SCIENTIFIC LETTERS

Knowledge of cardiopulmonary resuscitation in different hospital departments

Conocimientos en resucitación cardiopulmonar en distintos servicios hospitalarios

Antonio Caballero Oliver[1], Borja Domínguez Serrano[1], Paloma Muñoz Reinoso[1], Ángel Vilches Arenas[2], María de Regla Caballero Valderrama[3]

Cardiorespiratory arrest (CRA) is a serious health problem[1,2]. Its prognosis depends to a large extent on the time until the onset of cardiopulmonary resuscitation (CPR)[3,4] and on the CPR knowledge of the professionals attending it[5]. Previous studies carried out in hospitals show that knowledge of CPR can be improved[6]. The clinical guide of the European Resuscitation Council (ERC) advises the regular evaluation of this knowledge[7]. In this regard, this study was proposed. The main objective was to determine the degree of knowledge of the ERC clinical guide by doctors and nurses from different hospital services. The secondary objective was to compare the results obtained in the different departments.

A descriptive observational study was performed in the emergency department (ED), internal medicine unit (IMU) and intensive care unit (ICU) at the Virgen del Rocío University Hospital in Seville. A survey was carried out in the workplace, which was answered and collected in person. This survey was anonymous, voluntary and had been previously validated. The study was approved by the CEIC of the Hospital General Universitario Virgen del Rocío in Seville. The questionnaire included demographic data and data on professional activity [age, sex, profession, experience, last time advanced CPR was applied and qualification as an advanced life support (ALS) instructor]; on self-perception as a rescuer and knowledge of the latest ERC guide; finally, knowledge of ALS was assessed by means of twelve questions in multi-response test format with a single correct answer. Respondents who answered at least 50% of the questions correctly were considered eligible. For statistical analysis, qualitative variables were expressed as frequencies and percentages, quantitative variables as means and standard deviation. Comparisons between qualitative variables were done with the chi-square test. Student's t test was used in the comparisons of quantitative variables. A p < 0.05 was accepted as significant.

Table 1. Characteristics of the study population and self-perception of knowledge about cardiopulmonary resuscitation

Professional information	Global N = 303 n (%)	ED N = 96 n (%)	IMU N = 89 n (%)	ICU N = 118 n (%)	p
Sex: female	210 (69.3)	66 (68.8)	58 (65.2)	86 (72.9)	0.49
Profession					
Facultative	86 (28.4)	34 (35)	34 (38.2)	18 (15.2)	0.23
Nursing	217 (71.6)	62 (65)	55 (61.8)	100 (84.8)	0.32
Professional experience					
> 10 years	143 (48.6)	44 (47.3)	43 (48.9)	56 (49.6)	0.22
10 years	151 (51.4)	49 (52.7)	45 (51.1)	57 (50.4)	0.31
Last CPR performed					
2 years	210 (69)	62 (64.6)	55 (61.8)	92 (78)	0.76
> 2 years	54 (17.9)	25 (26)	19 (21.4)	10 (8.5)	0.61
ALS Instructor Training (ALSI)	42 (13.9)	23 (24)	7 (7.9)	12 (10.2)	0.18
Self-perception of CPR knowledge					
Are you aware of the existence of the new CPR guide?	244 (80.5)	80 (83.3)	72 (80.9)	92 (78)	0.61
Do you know the publication date of the CPR guide?	161 (53.1)	40 (41.7)	41 (46.1)	80 (67.8)	0.46
Do you consider yourself qualified to perform CPR?	244 (80.5)	82 (85.4)	64 (71.9)	98 (83.1)	0.54
Are you afraid of having to perform CPR? *	4.5 (2.8)	4.1 (2.9)	4.7 (2.6)	4.6 (2.8)	0.34

ED: emergency department; IM: internal medicine; ICU: intensive care unit; CPR: cardiopulmonary resuscitation; ALS: advanced life support.
*Fear was scored from 0 to 10; it is expressed as mean and standard deviation.

The average age of the respondents was 44 (SD 8) years. Table 1 shows the results on the characteristics of the surveyed population and on the self-perception of CPR knowledge. A total of 303 surveys were obtained from 328 professionals (response rate: 92.4%): 96 (31.7%) from ED, 89 (29.4%) from IMU and 118 (38.9%) from ICU. Two hundred and ten respondents (69%) stated that they had attended cases of CRP in the two previous years. The percentage of people who passed the specific ALS test was higher in doctors (79.1%) than in nurses (64.5%) (p = 0.02) and there were no differences with the rest of the characteristics (Table 2).

