

Emergency caregivers' level of knowledge of organ and tissue procurement

Alonso Mateos Rodríguez^{1,2}, Oliver Fernández Ramos³, Gloria de la Rosa Rodríguez⁴, Rebeca Bajo Rodilla⁴, Miguel Agudo García⁵, Fernando Neria Serrano²

OBJECTIVE. To assess emergency department (ED) staff and responders' knowledge of organ and tissue procurement and effective identification of donors in care settings.

MATERIAL AND METHODS. We developed 2 questionnaires, one for hospital ED staff and another for out-of-hospital responders in Spain. The questionnaires were available online to all hospital and prehospital staff through the web page of the Donation and Transplants working group of the Spanish Society of Emergency Medicine (SEMES). They were also posted on social media platforms to attract more respondents. We analyzed mean (SD) scores for quantitative variables and absolute and relative frequencies for qualitative ones using R software (version 4.2.3).

RESULTS. Responses to the questionnaire targeting hospital staff were received from 797 individuals: 514 physicians (65%) and 283 nurses (35%). Sixty-six percent of the hospitals (n = 531) extracted organs and tissues. The average score for knowledge of procurement was 4.6 (2.6), and 753 respondents (94.5%) believed that the hospital ED was an appropriate place to identify donors. Responses to the questionnaire targeting out-of-hospital emergency responders were received from 610 individuals: 231 (38%) physicians, 178 (29%) nurses, and 201 (33%) emergency medical technicians. No training about procurement had been received by 56.9%, and the respondents' mean score evaluation of their training was 4.2 (2.9). Slightly over half (51.3%) felt able to identify possible donors in their work setting. Identifying possible donors fell within the competencies of emergency caregivers according to 95.7% of the respondents.

CONCLUSIONS. Our study reveals the need for a holistic approach to training ED staff and emergency responders to procure the donation of organs and tissues for transplantation. We report clear findings that allow us to conclude that professionals currently lack training in procurement and are little involved in the process.

Keywords: Urgent care. Emergency medicine. Organ and tissue donation.

Evaluación del grado de conocimiento sobre donación de órganos y tejidos en profesionales de urgencias y emergencias

INTRODUCCIÓN. Los servicios de urgencias y emergencias son esenciales en la detección de donantes de órganos y tejidos. El objetivo de este estudio es evaluar el grado de conocimiento sobre donación de órganos y tejidos de los profesionales de urgencias y emergencias, para poder llevar a cabo una detección eficaz de donantes en sus servicios.

MATERIAL Y MÉTODOS. Se confeccionaron dos encuestas, una para profesionales de urgencias hospitalarias y otra para emergencias extrahospitalarias (SEM) de España. Las encuestas se enviaron mediante formulario *on line* a todos los servicios de urgencias hospitalarias (SUH) y SEM, a través de la página web del grupo de trabajo "SEMES Donación y trasplantes", así como, por redes sociales. El cuestionario incluyó datos demográficos, del servicio sanitario, formación en donación, conocimiento en puntos clave en el proceso de donación, barreras a éste y conocimiento sobre las recomendaciones en procesos de donación de órganos y tejidos SEMES-ONT.

RESULTADOS. La encuesta dirigida a SUH fue contestada por 797 profesionales, 514 médicos (65%) y 283 enfermeras (35%). En el 66% (531) de los centros participantes se realizaba extracción de órganos y tejidos. La puntuación de su nivel de conocimientos sobre la donación en una escala de 1 a 10 la situaban en 4,6 (DE 2,6). El 94,5% (753) de los participantes consideraron que el servicio de urgencias es un lugar adecuado para la detección de donantes. La encuesta dirigida a SEM fue contestada por 610 profesionales, 231 médicos (38%), 178 enfermeras (29%) y 201 técnicos en emergencias sanitarias (33%). El 56,9% no habían recibido cursos de formación sobre donación y, en una escala de 1 a 10, catalogaban su formación en este sentido con un 4,2 (DE 2,9). El 51,3% se encontraba capacitado para detectar un posible donante en su servicio. El 95,7% opinaron que la detección de posibles donantes era competencia de los profesionales de emergencias.

