in associations; BLS training providers; interest in receiving BLS training; willingness to undertake BLS training and previous experience of volunteering or in health institutions.

BLS knowledge: 64 affirmations based on orientation defined in national and international guidelines for this article^(1-2,13). The correct answers received the score 1, and wrong answers received the score 0 (zero). Thus, the total score ranged from 0-64 points. For content validation, the instrument was appreciated by field experts (doctors and nurses), and a pre-test was applied to 20 people with the same characteristics of the target population. There was no need to make changes.

The study protocol was approved by all the ethics committees of the institutions. In institutions where there was no ethics committee (180 institutions), the protocol was approved by their administration boards. Before the application of instruments, the study objectives and purposes were explained for all the subjects. Before completing, all participants signed the informed consent form.

The SPSS (*Statistical Package for the Social Sciences*), version 17, and descriptive and inferential statistics were used. Since the variable of level of knowledge about basic life support presented normal distribution (Kolmogorov-Smirnov), we used the Pearson correlation and the t Student test, establishing a significance level of 95% with $p < 0.05$.

RESULTS

SOCIODEMOGRAPHIC AND PROFESSIONAL CHARACTERISTICS OF THE SAMPLE

More than half of the respondents were female (55.6%), married (60.7%) with mean age of 37.7 ± 10.5 years. The education of the majority (65.1%) was until 12th grade or higher education, and 30.2% of respondents were administrative staff or similar (Table 1).

Table 1 – Distribution of the sample answers regarding sociodemographic and professional characteristics - Portugal, 2010-2012.

Variables		Nº	%
Gender (n = 1,697)	Male	754	44.4
	Female	943	55.6
Marital status (n=1,690)	Married	1025	60.7
	Divorced	190	11.2
	Single	461	27.3
	Widowed	14	0.8
Educational level (n= 1,690)	Incomplete primary	13	0.8
	Complete primary	175	10.4
	6 th grade	112	6.6
	9 th grade	289	17.1
	12 th grade	572	33.8
Profession (1,644)	Higher education	529	31.3
	Members of the armed forces	6	0.4
	Senior management of public administration	20	1.2
	Specialist in intellectual and scientific professions	380	23.1
	Technicians and intermediate level professionals	214	13.0
	Administrative staff and alike	497	30.2
Services and sales personnel	171	10.4	
Agricultural and fishery skilled workers	18	1.1	

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Variables		Nº	%
Profession (1,644)	Factory workers, craft and related trades workers	69	4.2
	Plant and machine operators	40	2.4
	Unskilled worker	113	6.9
	Student, working student	83	5.0
	Retired	15	0.9
	Unemployed	15	0.9
Military	3	0.2	

TRAINING AND EXPERIENCE OF THE PORTUGUESE POPULATION IN BASIC LIFE SUPPORT

Only 303 (17.8%) had attended a BLS course, the majority in the Portuguese Red Cross (23.5%) or qualified training centers (21.8%); 14.6% needed to perform BLS, with traffic accident (22.5%) as the most cited situation. The intervention carried out more times (47.5%) was calling 112 (Table 2).

Table 2 – Distribution of the sample answers in relation to training and experience in BLS - Portugal, 2010-2012.

Training and experience in BLS		Nº	%
Frequency of BLS course (n= 1,700)			
Yes		302	17.8
No		1.398	82.2
Training Institution (n= 293)			
University/Higher Education Institution		49	16.7
Hospital/Health Centers		6	2.0
Qualified Training Centers		64	21.8
Portuguese Red Cross		69	23.5
National Institute of Medical Emergency (INEM)		7	2.4
Firefighters		48	16.4
Military Institution		11	3.8
At work		16	5.5
Secondary school		7	2.4
Guides Association Portugal		1	0.3
Scouts		4	1.4
Portuguese Gymnastics Federation		1	0.3
City Council		10	3.4
Have you ever had to perform BLS (n= 1,668)			
Yes		243	14.6
No		1.425	85.4
Situations in which you performed BLS (n= 405)			
Drowning		30	7.4
Traffic accident		91	22.5
Choking		41	10.1
Heart attack		47	11.6
Cerebrovascular accident (CVA)		48	11.9

