

The use of an automatic defibrillator by non-sanitary personnel in sport areas: an observational study

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Abstract. *Introduction:* In industrialized countries, sudden cardiac death is a serious public health problem that accounts for about 15% to 20% of all deaths, with an incidence of 0.5 to 3 deaths per 100,000 athletes. In recent years, although both first aid prevention programs and the availability of External Automatic Defibrillator (AED) in public places have increased, few data are available with respect to real knowledge about the use of such devices. The aim of this study is to detect the level of knowledge and skills in the use of automatic external defibrillators among sports and management staff in sports facilities. *Materials and Methods:* A cross-sectional, multicentre study conducted in 16 sports facilities in the Province of Lecce, Italy, and targeted to all the athletic and managerial staff of these sports facilities. Information was obtained through a validated questionnaire consisting of 27 items. *Results:* 339 participants of which 59.3% male (n=201) (average=33.6; SD=13.1). 51.6% (n=175) were informed about the presence of the defibrillator, only 38.1% (n=129) declared to know where it was placed and 43.7% (n=96) considered it to be quite or very accessible. The majority of them (78.8%; n=267) were never involved in a training course and declared limited knowledge about the use of this device. *Conclusions:* Respondents stated that they have poor knowledge and skills in the use of the defibrillator, its operation and maintenance, which could reduce the positive outcomes of early treatment. Further studies should be conducted, although it may be appropriate to implement specific training courses for personnel working in sports centres. (www.actabiomedica.it)

Key words: External Automatic Defibrillator (AED), responsibility, training, athlete, nurse

Introduction

Sudden Cardiac Death (SCD) represents a sudden and unexpected natural death of cardiac etiology (1). Evidence agrees that defibrillation within 3-5 minutes following the onset of cardiac arrest can determine survival in 50-70% of cases (2) and that the spread of semi-automatic defibrillators that can be

used by non-healthcare personnel, can triple survival rates beyond hospital settings (3). The study by Kitamura et al. (4) showed that the progressive increase in cardio-respiratory education and training as well as the public availability of semi-automatic defibrillators, has allowed the doubling of survival rates - from 18.2% to 38.5% - in cases of cardiac arrest in public environments. An estimated 30% of cardiac arrests occur

in public places (5) with an incidence during sports activity of 0.5-0.6/100,000 per year, corresponding to approximately 1-2% of total cardiac arrests (6, 7). A recent Italian survey on cardiac arrests that occurred in sports facilities revealed that the majority of events affected male amateur athletes (93%) over 35 years of age. In this context, reanimation was effective in 62% of cases when an External Automatic Defibrillator (AED) was used before the arrival of the Emergency Medical Service (EMS) and in 9% of cases when rescue maneuvers began after the arrival of EMS (8). The Ministerial Decree dated 26 June 2017 (9) establishes the obligation for all sports societies, including amateurs, to be equipped with a semi-automatic defibrillator or a more advanced technology defibrillator, also establishing that personnel trained in the use of the device must be present during competitive competitions. This decree supplemented the guidelines on the equipment and the use of semi-automatic defibrillators and any other life-saving devices by associations and amateur sports clubs prescribed by the Ministerial Decree dated 24 April 2013 (10).

Several studies have attempted to deepen the levels of knowledge, skills and attitudes of the general population with respect to the use of AEDs in public places (11-14). Few studies have focused on sport fields (15). In the Italian society, the analysis of the deaths of athletes due to MCI during sports activities allowed to highlight some limitations in the management of rescue, both in terms of organization and training of health and non-healthcare personnel (16). To date, two years after the entry into force of the Ministerial Decree of June 26, 2017 (9), despite the numerous sudden cardiac deaths in amateur and amateur sports, no research has yet been conducted in the Italian context to investigate this issue, to which the outcomes of care seem to be closely related.

Aim of the study

The aim of this study was to determine the level of knowledge and skills on the use of the automatic external defibrillator among the personnel of sports facilities.

Methods

Design and setting. This observational study is cross-sectional and multicentric. The study was conducted in September of 2017, in involved 16 sport centers within the province of Lecce that adhered to it voluntarily. In the month of March in 2017 an email was sent to all sport center, public and private, containing a request to participate in the study. Data collection for the centers that agreed started in April of 2017 until September of 2017. After agreeing on when to compile the surveys, the surveys were distributed among the participants. After collecting informative consent and after an explanation how to complete the survey, a clear explanation was given on how the data would be collected and on the purpose of the study, including how the data and results would be processed. Participants had 20 minutes to compile the self-administrating modules within the supervision of one of the researchers, which provided privacy in the collection of results. The sample included athletes over the age of 18 that practiced sports recreationally or agonistically. The sample wasn't probabilistic and was recruited on the base of it being voluntary and with data collection consent.