DISCUSIÓN. Este estudio pone de manifiesto la necesidad de un abordaje integral de la formación de los profesionales de urgencias y emergencias en materia de donación y trasplante de órganos y tejidos.

Palabras clave: Urgencias. Emergencias. Donación.

Author Affiliations: ¹SUMMA112, Oficina Regional de Coordinación de Trasplantes, Madrid, Spain. ²Facultad de Medicina, Universidad Francisco de Vitoria, Madrid, Spain. ³Servicio de Urgencias, Hospital Universitario Son Espases, Palma, Spain. ⁴Organización Nacional de Trasplantes, Madrid, Spain. ⁵Servicio de Urgencias, Hospital Universitario Son Llàtzer, Palma. Coordinación Autonómica de Trasplantes Baleares, Spain.

Corresponding Author: Alonso Mateos Rodríguez. Oficina Regional de Coordinación de Trasplantes. Consejería de Sanidad. Paseo de la Castellana, 280. 28046 Madrid, Spain.

E-mail: mateos@salud.madrid.org

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Introduction

According to data from the ACCORD-Spain study, nearly 40% of patients who die in a hospital as a result of catastrophic brain injury do so outside an intensive care unit (ICU).^{1,2} The initiation or continuation of intensive care in these patients, for whom curative treatment has been ruled out, with the purpose of including donation after brain death (BD) as an end-of-life care option, is known as donation-oriented intensive care (DOIC).³ There have been numerous initiatives promoting DOIC, and the concept has been incorporated into current training programs on organ donation. Recently, recommendations have been developed for professionals in emergency departments (EDs)⁴ and intensive care medicine.⁵ Although DOIC accounts for 24% of total organ donations in Spain, it is still not systematically considered, and its implementation and consolidation continue to face challenges.² Organizational, educational, and research efforts are required to promote systematic consideration of DOIC, improve the so-called preliminary interview, and identify clinical, radiological, or other markers that can predict progression to BD in potential donors eligible for DOIC.²

The ACCORD-Spain project showed that hospitals with written criteria for notifying the transplant coordinator (TC) were 46% more likely to report potential donors.¹ Moreover, during the intervention phase of the same project, the notification rate of potential donors increased from 61% to 75% in hospitals that implemented written criteria for donor notification to the TC, improved communication with the TC, incorporated donation into neurocritical patient care protocols, and carried out training and continuous feedback for the professional groups managing neurocritical patients—particularly ED professionals.²

Additionally, the existence of uncontrolled donation after circulatory death (uDCD) protocols has had a positive impact on the detection of potential donors. These programs are no longer limited to large metropolitan areas but have also been implemented in regions with lower population density or smaller cities.^{6,7}

For all these reasons, emergency and prehospital services play an essential role in identifying potential organ and tissue donors, given their ability to detect patients in critical conditions, conduct initial medical assessments, and communicate with transplant coordination teams. Their involvement can significantly increase the availability of organs and tissues for patients on transplant waiting lists.

The objective of this study was to assess the level of knowledge about organ and tissue donation among emergency and prehospital professionals to enable effective donor detection within their services.

Materials and methods

We designed and distributed a survey to assess the level of knowledge regarding organ and tissue donation and transplantation among emergency and prehospital professionals. The questionnaire included the following variables: participant demographics; information about their healthcare service; previous training in organ dona-

tion within emergency medical services (EMS) and EDs during the past three years; knowledge of key aspects of the donation process; perceived barriers during donation; identification of potential donors; and awareness of recommendations related to organ and tissue donation in Spain.

Two versions of the questionnaire were created—one for ED professionals (physicians and nurses) and another for EMS professionals (physicians, nurses, and emergency medical technicians [EMTs]). The main difference between the two focused on donation processes: the EMS version emphasized uDCD.

The surveys were distributed online to all EDs and EMS units in Spain, published on the website of the Spanish Society of Emergency Medicine's Working Group "SEMES Donation and Transplantation" (SEMES-ONT), and shared through social media.