Situations in which you performed BLS (n= 405)

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Training and experience in BLS	N°	%
Burn	38	9.4
Intoxication and/or Food poisoning	28	6.9
Electrocution	11	2.7
Other situations	71	17.5
Activity performed (n= 238 references)		
Called Firefighters	38	16
Called the Police	6	2.5
Called 112	113	47.5
Asked for help	10	4.2
Performed activity on the victim	71	29.8
Activity performed on the victim (n= 100)		
Raised legs	13	13.0
Lie on the floor	21	21.0
Stanching bleeding	3	3.0
Put water on the affected limb	1	1.0
Back blow	9	9.0
First aid	30	30.0
Kept the victim conscious	1	1.0
Rescued the victim	5	5.0
Placed victim in the Recovery Position	5	5.0
Cardiac massage and ventilation	5	5.0
BLS application	6	6.0
Heimlich manouver	1	1.0

According to 54.1% of the participants, any citizen can help a victim and, therefore, must have knowledge on BLS (81.4%). They also indicated that training should be done in the workplace (84.9%). The National Institute of Medical Emergency (63.6%) and the Firefighters (62.1%) were the most cited to conduct training in BLS (Table 3).

Table 3 – Distribution of the sample answers regarding the opinion about who should attend BLS training and where - Portugal, 2010-2012.

Who should attend BLS training and where?	Yes		No	
	N°	%	N°	%
Any citizen can help a victim in life-threatening situation	857	54.1	728	45.9
All citizens should have knowledge on BLS	1,320	81.4	301	18.6
Teachers should have knowledge on BLS	249	15.4	1,372	84.6
Firefighters should have knowledge on BLS	461	28.4	1,160	71.6
Health professionals should have knowledge on BLS	436	26.9	1,185	73.1
In addition to the aforementioned, others should have knowledge on BLS	79	4.9	1,542	95.1
The military should have knowledge on BLS	263	16.2	1,358	83.8
Police should have knowledge on BLS	297	18.4	1,317	81.6

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Who should attend BLS training and where?	Yes		No	
	N°	%	N°	%
BLS training should be done in the workplace	1,436	84.9	256	15.1
BLS training should be done in cultural and recreational associations, aimed at community groups	1,446	88.4	189	11.6
BLS training should be given by the National Institute of Medical Emergency	1,048	63.6	599	36.4
BLS training should be given by the Ministry of Health	823	50.0	824	50.0
BLS training should be given by the Portuguese Resuscitation Council	187	11.4	1,459	88.6
BLS training should be given by the Red Cross	814	49.4	834	50.6
BLS training should be given by the Firefighters	1,024	62.1	624	37.9
BLS training should be given by the Civil Protection	578	35.1	1,068	64.9
BLS training should be given by Schools	783	47.5	866	52.5

Among the respondents, 522 (30.9%) emphasized that training in BLS should be initiated in the 2nd grade; 482 (29.8%) in the 1st grade, 502 (28.6%) in the 3rd grade, 155 (9.8%) in secondary school, and 13 (0.8%) mentioned it should be integrated into higher education (0.4%), with equal percentage mentioning that BLS training is not necessary (0.4%). Regarding availability to attend a training, 655 (38.6%) said they had plenty of availability, 378 (22.2%) said they were available, 592 (34.8%) reported being a bit available, and 75 (4.4%) have not expressed any availability.

KNOWLEDGE OF THE POPULATION ABOUT BASIC LIFE SUPPORT

Before a breathing victim, more than 90% of respondents would ask someone to call 112 (Portuguese Medical Emergency number). More than half of respondents gave correct answers for several indicators, among which: before approaching a victim, one should evaluate the security situation (79.9%); in a situation of electrocution, the rescuer must ensure that the power source was turned off before approaching the victim (79.6%); ensure there are safe conditions for approaching the victim (79%); try to see, hear and feel if the victim breathes for 10 seconds (77.9%).