Table 1. Sample characteristics

Sample characteristics (n=339).	N. (%)
Age (mean, DS)	33.56 – 13.06
Gender	328 (96.8%)
Male	201 (61.3)
Female	127 (38.7)
Level of practiced sport	339 (100.0%)
Professional	54 (15.9)
Amateur	130 (38.3)
Hobby	155 (45.7)
Types of sports	260 (76.7%)
Martial arts	41 (15.8)
Gym/fitness	92 (35.4)
Water sports	35 (13.5)
Other sports (dance, equitation, tennis)	26 (10.0)
Team sports (football, rugby, volleyball)	66 (25.4)
Level of education	329 (97.1%)
Primary school	16 (4.9)
Lower secondary school	72 (21.9)
Upper secondary school	178 (54.1)
Degree	63 (19.1)

Instrument. The survey (15) prior authorization received from the author had a linguistic evaluation. It was completed with a process of forward-backward translation as to verify comprehensibility and clarity for the Italian language. The instrument is made up of 30 items divided in two macro-areas. The first section regards availability of a AED device within the sport center, correct maintenance and control of the device and lastly the correct use during training and competitions (items 1-22); the second section is used to analyze and ascertain the capabilities to use the device of athletes and staff in the center by using a Likert scale of 10 points (1-10); (1 = noknowledge, 10=veryknowledgeable)(Item 23-27). In the last part of the survey there were two items that would determine perception of athletes towards medical staff within sport centers by using a Likert scale of 5 points (1=very agreeable, 5=not acceptable). Lastly there is a section used to ascertain personal data of the sample (gender, age, level of education, type of sport, level practiced and role within the sport center).

Data analysis. Descriptive testing was conducted on all the qualitative and quantitative variables through the use of Software Statistical Package for Social Science (SPSS) version 17. Continuous variables were synthesized with averages and standard deviation (DS) and categorical variables through frequencies and percentages

Ethical considerations. Data were collected with maximum respect towards privacy and taking care of keeping anonymity of the participants. The surveys were administered only to athletes that accepted to sign the consent form. The full project was presented to the representatives of the centers taken into consideration for the study and the study started only after their consent was obtained. All subjects participating in the study received the information slip and the consent module, which had to be signed.

Results

Socio-demographic characteristics of the sample

A total of 350 questionnaires were distributed and 340 athletes have participated to the study (96.8%); 10

Table 2. Competence, expertise and use of the AED

	N. (%)
Is the AED device available in your club	
Yes	175 (51.6)
No	79 (23.3)
I don't know	83 (24.5)
No answer	2 (0.06)
Does your club have regular checkups for the device?	
Yes	93 (27.4)
No	12 (3.5)
I don't know	81 (23.9)
No answer	153 (45.1)
Is there a member in your club that is responsible for the maintenance of the AED?	
Yes	115 (33.9)
No	10 (2.9)
I don't know	57 (16.8)
No answer	157 (53.7)
Is there a member qualified for the use of the AED in your club during competitions?	
No	5 (1.5)
Yes, only in some	37 (10.9)
Yes in most	31 (9.1)
Yes in all	75 (22.1)
No answer	191 (56.4)
During training sessions is there a member qualified for the use of the AED in your club?	
No	21 (6.2)
Yes, only in some	53 (15.6)
Yes in most	35 (10.3)
Yes in all	58 (17.1)
No answer	172 (50.7)
Do you know where the AED is within your club?	
Yes	129 (38.0)
No	69 (20.4)
No answer	141 (41.6)
How accessible do you think the AED device is during emergencies?	
Very accessible	96 (28.3)
Accessible enough	52 (15.3)
Not very accessible	18 (5.3)
No answer	173 (51.0)
Is the defibrillator locked under key?	
Yes	28 (8.3)
No	144 (42.5)
No answer	167 (49.3)
According to you who can use the external automatic defibrillator?	
No one	3 (0.9)
Every one	29 (8.6)
Only those who have an adequate formation	303 (89.4)
No answer	4 (1.2)

	N. (%)
Have you ever participated in a training course for the use of a defibrillator?	
Yes	65 (19.2)
No	267 (78.8)
No answer	7 (2.1)
How useful do you think a AED is within your club?	
Not useful	1 (0.3)
Not much	4 (1.2)
Enough	28 (8.3)
Important	76 (22.4)
Very important	223 (65.8)
No answer	7 (2.1)

questionnaires have been excluded because the subjects were not athletes. 15.5% (n=54) of the participants practice sport at professional level, 37.2% (n=130) at amateur level and 44.4% (n=155) practice it as a hobby.

