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# Teaching basic life support to 12–16 year olds in Barcelona schools: Views of head teachers<sup>☆</sup>

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## Summary

**Aim:** To determine the opinion of head teachers on the educational and logistical characteristics required for a basic cardiopulmonary resuscitation (b-CPR) programme for secondary school teenagers to succeed.

**Material and methods:** The study was carried out in Barcelona which has 227 public and private secondary schools. Secondary school is started at 12 years old, and finished around 16 once teenagers pass grade 4. A hypothetical b-CPR program split into two parts (concepts and training) was introduced to all Barcelona secondary school head teachers, and a 23 question survey on the programme characteristics was mailed to them three times.

**Results:** One hundred out of 227 (44%) surveys were sent back: 63% from private and 37% from public secondary schools with 85% of head teachers being interested in incorporating a b-CPR programme in the school curriculum. Interested head teachers did not differ in age, sex, or kind of degree compared to their non-interested counterparts. Neither were differences found in secondary school characteristics (ownership, religious orientation, size, and neighborhood average income) of both groups of head teachers. Overall, it was considered that the programme could increase the students' self-esteem (86%), and be useful for saving lives (72%). It was also felt that both theoretical (77%) and practical classes (97%) should be given by health-care providers. However, up to 69% thought that school teachers would be willing to

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give theoretical classes if trained previously. The school was identified as the best setting to perform the programme (83%), which should be given to grades 3 or 4 (97%), should last less than 5 h (83%), and should be completed within a time frame of less than 1 week (86%). The greatest programme barrier would be its cost if this was over €5–10 per student (55%).

**Conclusions:** In Barcelona, most secondary schools surveyed were highly interested in a b-CPR programme for their teenagers in grades 3 or 4. Teachers would prefer healthcare providers to give the programme but would be willing to teach b-CPR theory if trained previously.

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## Introduction

Successful outcome after an out-of-hospital cardiac arrest is directly related to the promptness with which the chain of survival is implemented. The presence of a bystander who activates the emergency medical service immediately and begins basic cardiopulmonary resuscitation (b-CPR) significantly increases the incidence of the return of spontaneous circulation and the number of patients with out-of-hospital cardiac arrest finally discharged from hospital.<sup>1</sup> In spite of the fact that more than half of cardiac arrests are witnessed, bystanders give CPR in only one-third of these cases.<sup>2,3</sup> Consequently, training lay people in b-CPR has been increasingly emphasized.<sup>4</sup>

The ideal situation would be to train the whole population. Motivation to learn b-CPR skills however is variable among adults,<sup>5,6</sup> and “drop-out” rates from training programmes are often high.<sup>7</sup> Moreover, the scarcity of resources usually requires that training be targeted to certain groups.<sup>8</sup> In an attempt to maximise the number of potential CPR lay providers in the community, several societies and organisations have suggested that a b-CPR programme should be included in the school curriculum within the mandatory schooling period.<sup>2,9,10</sup> This is the final setting where a large proportion of a community’s youth is assembled in specific institutions before being released to society. Since the first b-CPR programme for school children aged 12–14 years was tested in Norway in 1960,<sup>11</sup> the secondary or high school period has been identified as an ideal learning time,<sup>12–15</sup> because of teenagers’ maturity, intellect and dexterity to perform the CPR skills adequately.<sup>15</sup>

In designing a b-CPR programme for secondary school students, one of the most important challenges is to conceive a project that best fits not only the teenagers’ personality and expectations, but also into each particular school setting where it will be applied. Accordingly, failing to identify,

recognize and add such essential facts can lead schools to be reluctant to incorporate b-CPR programmes to their curriculum. In 2002, we started a pilot programme on b-CPR for secondary school students in eight schools in Barcelona. The preliminary results have been reported recently.<sup>16</sup> Prior to a wider distribution of the programme, we asked about the school interest in including a b-CPR programme in their curriculum, the factors associated with this interest and all the potential issues related to the logistics.