Among the 64 indicators, participants have given correct answers for 25.9 ± 11.5 on average, which is less than half of the proposed indicators. The level of knowledge on BLS ($r=0.98$; $p < 0.01$) increased as the respondents' age increased. On average, male participants who already had the training and those who had performed BLS hit more questions than female participants who did not have the training nor have performed BLS ($p < 0.01$), as shown in Table 5.

Table 4 – Distribution of the sample answers about knowledge on BLS - Portugal, 2010-2012.

Areas	Indicators	Wrong		Correct	
		N	%	N	%
Faced with a seemingly unresponsive victim:					
	Try to approach, even if exposed to danger	684	39.9	1,029	60.1
	Ensure you have safe conditions to approach the victim	360	21.0	1,353	79.0
	Check if the victim is responding to stimuli or not (tapping the shoulder and asking if the person is ok)	501	29.2	1,212	70.8
	Stimulate the victim by shaking his/her head	381	22.2	1,332	77.8
In case the victim does not respond to stimulation:					
	Place a coat under the victim's head to avoid injuries on the floor	991	57.9	722	42.1
	Scream for help	522	30.5	1,191	69.5
	Give water with sugar	703	41.0	1,010	59.0
	Check if there is any object inside the mouth	815	47.6	898	52.4
To continue a proper operation one must:					
	Place the victim on the side to avoid choking	1,430	83.5	283	16.5
	Do extension of the head and/or chin lift	1,249	72.9	464	27.1
	Try to look, listen and feel for breathing during 10 seconds	378	22.1	1,335	77.9
	Put a hard object in the mouth to avoid biting the tongue	1,258	73.4	455	26.6
If the victim is breathing:					
	If not a polytrauma, position the victim on the side	833	48.6	880	51.4
	Find signs of circulation	1,548	90.4	165	9.6
	Ask somebody to call 112	131	7.6	1,582	92.4
	Even if you are alone, do not leave the victim	1,569	91.6	144	8.4
If the victim is not breathing, coughing and there is no movement:					
	Ask somebody to call 112	126	7.4	1,587	92.6
	Give four strong thrusts on the victim's chest to stimulate breathing	956	55.8	757	44.2
	If you are alone, leave the victim and go ask for help	1,217	71.0	496	29.0
	Put victim on the side	1,241	72.4	472	27.6
	Start chest compression immediately	1,034	60.4	679	39.6
After checking the victim is not breathing and asking for help, one must:					
	Blow into the victim's mouth, checking if the chest moves	1,127	65.8	586	34.2
	Wait for the arrival of specialized help	1,464	85.5	249	14.5
	Observe the victim's mouth again, in case the blow has not been effective	1,437	83.9	276	16.1
	Start chest compressions	1,052	61.4	661	38.6
	Pinch the victim's nostrils with thumb and index finger	1,431	83.5	282	16.5
When performing chest compressions:					
	Do chest compressions with the victim's arms straight	1,026	59.9	687	40.1
	Place the victim on the side	978	57.1	735	42.9
	Start chest compressions at a rate of 50 per minute	1,371	80.0	342	20.0
	Compress the chest the largest number of times possible	1,203	70.2	510	29.8
	High count the number of chest compressions performed	1,061	61.9	652	38.1
When performing cardiopulmonary resuscitation one should:					
	Keep silent to avoid getting distracted when counting chest compressions	1,398	81.6	315	18.4
	Alternate 30 chest compressions with two effective breaths	1,367	79.8	346	20.2
	Know how long the victim has being revived	1,529	89.3	184	10.7
	Keep BLS until arrival of specialized aid or the victim recovers signs of circulation	1,379	80.5	334	19.5
	Alternate 15 chest compressions with two effective breaths (15: 2)	908	53.0	805	47.0
	Suspend CPR when feeling exhausted	1,480	86.4	233	13.6