Knowledge and skills on the use of the defibrillator

23.3% (n=80) of the respondents reported that they do not have a defibrillator in their centre due to the high cost and the lack of awareness of how important it is to be equipped with it. The provision of this device, in most cases, was achieved through self-financing (25.1%, n=85) or donation (15.1% n=51). Participants indicated a frequency of use in life-threatening situations of 0.6% (n=2), 50.1% stated that they had never used the device and 49.3% refrained from responding. In addition, 78.8% (n= 267) have never participated in a training course, demonstrating a lack of knowledge and skills regarding the correct use and management of the defibrillator. Concerning the placement of the device inside the center, 15.9% (n=54) of the participants believe that AED is quite accessible in case of cardiac arrest, while more than one in two athletes (51.3%) did not provide any statement about it. 8.3% (n=30), reported that the defibrillator is kept under lock and key, only 28.4% of the respondents are aware of the regular technical checks that must be carried out on the device, while almost all respondents (97.4%, n=330) do not know the maintenance schedule of the AED provided in their centre.

Discussion

The main objective of the study was to detect the level of knowledge and skills on the use of the automatic external defibrillator among sports and management staff working in sports centres. The results of this study highlighted the reduced presence of the device inside the participating centers, the lack of knowledge of the athletes with respect to the proper use and management of the AED. The American Heart Association guidelines (17) recommend that the defibrillator should be clearly visible and stored in a locker without a padlock or other security system; this seems to be in line with the results of the study, since less than one in ten (8.6%) said they had to search for the defibrillator, but in contrast to those in the literature, where more than half of these associations choose to keep their defibrillator under lock and key (15). There was a high rate of non-response in items that aimed to probe more technical aspects such as those related to defibrillator maintenance or the presence or absence, during official competitions or training, of personnel trained in the use of the AED. This gap could suggest a lack of awareness from the athletes, which could be answered through targeted strategies, such as the production of information material.

Results suggest that the implementation of the legislation should be accompanied by adequate organization of training and emergency procedures in order to ensure timely and effective intervention in the event of SCD (15). Although there have been significant developments in the technology and distribution of AEDs in recent years, these efforts may prove somewhat unnecessary if devices cannot be located and used in a timely manner when needed and there is no increase in theoretical knowledge and practical skills (13). Studies in literature have shown that the predisposition to form and use the device decreases if there is little consideration of the “sudden cardiac arrest” problem (12) although its use has a positive impact on survival (18, 19). The training of sports center workers to correctly use the AED is an essential requirement to increase the survival rate in case of cardiac arrest; some studies have shown that a high percentage of untrained subjects were not able to use an AED safely, despite

following the voice instructions and possibly the instructions given by the emergency system operator (20, 21). According to the current ministerial regulations (9), it is necessary to identify the subjects who, due to availability, temporal presence in the sport facilities and presumed aptitude, appear more suitable to carry out the task of first responder. In addition, the number of subjects to be trained is strictly dependent on the place where the AED is located and the type of organization involved, assuming that a sufficient number of people are trained for each AED.

According to the results of this study, more than half of the participants underlined the lack of adequately trained staff within the centre, and averagely only two members were trained for each participating centre, an aspect that contrasts with the current regulations in force in Italy and with what emerges from the study conducted by Cronin et al. (15), which showed that no less than 10 members were able to use a defibrillator within the centres interviewed. In order to fill this training gap, it could be of fundamental importance to include a suitably trained professional, such as the Nurse, in the centres that practice amateur and competitive sports. The results of the study, suggest that the Nurse could certainly have a key role in training in the field of sports, whose involvement would ensure immediate interventions to reduce the risk of heart death in sports.

Conclusions

Sudden cardiac death and the use of defibrillators is a phenomenon of great social interest; solidarity and sensitivity to this subject should certainly be encouraged through paths of awareness and health education. Awareness-raising on this topic, aimed at making people aware of its dimensions and related issues, can therefore be useful, provided that it takes place through qualified dissemination processes and is placed in a constructive perspective. The results of this study have highlighted a lack of knowledge and skills of athletes on the correct management of the defibrillator and, in general, it emerged an insufficient awareness of the problem within the sports centers involved, in which a defibrillator is not always available. The lack

of training could be filled with the contribution of a professional Nurse within the sports centres, a combination that does not exist in the Italian context in amateur and amateur sport where, instead, in other European realities, the Nurse plays a key role in the planning of sports emergencies. Our sample cannot be considered representative of the entire Italian sports population.

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