## Material and methods

The study was carried out in Barcelona, a Mediterranean city extending to 100 km<sup>2</sup> and a population of around one and a half million. In Barcelona, there are over 90,000 students enrolled in 227 public and private secondary schools each year. According to the educational system, students start secondary school at 12 years, and finish around 16 once they pass the secondary school grade 4. Thus, around 22,500 youths finish secondary education every year.

We designed a 23 question survey to gather information on different educational and logistical characteristics of the programme which was mailed to the head teachers of all the secondary schools located in Barcelona three times (December 2003, and February and May 2004). The questionnaires could be returned by mail or FAX. The study was closed June 30th, 2004.

We considered as the dependent variable the question: “Are you interested in incorporating a b-CPR programme for your students?” As potential factors associated with such an interest, we analysed age (over or under 40 years), sex (male or female), and the kind of degree (science or arts) held by the head teachers, as well as the ownership (public or private), religious orientation (lay or religious), and size (large—more than four classrooms per grade, medium—three or four

classrooms, or small—one or two classrooms) of the secondary school. Depending on the average income of the neighborhood in which the schools were located, they were classified as above average (more than 110% of Barcelona average income), average (between 90% and 110%), or below average (less than 90%).

The survey also included issues regarding the thoughts of the head teachers about the support that a b-CPR programme would have from school staff, students and students' parents; the eventual benefits to students (to save lives, to be capable of facing emergencies, to increase self-esteem, to find a job); and the potential difficulties in incorporating the programme within the school season (not enough time to teach the increasing curriculum, problems in class scheduling, inconvenience of healthcare provider presence, lack of appropriate school facilities, inability to train school teachers, programme cost). All these variables were graded as high, medium, or low.

Finally, they were asked to advise on the best setting where the programme should be given (school or hospital), the best grade for teaching b-CPR (grades 1–2, grade 3, or grade 4), total programme length (1–2 h, 3–4 h, or 5 or more hours), time frame to complete the programme (1 day, less than 1 week or more than 1 week) and who would be better to teach the theoretical and practical classes (healthcare providers or school teachers). Additionally, we also asked about the feasibility of school teachers acting as providers of b-CPR concepts if previously trained.

We expressed the qualitative variables as percentages. For comparisons between groups, the Chi square, Chi square for trend, or Fisher's exact tests were used. *P*-values less than 0.05 were considered as statistically significant.

## Results

One hundred out of 227 (44%) surveys were sent back by the head teachers, 58% of whom were over 40, 54% were male, and 53% had an Arts degree. The demographic characteristics of the schools showed that most were of private ownership (63%), and were non-religious, oriented or lay (57%). Their size was considered to be large in 8%, medium in 28% and small in 64%. Depending on the average income of the neighborhood in which the schools were located, 37% were classified as above average, 42% as average, and 21% as below average.

Eighty-two percent of the head teachers considered that a b-CPR programme would be highly

useful for secondary school teenagers. This belief did not differ statistically according to the head teachers' age, sex or degree. There were no statistical differences found in relation to school ownership, religious orientation, size, and neighborhood income. These results are shown in Table 1.

More than 80% of the head teachers felt that a b-CPR programme for their schools would be more than welcome by school staff, students and students' parents, and would receive a high or medium degree of support from them, with interested head teachers expecting greater support than their non-interested counterparts (Table 2).

They also considered that the addition of a b-CPR course for their secondary students could help them save lives, deal with emergencies and increase their self-esteem, but would not be useful for finding future employment. Again, potential benefits were recognised more by head teachers interested in the program (Table 3).

No major problems were perceived in incorporating the course apart from the programme cost (hypothetically, €5–10 per student), which was stated as the main handicap by 55% of the head teachers. These opinions were highly homogeneous and no statistical differences were found among responders. The only difference between the interested and non-interested head teachers was the presence of a healthcare provider, which was perceived as more inconvenient by the non-interested head teachers (Table 4).