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Areas	Indicators	Wrong		Correct	
		N	%	N	%
In case a person chokes:					
	Only encourage coughing, if the victim is conscious	827	48.3	886	51.7
	Lie the victim down	779	45.5	934	54.5
	Remove dentures or other foreign objects that may be loose in the mouth	546	31.9	1,167	68.1
	Give back blows if the victim cannot cough	913	53.3	800	46.7
	Leave the victim and ask for help	695	40.6	1,018	59.4
	If the victim is unconscious, re-inspect the mouth for foreign objects	908	53.0	805	47.0
	Apply the Heimlich maneuver	1,148	67.0	565	33.0
Regarding the rescuer's safety					
	Evaluate security conditions before approaching a victim	345	20.1	1,368	79.9
	There is no risk of contagion in contact with the victim's sweat	1,288	75.2	425	24.8
	The pocket handkerchief is an effective protection to disease transmission in resuscitation procedures	1,126	65.7	587	34.3
	In case of electric shock, immediately grab the victim to keep him/her away from danger	582	34.0	1,131	66.0
	If a victim has ingested pesticide and is not breathing, one should not blow on the mouth	967	56.5	746	43.5
Faced with a child victim:					
	Perform a minute of CPR in an unconscious child before asking for help	1,328	77.5	385	22.5
	Performing chest compressions is a correct technique for infants in respiratory arrest	1,415	82.6	298	17.4
	Alternate 15 chest compressions with 2 breaths for infants in cardiac arrest	1,502	87.7	211	12.3
	Chest compressions are performed with two fingers on the inter-nipple midline in infants older than a year	1,397	81.6	316	18.4
	Alternate five chest compressions with two breaths for infants in cardiac arrest	1,511	88.2	202	11.8
In special situations:					
	The rescuer should lie down the victim with severe chest pain and shortness of breath to prevent him/her from getting tired	1,489	86.9	224	13.1
	A victim with violent headache, sudden loss of speech and difficulty in moving a body part must be positioned on his/her side	1,421	83.0	292	17.0
	Before a victim with visible bleeding, it is important to wear gloves, expose the wound and compress the bleeding area with compresses or a scarf	571	33.3	1,142	66.7
	Remove any foreign body from the bleeding wound and place a tourniquet on the limb root, if the wound is on an arm or leg	1,409	82.3	304	17.7
	Before a victim with suspected severe allergic reaction, move him/her away from the possible cause and ask for help immediately - call 112	540	31.5	1,173	68.5
	In intoxicated victims, the toxic name, quantity, time and situation of occurrence are aspects of little importance	477	27.8	1,236	72.2
	In a situation of electrocution, the rescuer must ensure the power source was turned off before approaching the victim	349	20.4	1,364	79.6
	In any victim it is important to prevent hypothermia	623	36.4	1,090	63.6
	In a drowning victim, there should always be suspicion of cervical spine injury	1,258	73.4	455	26.6
	In a pregnant victim, the resuscitation procedures are identical to other victims, but elevating the right hip	1,634	95.4	79	4.6

Table 5 – Results of the Student t test application regarding the knowledge level* of the sample on BLS - gender, frequency of some BLS course and performance of BLS - Portugal, 2010-2012.

Variables		N	Average of correct answers	Standard deviation	t	P
Gender	Male	754	27.3	12.0	4.521	0.000
	Female	943	24.8	11.0		
Have you attended any BLS course	Yes	303	35.6	10.7	17.481	0.000
	No	1,398	23.8	10.6		
Have you ever had to perform BLS	Yes	243	31.0	11.5	7.627	0.000
	No	1,425	25.0	11.3		

* values may range between 0 and 64.

DISCUSSION

More than half of the study sample was female (55.6%), a percentage similar to the Portuguese population⁽¹⁴⁾. According to the 2011 census⁽¹⁵⁾, about 47% of the population is married. Data in this study are different, with a greater number of married subjects (60.7%). However, data include 13% of individuals living in common-law marriage, which is different from information in the 2011 census.

According to the census, 15 %⁽¹⁴⁾ of people have higher education, which is much lower than the percentage observed in this study (31.3%). Approximately 30.2% of the sample have a profession in the area of administrative personnel and alike, and this value is explained by the selected data collection sites (companies and schools). In the general population, *trade, hotels, transports and communications*, and *other service activities*, are the professional activities where more people are employed, approximately 30% and 29%, respectively⁽¹⁴⁾.

The results of several studies show that the implementation of basic life support measures by the citizen/lay people with training reduces mortality and morbidity rates^(7,15-16). Individuals who had cardiopulmonary resuscitation (CPR) of a trained citizen/lay person are four times more likely to survive for 30 days than those in which CPR was not applied⁽¹⁷⁾.