The obtained results show that it is essential that the professionals of the ED, IMU and ICU have knowledge in CPR, since most of the people surveyed had to carry out this procedure in the two years prior to the survey. Almost 70% passed the knowledge test, which we consider an acceptable result. The doctors obtained better results than the nurses, both in terms of pass rate and average score (p = 0.020 and p < 0.001, respectively). Although a previous study[8] indicates that years of experience go against CPR skills, we did not find this to influence knowledge; nor did the time elapsed since the last CPR performed.

Unlike previous studies that suggest better knowledge of CPR in the ED than in IMU[9], in our study there were no differences depending on the respondents' original department. In all three departments there was a low fear of facing a CRA. Both findings contrast with the fact, referred to in the literature[2], of greater survival in monitored hospitalization areas; perhaps this depends more on early detection of CRA and earlier action in such areas. We believe that the results obtained may be related to the wide range of training activities in CPR in the Andalusian Public Health System[10].

The study has the limitations of a survey. Furthermore, the results cannot be extrapolated to other hospitals due to the different organisational and work distribution structures, and must therefore be corroborated with new studies. In spite of this, we

Table 2. Percentage of successful candidates according to the characteristics of the interviewees

Characteristics	% passed	p
Department		0.471
ED	68.8	
IMU	64.0	
ICU	72.0	
Profession		0.020
Facultative	79.1	
Nursing	64.5	
ALS instructor		0.189
No	67	
Yes	78.6	
Last CPR*		0.817
> 2 years	68.5	
2 years	71.3	
Professional experience		0.570
10 years	70.2	
> 10 years	66.4	

ED: emergency department; IMU: internal medicine unit; ICU: intensive care unit; ALS: advanced life support; CPR: cardiopulmonary resuscitation.

can conclude that the degree of knowledge about CPR guidelines in our hospital is the same in the ED, IMU and ICU. Doctors show a better level without being influenced by professional experience or the time elapsed since the last CPR performed. Given that knowledge of CPR is similar in the three departments, a priori it must be assumed that the response to a CRA situation will be similar.

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Author affiliation: [1]Servicio de Urgencias, Hospital General Universitario Virgen del Rocío, Sevilla, Spain. [2]Faculty of Medicine, University of Seville, Spain. [3]Cardiology Service, Virgen del Rocío General University Hospital, Seville, Spain.
E-mail: antoniocaballerooliver@gmail.com
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Corresponding author: Antonio Caballero. Avda. Manuel Siurot, s/n, 41013 Sevilla, Spain.

Time in toxicologic analysis: a critical factor in emergency department cases of suspected chemical submission

La importancia del factor tiempo en el análisis toxicológico de casos de sospecha de sumisión química en un servicio de urgencias hospitalario

Cesáreo Fernández Alonso[1,4,5], Óscar Quintela Jorge[2], Begoña Bravo Serrano[2], Andrés E. Santiago-Sáez[3,4]

Hospital emergency departments (HEDs) frequently see patients under the influence of alcohol, other toxins and new psychoactive substances (NPSs) that may be undetectable in most toxicological analyses (TA) performed in this care setting[1]. Chemical submission (CS), opportunistic or premeditated[2], is an emerging phenomenon in HEDs usually associated with crimes against sexual freedom (CSF)[3]. The Hospital Clínico San Carlos (HCSC) has a clinical guide, a register of cases and an action procedure in case of suspicion of CS in the emergency department[4]. According to them, biological samples (blood and urine) are collected under a chain of custody with prior consent and information to the patient. Reporting to the police is recommended and in cases of CSF the current protocol of the Community of Madrid is followed, with subsequent forensic medical assessment.

In order to assess whether the time between patient-referred toxic exposure and collection of biological samples (T) in suspected cases of CS in a HED is associated with a positive TA result, an observational retrospective cohort study was conducted which selected all patients seen in the HCSC HED on suspicion of CS between March 2015 and February 2017. TA was performed at the Instituto Nacional de Toxicología y Ciencias Forenses (INTCF) in Madrid.