Table 5 shows the advice received from the head teachers. It was felt that theoretical and practical classes should be given in the schools rather than in the hospital (95% and 72%, respectively); the programme would best fit into grades 3 or 4 (96%), should not exceed a duration of 4 h (83%), and should be completed within a time frame of no more than 1 week (86%). It was also considered that healthcare providers rather than trained school teachers should be in charge of both parts of the course (77% and 97%, respectively). Non-interested head teachers reported that the course would only be suitable for grade 4 students, should last less than 2 h, and not exceed 1 day, while interested schools showed greater flexibility.

Despite the preference of a healthcare professional being in charge of the theory and practical classes of a b-CPR course, up to 69% of the head teachers stated their teachers would be willing to teach the b-CPR theory if trained beforehand. The expected availability to teach such concepts did not differ according to the demographic characteristics of the head teachers and schools (Table 6).

**Table 1** Demographic data of the head teachers and schools participating in the study, and comparison between groups (interested and non-interested schools)

	Total <sup>a</sup> (n = 100)	Interested <sup>a</sup> (n = 82)	Non-interested <sup>a</sup> (n = 18)	P-value <sup>b</sup>
Head teacher age				0.92
Under 40 years	41 (42)	34 (42)	7 (41)	
Over 40 years	56 (58)	46 (58)	10 (59)	
Not specified	3	2	1	
Head teacher gender				0.75
Male	51 (54)	43 (54)	8 (50)	
Female	44 (46)	36 (46)	8 (50)	
Not specified	5	3	2	
Head teacher degree				0.70
Sciences	37 (47)	32 (48)	5 (42)	
Arts	42 (53)	35 (52)	7 (58)	
Not specified	21	15	6	
School ownership				0.47
Public	36 (37)	31 (39)	5 (29)	
Private	61 (63)	49 (61)	12 (71)	
Not specified	3	2	1	
School religious orientation				0.38
Lay	55 (56)	47 (59)	8 (47)	
Religious	42 (44)	33 (41)	9 (53)	
Not specified	3	2	1	
School size				0.91
Large	7 (8)	6 (8)	1 (6)	
Medium	29 (32)	23 (31)	6 (35)	
Small	56 (60)	46 (61)	10 (59)	
Not specified	8	7	1	
Neighborhood average income				0.18
Above average	37 (37)	32 (29)	5 (28)	
Average	42 (42)	31 (38)	11 (61)	
Below average	21 (21)	19 (23)	2 (11)	
Not specified	0	0	0	

<sup>a</sup> Values expressed as cases and percentages (between brackets) calculated without taking into account "not specified".

<sup>b</sup> P-value calculated using Chi square, Chi square for trend, or Fisher exact tests as appropriate.

## Discussion

The results of the present study can be summarised in three main findings. First, secondary schools in Barcelona are highly interested in incorporating a b-CPR programme for their students. Second, this opinion is not influenced by the demographic characteristics of either the head teachers or the schools. Finally, as experts in teenager education, the head teachers advised that the b-CRP programme should be given in grades 3 or 4, should be short in length (less than 5 h), and should be completed within a time frame of no more than 1 week. Furthermore, the course should be taught by healthcare providers at school facilities and, above all, the classes should be without cost for both the students and schools.

Recommendations on the delivery of life support to victims of cardiac arrest, severe trauma and other causes of sudden coma began in the early 1960s. In cases of cardiac arrest, initiation of resuscitation by bystanders has been shown to increase the ultimate survival rates.<sup>17–21</sup> The frequency of b-CPR delivery by bystanders has, unfortunately, been very low so far,<sup>19–21</sup> and thus, out-of-hospital cardiac arrests still have a poor outcome with very low survival rates,<sup>17–21</sup> being less than 10% in Europe<sup>18,22</sup> and most urban areas in the USA.<sup>17,19–21</sup> The main problem with pre-hospital bystander CPR is getting people to learn basic life support skills.<sup>5,6</sup> This is due to a variety of reasons including cost, length of course, accessibility and lack of entertainment, personal interest, advertising of courses and the unwillingness of citizens to participate in an emergency situation.<sup>23</sup> It therefore, seems to