In the present study, the low percentage (17.8%) of people who attended a BLS course is noteworthy. In this regard, several studies have mixed results: in some, the vast majority of spectators of critical events did not have first aid training^(7,18), in others, on the other hand, more than half of the sample (54.1%) had CPR training, and 21.2% immediately initiated CPR⁽¹⁹⁾. In another study⁽¹¹⁾, the authors found that 77.9% of participants had attended some kind of preparation in the area of first aid, although 61% had not done any training in the past five years⁽²⁰⁾.

Among the most frequently cited training locations are the qualified training centers (21.8%) and the Portuguese Red Cross (23.5%), different from data found in other studies^(16,20-22). In a study conducted through telephone interviews with 7,320 respondents, the most common sources of training in first aid, more specifically in burns, were books (41.7%) and the internet (32.9%). In only 9.8% of cases the respondents resorted to the health authorities and surgery doctors as sources of information/training⁽²³⁾. On the other hand, in a study in Brazil, the authors⁽¹⁶⁾ found that 35.6% had their training in the drivers' preparation course and 20.6% had it in the workplace. These differences may be due to the type of sample, place and type of data collection instrument.

Of the 1,668 people participating in the study, 1,425 (85.4%) never had to perform BLS. Traffic accident was the most reported situation (22.5%) for those who had already provided assistance, a slightly higher data (12.2%) than that found in another study⁽¹⁶⁾.

Citizens have taken several measures in an emergency situation, such as: application of a bandage/dressing⁽¹⁸⁾, positioning the victim^(11,18), bleeding control^(11,18), ensure safety at accident site^(10,16), release of the victim⁽¹⁶⁾, opening

the airway^(11,18), precautions against hypothermia⁽¹⁶⁾, cardiopulmonary resuscitation⁽¹⁶⁾ and providing tranquility to the victim^(11,18).

Taking into account the probability of avoiding 4.5% of potential prehospital deaths with immediate BLS⁽²⁴⁾, and considering the first link in the chain of survival⁽¹⁾, in this study, 47.5% of participants asked for help by immediately accessing the emergency medical system (dial 112), which is in agreement (31%) with results from another study⁽¹⁶⁾.

When asked about who should offer the training, 63.6% mentioned the National Institute of Medical Emergency. Training is carried out by doctors and nurses in this institution, which is in line with the highlighted information in the literature, stating that it should be done by skilled personnel^(7,10,16).

Approximately 95.6% of the sample showed availability to attend the training, and similar results (94.45%) were found in the study carried out with students⁽²⁵⁾. Training must be offered in cultural associations aimed at community groups (88.4%) or in the workplace (84.9%). These options would facilitate adherence to training by avoiding the displacement of participants.

Training in BLS should begin in the student population and before the start of higher education⁽⁶⁾. Authors of recent studies⁽⁴⁾ showed that even nine-year-old children can perform CPR if properly prepared. Having the training is important and there should be recycling to improve knowledge and confidence of those involved^(4,6).

In a quasi-experimental study of students with average age of 21.5 ± 0.74 years who received formal training and practice in first aid, the authors⁽²⁵⁾ found these students had better knowledge than those who had not attended training ($p < 0.001$). Similar results were found by other authors⁽⁸⁾ in a study with Danish students (average age of 17.5 ± 1.2 years) and students from 13 European countries⁽²⁶⁾. Some studies have shown that even individuals who had training presented low values of knowledge^(25,27) and some said they did not feel prepared^(16,26). Still, it is proven that adult training in BLS is effective and necessary⁽²⁸⁻²⁹⁾, reinforcing the need for recycling and updating knowledge⁽⁷⁾.

Regarding the level of knowledge, as in another study⁽⁷⁾, it was found that the studied population had insufficient and some incorrect knowledge. Male respondents who attended a course in BLS and those with experience in BLS showed higher levels of knowledge on BLS, on average. In a study with students, the authors⁽²⁵⁾ found that women and those who had previous training showed higher level of knowledge on BLS. The rate of correct answers in 64 questions was 25.9%, higher than the 10% found in another study⁽¹⁶⁾. However, the content and the questions are not similar with those of the present study (degree of difficulty/different scope).