Fifty-six patients with suspected

Table 1. Description of toxicological analysis carried out at the National Institute of Toxicology and Forensic Sciences in cases of suspected chemical submission registered at the Hospital Clínico San Carlos in Madrid

Toxicological analysis	Biological samples					
	Blood			Urine		
	N (%)	I[1] N (%)	T[2] h (RIC)	N (%)	I[1] N (%)	T[2] h (RIC)
Ethyl alcohol	22 (39.3)	1 (1.8)	5 (3.75-7)	23 (41.1)	2 (3.6)	5 (3-7)
Cocaine and derivatives (ecgonine, benzoylecgonine, others)	7 (12.5)	7 (12.5)	4 (3-12)	8 (14.3)	8 (14.3)	4.5 (3-15)
Adulterants (levamisole, lidocaine, acetone)	–	–	–	4 (7.1)	4 (7.1)	9 (5-16)
Amphetamines and derivatives (MDA, MDMA, others)	3 (5.4)	3 (5.4)	5 (2-12)	5 (8.9)	5 (8.9)	5 (3.5-54)
Mephedrone	–	–	–	2 (3.6)	2 (3.6)	8 (4-12)
Cannabis and derivatives (1,11-nor-d9-THC-COOH)	3 (5.4)	1 (1.8)	4 (3-9)	6 (10.7)	4 (7.1)	3.5 (2.7-30.7)
GHB (gammahydrobutyrate) or liquid ecstasy	–	–	–	2 (3.6)	1 (1.8)	8 (4-12)
Alpha-PVP (alpha-pyrrolidinovalerophenone)	1 (1.8)	1 (1.8)	8	1 (1.8)	1 (1.8)	8
Ketamine and metabolites (Dehydronorketamine)	–	–	–	1 (1.8)	1 (1.8)	4
Antidepressants (desvenlafaxine, paroxetine)	2 (3.6)	1 (1.8)	5 (3-7)	1 (1.8)	1 (1.8)	7
Benzodiacepinas (nordiacepam, loracepam, alprazolam)	1 (1.8)	0	8	3 (5.4)	1 (1.8)	8 (8-48)

[1]Unexpected. [2]Time of evolution between toxic exposure and extraction of biological samples.

CS associated with theft or CSF were analyzed. The descriptive TA results are shown in Table 1. TA was positive (blood or urine) in 37 (66.1%) cases. In blood, the median time to TA was 5 (3.5-8) hours (h) for positives and 15 (10-36) hours for negatives ($p < 0.001$). In urine, the median TA was 6 (4-12) h in the positive and 16.5 (10-36) h in the negative ($p < 0.001$). A significant difference ($p < 0.001$) was observed in the median of the 9-hour T depending on the presence of some toxin in blood (95% CI 6-18) and also in urine (95% CI 4-18).

Therefore, the early collection of blood and urine in cases of suspected CS in the HED was associated in our sample with a positive AT result. It is evident in these cases that the possibility of obtaining positive results increases when the interval between intoxication and obtaining the sample decreases. This interval is critical for shorter half-life substances such as GHB, ketamine or scopolamine among others[5].

CS is a health problem with medico-legal implications. Health professionals respond to the patient's health demands and, in this case, they also become justice assistants. According to the above, the early visit of the victim to the ED and the activation of protocols such as the one of the HCSC, together with the possibility of a highly qualified TA such as that of the INTFC, may be a way to improve the attention given in cases of suspicion of CS in the ED.

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Affiliation of the authors: [1]Servicio de Urgencias del Hospital Clínico San Carlos (HCSC), Madrid, Spain. [2]Chemistry Department at the National Institute of Toxicology and Forensic Sciences (INTCF), Madrid, Spain. [3]Forensic Medicine Service at HCSC. [4]Violence Commission at HCSC, Madrid, Spain. [5]Emergency and Emergency pathology research group, attached to HCSC, Madrid, Spain. IDDISC, Madrid, Spain.

E-mail: cesareofa@hotmail.com

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Correspondence: Cesáreo Fernández Alonso. Emergency Department. San Carlos Clinical Hospital. Calle Profesor Martín-Lagos s/n, 28040 Madrid, Spain.