**Table 2** Head teacher’s thoughts about support that a b-CPR program would have from different school-related people and comparison between groups (interested and non-interested schools)

	Total <sup>a</sup> (n = 100)	Interested <sup>a</sup> (n = 82)	Non-interested <sup>a</sup> (n = 18)	P-value <sup>b</sup>
<b>Students</b>				<0.001
High	37 (38)	37 (45)	0 (0)	
Medium	49 (50)	43 (52)	6 (37)	
Low	12 (12)	2 (3)	10 (63)	
Not specified	2	0	2	
<b>School teachers</b>				<0.001
High	46 (47)	45 (55)	1 (6)	
Medium	41 (42)	33 (40)	8 (50)	
Low	11 (11)	4 (5)	7 (44)	
Not specified	2	0	2	
<b>Students’ parents</b>				<0.001
High	34 (35)	34 (42)	0 (0)	
Medium	45 (47)	38 (48)	7 (44)	
Low	17 (18)	8 (10)	9 (56)	
Not specified	4	2	2	

<sup>a</sup> Values expressed as cases and percentages (between brackets) calculated without taking into account “not specified”.

<sup>b</sup> P-value calculated using Chi square, Chi square for trend, or Fisher exact tests as appropriate.

be essential to come up with a programme in which CPR can be taught to as many people as possible, to expose the citizens to CPR at a young age to raise awareness, explain the importance of CPR and stimulate the interest of as many people as possible. Hence, several societies and organizations

have recommended that basic life support skills should be taught in schools.<sup>2,9,10</sup> There are many reasons to support this concept, being one of the most important that training all school teenagers in CPR could ultimately ensure reaching the whole population.<sup>2</sup> Teenagers, unlike adults, are an easily

**Table 3** Eventual benefits for students on completion of a b-CPR program and comparison between groups (interested and non-interested schools)

	Total <sup>a</sup> (n = 100)	Interested <sup>a</sup> (n = 82)	Non-interested <sup>a</sup> (n = 18)	P-value <sup>b</sup>
<b>To help save lives</b>				<0.001
High	30 (32)	30 (38)	0 (0)	
Medium	40 (43)	34 (43)	6 (40)	
Low	24 (25)	15 (19)	9 (60)	
Not specified	6	3	3	
<b>To help them face an emergency</b>				<0.001
High	42 (44)	40 (50)	2 (13)	
Medium	43 (45)	37 (46)	6 (40)	
Low	10 (11)	3 (4)	7 (47)	
Not specified	5	2	3	
<b>To increase their self-esteem</b>				<0.22
High	50 (51)	43 (52)	7 (41)	
Medium	44 (44)	36 (44)	8 (47)	
Low	5 (5)	3 (4)	2 (12)	
Not specified	1	0	1	
<b>To find a job in the future</b>				0.51
High	4 (4)	4 (5)	0 (0)	
Medium	38 (40)	33 (41)	5 (33)	
Low	53 (56)	43 (54)	10 (77)	
Not specified	5	2	3	

<sup>a</sup> Values expressed as cases and percentages (between brackets) calculated without taking into account “not specified”.

<sup>b</sup> P-value calculated using Chi square, Chi square for trend, or Fisher exact tests as appropriate.