According to international guidelines^(1-2,13), more than 50% gave wrong answers for the questions related to chest compressions. However, 79.9% of respondents gave correct answers on the items concerning the safety of rescuer.

When the victim breathes and if not traumatized, 51.4% gave right answer for the question of the proper placement,

a higher value than that from another study⁽¹⁴⁾. The victim should be placed in the recovery position to prevent airway obstruction and consequent respiratory arrest⁽¹⁻²⁾.

When the victim chokes, only 33% of respondents said the Heimlich maneuver should be performed. Such maneuver should be performed whenever there is serious airway obstruction and the victim is conscious. If choking is mild and the cough is effective, coughing should be encouraged and the person monitored. However, if the person is unconscious and the obstruction is severe, the rescuer should call 112 and begin CPR⁽¹⁻²⁾.

The area of interventions to the child had the lowest percentage of correct answers, between 22.5% (faced with the unconscious child, perform CPR for a minute before calling help) and 11.8% (in an infant in cardiac arrest, five chest compressions should be alternated with two breaths). In infants, chest compressions must follow the compression-ventilation ratio of 15: 2 (with two rescuers)⁽¹⁻²⁾.

CONCLUSION

The results of this study reinforce the need for training laypeople in BLS to reduce mortality and morbidity rates in situations of accident and sudden illness in extra-hospital setting. Although there are several courses in the

Portuguese community, both in the classroom and online, some mandatory, it is necessary to introduce the subject in the school curricula of all young people as early as possible. Theoretical and practical training programs should be conducted in schools and workplaces to empower the population in this area, reducing morbidity and mortality due to accidents and emergencies.

Respondents had low levels of knowledge on BLS, evidencing the need and the availability to have the training. Courses should be managed by health professionals, including nurses, maximizing the skills of these professionals in BLS. Despite some difficulties in completing the instrument given its extent, respondents found it useful to realize the knowledge gaps and the importance of attending the training.

We encourage replication of the study in other research scenarios, particularly with children and teachers. In future studies, it would be important to increase the sample size and develop longitudinal studies, after conducting theoretical and practical training, aiming to assess their effectiveness. It would also be interesting to develop documentary analysis to verify the morbidity and mortality of victims of accident or sudden illness rescued or not by lay people with and without training.

RESUMO

Objetivo: Avaliar o nível de conhecimento e a disponibilidade da população portuguesa para realizar formação sobre Suporte Básico de Vida (SBV) e identificar alguns fatores relacionados ao seu nível de conhecimento sobre SBV. **Método:** Estudo observacional realizado com 1.700 pessoas que responderam a um questionário composto por dados sociodemográficos e profissionais, formação, interesse na formação e conhecimentos sobre SBV. **Resultados:** Dos 754 homens e 943 mulheres, apenas 17,8% (303) frequentou um curso sobre SBV, mas 95,6% manifestou disponibilidade para realizar a formação. Em média, não apresentaram bons níveis de conhecimentos em suporte básico de vida (acertaram em $25,9 \pm 11,5$ dos 64 indicadores). Os inquiridos mais velhos, do sexo masculino, os que efetuaram formação e os que já prestaram SBV acertaram em média mais questões ($p < 0,01$). **Conclusão:** Os níveis de conhecimento da população portuguesa são baixos, mas as pessoas estão disponíveis para formação, sendo importante desenvolver cursos de formação e treino para melhorar os seus conhecimentos.

DESCRITORES

Ressuscitação Cardiopulmonar; Primeiros Socorros; Conhecimento; Educação em Saúde.