Satisfaction and academic performance of students of emergency medicine in a learning model based on a flipped classroom

Satisfacción y rendimiento académico en los estudiantes de medicina de urgencia tras implementar un modelo docente basado en aula invertida

Tomás Hernández Ruipérez[1,2], María de Gracia Adánez Martínez[1,2], Luis María Muñoz Gimeno[1], José Luís Díaz Agea[2], María del Carmen Hernández Murciano[3], César Leal Costa[2,4]

The channel through which the specialty of Emergency Medicine (EM) derives is fed by several tributaries, one of which is undergraduate training. Several international organizations have insisted on the need to train and educate medical students in Emergency Medicine, in addition to establishing it as a new medical

Table 1. Descriptive statistics of the sample by academic year

	2015-2016	2016-2017	p
Sex [n (%)]			0.006
Woman	33 (54.1)	57 (77.03)	
Male	28 (45.9)	17 (22.97)	
Age [average (SD)]	23 (1)	23 (1)	0.32
Examination grade [mean (SD)]	5.84 (1.12)	7.22 (1.43)	< 0.001
Satisfaction [average (SD)]			
Planning	2.68 (1.74)	4.23 (0.80)	0.001
Resources	2.70 (1.68)	4.05 (1.00)	0.002
Overview	2.86 (1.72)	4.27 (0.79)	0.001
Methodology	2.83 (1.68)	4.30 (0.76)	0.001

specialty. In order to achieve this purpose, it is necessary to generalise this subject in Spanish universities[1].

Active learning methodologies are teaching strategies that involve students in their own training, making them active agents in the classroom and participants in improving their learning outcomes. At the same time, technological advances have favoured the use of other sources of information, such as online teaching material and virtual classrooms, which have led to a change in the traditional teaching paradigm[2]. In the inverted classroom (IC), the student assimilates the content at home and the classroom sessions are used to work in groups[3]. The objective of this work was to compare students' satisfaction and academic performance according to the teaching methodology used (traditional class vs. IC) in the subject of Emergency Medicine (ED) in the Medicine degree.

A quasi-experimental study with non-equivalent control group design was carried out in the subject Emergency Medicine (EM) at the Catholic University of Murcia (UCAM), Spain. The control group consisted of 61 students of the academic year 2015-2016 and the intervention group of 74 students of 2016-2017, who worked the 58 clinical cases proposed in IC format. The following variables were analyzed: sociodemographic characteristics of the students (age and sex), academic performance (grade in the multiple-choice test of the subject whose score ranged from 0 to 10) and satisfaction with the teaching activity of the teaching staff that contemplated four dimensions: planning, resources, general vision and methodology (Likert scale of 5 degrees of response, being 1 totally in disagreement and 5 totally in agreement). In order to analyse the mean differences between the academic performance and the dimensions of the satisfaction survey in each academic year, the Student t and chi-square tests were used. The statistical significance was established for a value $p < 0.05$.

Of the 135 students, 90 were women and 45 were men. The average age was 23 (SD = 1). The response rate in academic performance was 100%, and in the satisfaction survey ranged from 36% (n = 22) by 2015-2016, to 38% (n = 28) by 2016-2017. Academic performance in 2016-2017 was higher than in 2015-2016 ($p < 0.001$) (Table 1). The students who participated more in the IC solving clinical cases obtained better grades, observing a positive and statistically significant correlation ($r = 0.413$; $p < 0.001$). On the other hand, student satisfaction during 2015-2016 was lower than in 2016-2017, and these differences were statistically significant for the dimensions of planning ($p = 0.001$), resources ($p = 0.002$), general vision ($p = 0.001$) and methodology ($p = 0.001$) (Table 1).

Other authors have proposed IC in undergraduate EM and other subjects, and have obtained very good acceptance in the satisfaction survey, but without measuring or comparing academic results[4,5]. Our study shows that the use of an IC-inspired teaching model has enabled EM students to achieve better academic results and show a higher degree of satisfaction.

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Author affiliation: [1]Servicio de Urgencias, Hospital Clínico Universitario Virgen de la Arrixaca, Murcia, Spain. [2]Universidad Católica de Murcia (UCAM), Murcia, Spain. [3]Internal Medicine Service, Hospital General Universitario Reina Sofía. Murcia, Spain. [4]Emergency and Emergency Department 061. Murcian Health Service, Murcia, Spain.
E-mail: cleal@ucam.edu

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Corresponding author: César Leal Costa. Hospital Clínico Universitario Virgen de la Arrixaca. Ctra. Madrid-Cartagena, s/n. 30120 El Palmar, Murcia, Spain.