**Table 4** Potential difficulties in incorporating a b-CPR program into the school season and comparison between groups (interested and non-interested schools)

	Total <sup>a</sup> (n = 100)	Interested <sup>a</sup> (n = 82)	Non-interested <sup>a</sup> (n = 18)	P-value <sup>b</sup>
Not enough time				0.15
High	30 (31)	22 (28)	8 (50)	
Medium	40 (42)	34 (43)	6 (38)	
Low	26 (27)	24 (29)	2 (12)	
Not specified	4	2	2	
Trouble in class scheduling				0.25
High	26 (27)	19 (24)	7 (44)	
Medium	48 (51)	42 (53)	6 (37)	
Low	23 (22)	20 (23)	3 (19)	
Not specified	3	1	2	
Inconvenience for health-care provider presence				<0.001
High	3 (3)	0 (0)	3 (19)	
Medium	25 (26)	19 (24)	6 (37)	
Low	68 (71)	61 (76)	7 (44)	
Not specified	4	2	2	
Lack of appropriate school facilities				0.19
High	8 (8)	5 (6)	3 (20)	
Medium	26 (27)	22 (27)	4 (27)	
Low	63 (65)	55 (67)	8 (53)	
Not specified	3	0	3	
Inability to train school teachers				0.81
High	30 (32)	25 (32)	5 (31)	
Medium	41 (43)	35 (44)	6 (38)	
Low	24 (25)	19 (24)	5 (31)	
Not specified	5	3	2	
Program cost (€5–10 per student)				0.74
High	58 (60)	47 (59)	11 (69)	
Medium	29 (30)	25 (31)	4 (25)	
Low	9 (10)	8 (10)	1 (6)	
Not specified	4	2	2	

<sup>a</sup> Values expressed as cases and percentages (between brackets) calculated without taking into account "not specified".

<sup>b</sup> P-value calculated using Chi square, Chi square for trend, or Fisher exact tests as appropriate.

accessible population, are capable of learning CPR and may be more interested in learning the skill.<sup>9,13</sup> The head teachers in the present study seemed to agree with this idea, because they were highly interested in offering a b-CPR programme. Other authors from different countries have found similar degrees of acceptance demonstrating universal interest in b-CPR programs for students regardless of the culture and educational system.<sup>24</sup> In keeping with this concept, we found no differences between interested and not interested schools in terms of the head teacher or the school's demographics, in contrast with data from other authors who suggest that certain schools, especially those which are larger, would be more interested in teaching b-CPR.<sup>25</sup>

CPR training for school students first started in Norway in the 1960s.<sup>26</sup> Since then, it has sporadi-

cally been offered to students in Scandinavia, Great Britain and the United States.<sup>2,10</sup> One of the most extended experiences has been gained in Canada, where more than 20,000 students are taking a b-CPR programme each year.<sup>27</sup> In Barcelona, our group has been teaching b-CPR skills to secondary school students since 2002. The results are encouraging, but the programme, unfortunately, reached only 2000 out of 67,500 students in secondary schools during last 3 years.<sup>16</sup> Some benefits and barriers have been linked to all these programmes. Among the benefits noted in present study, the interested head teachers listed the skills to save a life, the preparation for an emergency and the increase in students' self-esteem. These results compare with those obtained in a previous study,<sup>24</sup> but not with those reported by non-interested head teachers in Barcelona, which surprisingly found few benefits to

**Table 5** Head teachers' advice on program logistics and comparison between groups (interested and non-interested schools)

	Total <sup>a</sup> (n = 100)	Interested <sup>a</sup> (n = 82)	Non-interested <sup>a</sup> (n = 18)	P-value <sup>b</sup>
Best setting for theoretical classes				0.50
School	84 (95)	69 (95)	15 (100)	
Hospital	4 (5)	4 (5)	0 (0)	
Not specified	12	9	3	
Best setting for practical classes				0.34
School	64 (72)	55 (74)	9 (60)	
Hospital	25 (28)	19 (26)	6 (40)	
Not specified	11	8	3	
Best grade for teaching b-CPR				<0.01
Grade 1 or 2	3 (4)	3 (5)	0 (0)	
Grade 3	30 (39)	30 (47)	0 (0)	
Grade 4	43 (57)	31 (48)	12 (100)	
Not specified	24	18	6	
Best total program length				<0.05
1–2 h	31 (35)	22 (30)	9 (60)	
3–4 h	43 (48)	38 (51)	5 (33)	
5 or more hours	15 (17)	14 (19)	1 (7)	
Not specified	11	8	3	
Best time frame to complete the program				<0.05
One day	50	40 (55)	10 (83)	
Less than a week	23	21 (29)	2 (17)	
More than a week	12	12 (16)	0 (0)	
Not specified	15	9	6	
Best teacher for theoretical classes				0.80
School teacher	20 (22)	16 (22)	4 (28)	
Health care provider	69 (78)	59 (78)	10 (72)	
Not specified	11	7	4	
Best teacher for practical classes				0.06
School teacher	3 (3)	1 (1)	2 (13)	
Health care provider	92 (97)	79 (99)	13 (87)	
Not specified	5	2	3	