RESUMEN

Objetivo: Evaluar el nivel de conocimiento y la disponibilidad de la población portuguesa para llevar a cabo la formación sobre Soporte Básico de Vida (SBV) e identificar algunos factores relacionados con su nivel de conocimiento acerca del SBV. **Método:** Estudio observacional realizado con 1.700 personas que respondieron a un cuestionario compuesto de datos sociodemográficos y profesionales, formación, interés en la formación y conocimientos sobre SBV. **Resultados:** De los 754 hombres y 943 mujeres, solo el 17,8% (303) asistió a un curso sobre SBV, pero el 95,6% manifestó disponibilidad para realizar la formación. En promedio, no presentaron buenos niveles de conocimientos en soporte básico de vida (contestaron bien $25,9 \pm 11,5$ de los 64 indicadores). Los respondedores mayores, del sexo masculino, los que llevaron a cabo la formación y los que ya prestaron SBV contestaron bien, en promedio, más cuestiones ($p < 0,01$). **Conclusión:** Los niveles de conocimiento de la población portuguesa son bajos, pero las personas están disponibles para la formación, por lo que es importante desarrollar cursos de formación y entrenamiento a fin de mejorar sus conocimientos.

DESCRIPTORES

Resucitación Cardiopulmonar; Primeros Auxilios; Conocimiento; Educación en Salud.

REFERENCES

1. Portugal. Instituto Nacional de Emergência Médica. Manual de suporte avançado de vida. 2ª ed. Lisboa: INEM; 2011.
2. European Resuscitation Council. Guidelines for Resuscitation [Internet]. 2010 [cited 2014 Apr 10]. Available from: <http://www.cprguidelines.eu/2010/>
3. Portugal. Instituto Nacional de Estatística. Estatísticas dos transportes. Lisboa: INE; 2011.