<sup>a</sup> Values expressed as cases and percentages (between brackets) calculated without taking into account "not specified".

<sup>b</sup> P-value calculated using Chi square, Chi square for trend, or Fisher exact tests as appropriate.

such a programme. It is likely that the lack of information and advertising about the need for such programmes in our community play an important role in this opinion. This possibility warrants further investigation because the opinions of teachers are usually taken into account by teenagers, and can exert a negative influence on their education. Strategies focusing on changing these thoughts should be applied urgently, and become the cornerstone of all educational campaigns on this issue.

Among the barriers to introducing the course, no major differences were found among schools. As other schools had done before<sup>23,24</sup>, non-interested schools reported that reasons for not taking b-CPR courses were logistical, not philosophical, and mainly included insufficient time to teach a larger

curriculum, problems in class scheduling, lack of appropriate school facilities and school teacher training and programme cost.<sup>28</sup> If the advice of the head teachers' were taken into account, it would be easy to overcome all these reasons but one: the cost of the course. Head teachers were certain of the secondary school administrators and students' parents reluctance to cover the cost of the course. From the European welfare state point of view, both education and health care are universal rights for all their citizens, which means that governments should guarantee and maintain these rights free of charge. Funding options for CPR training programmes should be provided to secondary schools and new opportunities for grant funding explored. A model that merits investiga-

**Table 6** Feasibility of teachers giving the concepts of a b-CPR course and comparison between groups (feasible and non-feasible groups)

	Total <sup>a</sup> (n=93)	Feasible <sup>a</sup> (n=64)	Not-feasible <sup>a</sup> (n=29)	P-value <sup>b</sup>
Head teacher age				0.55
Under 40 years	38 (42)	25 (40)	13 (46)	
Over 40 years	53 (58)	38 (60)	15 (54)	
Not specified	2	1	1	
Head teacher gender				0.31
Male	47 (53)	30 (49)	17 (61)	
Female	42 (47)	31 (51)	11 (39)	
Not specified	4	3	1	
Head teacher degree				0.89
Sciences	35 (47)	24 (46)	11 (48)	
Arts	40 (53)	28 (54)	12 (52)	
Not specified	18	12	6	
School ownership				0.94
Public	35 (38)	24 (39)	11 (38)	
Private	56 (62)	38 (61)	18 (62)	
Not specified	2	2	0	
School religious orientation				0.47
Lay	59 (65)	37 (60)	15 (52)	
Religious	32 (35)	25 (40)	14 (48)	
Not specified	2	2	0	
School size				0.77
Large	7 (8)	4 (7)	3 (10)	
Medium	27 (31)	20 (35)	7 (24)	
Small	52 (61)	33 (58)	19 (66)	
Not specified	7	7	0	
Neighborhood average income				0.82
Above average	32 (34)	22 (34)	10 (34)	
On average	41 (44)	29 (45)	12 (41)	
Below average	20 (22)	13 (21)	7 (26)	
Not specified	0	0	0	

<sup>a</sup> Values expressed as cases and percentages (between brackets) calculated without taking into account "not specified".

<sup>b</sup> P-value calculated using Chi square, Chi square for trend, or Fisher exact tests as appropriate.

tion is the development of public–private funding partnerships such as Canada's Advance Coronary Treatment (ACT) Foundation. The ACT Foundation has developed partnerships with several pharmaceutical companies that cover the Foundation's operational costs on an ongoing basis. The Foundation then assists schools in obtaining programme implementation funds from local businesses or service organisations. In this way the ACT has brought CPR to over 100 Canadian high schools and 20,000 students.<sup>27</sup>

Once CPR training is available in a school, the head teachers' advice should be heard in relation to providing an effective link between CPR student training and secondary school aims. From their point of view, b-CPR programmes should be given within grades 3 or 4, be taught by health

care providers, last less than 5 h and be completed in less than a week. Regarding the ideal grade, although effective learning is achieved as young as 6–7 years old,<sup>29</sup> the age at which b-CPR training is provided to children may influence knowledge acquisition and retention. On studying teenagers, Van Kerschaver et al. have demonstrated that older children performed the skills better and the effectiveness of refresher training was more pronounced as age increased.<sup>13</sup> On the other hand, the teaching of b-CPR is undertaken by a wide variety of individuals, i.e., health care providers, voluntary ambulance services, qualified first responders or school staff.<sup>25</sup> It is advisable that teachers with previous instruction and assisted by a video learning method train their pupils, so that the main cost of CPR courses (i.e., the instructors) could be

eliminated.<sup>23,30</sup> In contrast, in present study the head teachers thought that the teachers would be able to teach, at best, b-CPR concepts but not skills. We failed to identify a particular subgroup with a greater predisposition to teach the concepts of b-CPR. As such programmes have not been previously tried in Barcelona, it is likely to be difficult for head teachers to imagine what it takes to become a skilful b-CPR instructor. With respect to the total length of a b-CPR programme for secondary school students, the limited school time and difficulty in class scheduling should carefully weighed, with the necessity of completing and achieving b-CPR skills correctly in a proper fashion. From this perspective, the wish of the head teachers for a programme lasting no more than 5 h is quite reasonable and complies with the average length of other European b-CPR programmes for lay people.<sup>31</sup> Regarding the period of time in which the course should be completed, 1 week seems to be reasonable, because it avoids overlaps, allows students to practice skills, and teachers to introduce preventive and reinforced concepts related to other subjects developed in school curriculum.<sup>30</sup>

There are, nonetheless, some limitations to this study. Not all schools responded to the survey. It is most likely the non-responders were not interested in a b-CPR programme, so that the reported percent of schools that were interested probably represents an overestimation. This is the first time Barcelona secondary school head teachers were asked for their opinions on b-CPR programmes, so the percentage of schools interested cannot be considered a negligible number as it includes one third (82 out of 227) of all the secondary schools in Barcelona city. Eight schools had participated in the pilot programme<sup>16</sup> and this previous experience could have shaped the head teachers responses. However, only three of them answered the questionnaire, and we believe that the previous knowledge of the b-CPR program of these three head teachers did not influence the final overall results obtained in present survey. On the other hand, only head teachers answered the survey, and it is possible that they did not represent the beliefs of other teachers or school administrators. This could have resulted in either under or over interest in b-CPR training. Finally, some concern as to whether the present results represent the general opinion on b-CPR programmes may arise. The external validity may thus be questioned and the results may not be applied to schools placed in other metropolitan or non-metropolitan areas or in other European countries. However, the study included a considerable variation in school size and socio-economic characteristics of the students. Moreover, the results

were quite similar to those of a survey in the United Kingdom and Washington State (USA) schools where b-CPR training occurred.<sup>24,25</sup>

In conclusion, Barcelona secondary schools are highly interested in incorporating a b-CPR programme for their students. However, some difficulties in extending b-CPR skills to school teenagers were identified: costs, length, accessibility and lack of interest by a few head teachers. Therefore, only with economic support and conviction from the administrators, along with enthusiasm and perseverance of all the personnel involved, will b-CPR learning become available for all teenagers.

## Conflict of interest

None.

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