4. Meissner TM, Kloppe G, Hanefeld C. Basic life support skills of high school students before and after cardiopulmonary resuscitation training: a longitudinal investigation. *Scand J Trauma Resusc Emerg Med* [Internet]. 2012 [cited 2014 Apr 10];20:31. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3353161/>
5. Lešnik D, Lešnik D, Golub J, Križmarić M, Mally S, Grmec S. Impact of additional module training on the level of basic life support knowledge of first year students at the University of Maribor. *Int J Emerg Med* [Internet]. 2011 [cited 2014 Apr 10];4:16. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3095545/>
6. Miró Andreu O, Escalada Roing X, Jiménez-Fábrega X, Díaz Miranda N, Sanclemente G, Villena O, et al. Programa de Reanimación Cardiopulmonar Orientado a Centros de Enseñanza Secundaria (PROCES): conclusiones tras 5 años de experiencia. *Rev Soc Esp Med Urgencias Emerg*. 2008;20(4):229-36.
7. Pergola A M, Araujo IEM. Laypeople and basic life support. *Rev Esc Enferm USP* [Internet]. 2009 [cited 2014 Apr 10];43(2):335-42. Available from: http://www.scielo.br/pdf/reeusp/v43n2/en_a12v43n2.pdf
8. Marton J, Pandúr A, Pék E, Deutsch K, Bánfai B, Radnai B, et al. Knowledge about basic life support in European students. *Orv Hetil*. 2014;25;155(21):833-7.
9. Hall A, Wotton K, Hutton A. Bystander experiences at and after a motor vehicle accident: a review of the literature. *Austr J Paramed* [Internet]. 2013 [cited 2014 Mar 12];10(4). Available from: <http://ro.ecu.edu.au/jephc/vol10/iss4/2>
10. Mori S, Whitaker IY, Marin HF. Evaluation of an educational website on first aid. *Rev Esc Enferm USP* [Internet]. 2013 [cited 2014 Aug 10];47(4):950-7. Available from: http://www.scielo.br/pdf/reeusp/v47n4/en_0080-6234-reeusp-47-4-0950.pdf
11. Arbon P, Hayes J. First aid and harm minimization for victims of road trauma: a population study. Final Report June 2007 [Internet]. Adelaide, Australia: Flinders University; 2007 [cited 2014 Apr 24]. Available from: http://clicktosave.com.au/wp-content/uploads/2013/06/Australian_Population_Study_on_victims_of_Road_Trauma1.pdf
12. Liu KY, Haukoos JS, Sasson C. Availability and quality of cardiopulmonary resuscitation information for Spanish-speaking population on the Internet. *Resuscitation*. 2014;85(1):131-7.
13. American Heart Association. 2010 Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science. *Circulation* [Internet]. 2010 [cited 2014 Aug 10];122 Suppl 3:S639-946. Available from: http://www.counselling-care.it/pdf/pdf_ps/2010-aha-guidelines.pdf
14. Portugal. Instituto Nacional de Estatística. Censos 2011. XV Recenseamento Geral da População. V Recenseamento Geral da Habitação. Resultados definitivos. Lisboa: INE; 2012.
15. Murad MK, Husum H. Trained lay first-helpers reduce trauma mortality: a controlled study of rural trauma in Iraq. *Prehosp Disaster Med*. 2010;25(6):533-9.
16. Pergola AM, Araujo IEM. The layperson in emergency situations. *Rev Esc Enferm USP* [Internet]. 2008 [cited 2014 Aug 10];42(4):769-76. Available from: http://www.scielo.br/pdf/reeusp/v42n4/en_v42n4a20.pdf
17. Wissenberg M, Lippert FK, Folke F, Weeke P, Hansen CM, Christensen EF, et al. Association of national initiatives to improve cardiac arrest management with rates of bystander intervention and patient survival after out-of-hospital cardiac arrest. *JAMA*. 2013;310(13):1377-84.
18. Mauritz W, Pelinka LE, Kaff A, Segall B, Fridrich P. First aid measures provided by bystanders at the accident site: a prospective epidemiological study in the area of Vienna. *Wien Klin Wochenschr*. 2003;115(19-20):698-704.
19. Swor R, Khan I, Domeier R, Domeier RM. CPR training and CPR performance: do CPR-trained bystanders perform CPR? *Acad Emerg Med*. 2006;13(6):596-601.
20. Larsson EM, Martensson NL, Alexanderson KA. First-aid training and bystander actions at traffic crashes: a population study. *Prehosp Disaster Med*. 2002;17(3):134-41.
21. Jones CM, Owen A, Thorne CJ. Comparison of the quality of basic life support provided by rescuers trained using the 2005 or 2010 ERC guidelines. *Scand J Trauma Resusc Emerg Med*. 2012;20:53.
22. Akpek EA, Kayhan Z. Knowledge of basic life support: a pilot study of the Turkish population by Baskent University in Ankara. *Resuscitation*. 2003;58(2):187-92.
23. Harvey LA, Bar ML, Poulos RG, Finch CF, Sherker S, Harvey JG. A population-based survey of knowledge of burns in New South Wales. *Med J Aust*. 2011;195(8):465-8.
24. Ashour A, Cameron P, Bernard S, Fitzgerald M, Smith K, Walker T. Could bystander first-aid prevent trauma deaths at the scene of injury. *Emerg Med Australas*. 2007; 19(2):163-8.
25. Khan A, Shaikh S, Shuaib F, Sattar A, Samani SA, Shabbir Q, et al. Knowledge attitude and practices of undergraduate students regarding first aid measures. *J Pak Med Assoc*. 2010;60(1):68-72.
26. Aaberg AMR, Larsen CEB, Rasmussen BS, Hansen CM, Larsen JM. Basic life support knowledge, self-reported skills and fears in Danish high school students and effect of a single 45-min training session run by junior doctors; a prospective cohort study. *Scand J Trauma Resusc Emerg Med*. 2014, 22:24.
27. Cheung B, Ho C, Kou O, Kuong EE, Lai KW, Leow PL, et al. Knowledge of cardiopulmonary resuscitation among the public in Hong Kong: telephone questionnaire survey'. *Hong Kong Med J*. 2003; 9(5):323-8.
28. Janisha KP, Priya V, Fermina J. Effectiveness of planned teaching programme on knowledge regarding basic life support among young adults. *Int J Nurs Educ*. 2012;4 (1):28.
29. Miyadahira AMK, Quilici AP, Martins CC, Araújo GL, Pellicciotti JSS. Cardiopulmonary resuscitation with semi-automated external defibrillator: assessment of the teaching-learning process. *Rev Esc Enferm USP* [Internet]. 2008 [cited 2014 Aug 10];42(3):532-8. Available from: http://www.scielo.br/pdf/reeusp/v42n3/en_v42n3a16.pdf