For quantitative variables, mean and standard deviation (SD) were calculated; for qualitative variables, absolute and relative frequencies were used. Data were analyzed using R software version 4.2.3.

Results

Results of the ED survey

Table 1 presents the overall demographic characteristics of survey participants.

A total of 797 professionals responded: 514 physicians (65%) and 283 nurses (35%), with a mean age of 43 years (SD, 9.6) and a predominance of women (66.2%). Most participants held permanent contracts ($n = 409$, 51.3%) and had an average of 13 years (SD, 9.1) of experience working in EDs (Table 2).

In 66% ($n = 531$) of health care centers, organ and tissue retrieval was performed; however, only 42.5% ($n = 339$) conducted transplants, and 48.7% ($n = 388$) had protocols for controlled donation after circulatory death.

Nearly half (47.8%, $n = 381$) had received prior training in donation, and 55.3% ($n = 441$) reported feeling prepared to identify neurocritical patients in the ED. However, when asked to rate their level of knowledge about donation on a 1–10 scale, the mean score was only 4.6 (SD, 2.6).

A large majority (94.5%, $n = 753$) believed that the ED is an appropriate setting for donor detection, and a similar proportion felt that it should be part of ED healthcare professionals' responsibilities.

On a 1–10 scale, participants rated their relationship with their hospital's transplant coordinator at a mean of 5.9 (SD, 3.1). Nearly half (47.6%, $n = 485$) had participated in identifying a donor, and 38.1% ($n = 304$) had notified the transplant coordinator at some point. Only 31% ($n = 247$) reported the existence of donor detection protocols in their department, 12% ($n = 98$) had visible posters about organ and tissue donation, and 8.8% ($n = 70$) provided training to new staff in this field. Furthermore, 34.1% ($n = 272$) had no designated donation reference professional, and only 30.5% ($n = 246$), indicated that an ED professional was part of the transplant coordination team. In

Table 1. Demographic characteristics of survey participants

Variable	ED N = 797 n (%)	EMS N = 610 n (%)
Age		
Mean (SD)	43.2 ± 9.6	44.5 ± 9.2
Median [25%–75%]	43 [36-50]	44 [38-52]
Minimum <-> Maximum	21 <-> 65	20 <-> 71
Sex		
Female	528 (66.2)	277 (45.4)
Male	269 (33.8)	333 (54.6)
Professional category		
Medicine	514 (64.5)	231 (37.9)
Emergency Medical Technician	no aplica	201 (33.0)
Nursing	283 (35.5)	178 (29.2)
Employment status		
Permanent	409 (51.3)	404 (66.2)
Interim	186 (23.3)	109 (17.9)
Temporary	181 (22.7)	90 (14.8)
In training (Resident physician/nurse, etc.)	21 (2.6)	7 (1.1)
Work experience (years)		
Mean (SD)	17.1 ± 9.3	19.1 ± 9.0
Median [25%–75%]	17 [10-24]	20 [12-25]
Minimum <-> Maximum	1 <-> 42	1 <-> 47

ED: emergency department; EMS: emergency medical services; SD: standard deviation.

Table 2. Descriptive analysis of the responses of hospital emergency department professionals

	N = 797 n (%)
Is organ retrieval performed at your center?	
Yes	531 (66.6)
No	177 (22.2)
Don't know	89 (11.2)
Is organ and/or tissue transplantation performed at your center?	
Yes	339 (42.5)
No	318 (39.9)
Don't know	140 (17.6)
Does your center have a protocol for controlled asystolic donation?	
Yes	388 (48.7)
No	191 (24)
Don't know	218 (27.4)
Have you received any training on donation in the past 3 years?	
Yes	381 (47.8)
No	402 (50.4)
Don't remember	14 (1.8)
Do you consider yourself qualified to identify potential donors in the emergency department?	
Yes	441 (55.3)
No	226 (28.4)
Don't know	130 (16.3)
Rate your level of training on donation and transplantation from 0 (none) to 10 (excellent).	
Mean (SD)	4.6 ± 2.6
Median [25%–75%]	5 [3-7]
Do you consider the emergency department an appropriate place for identifying potential donors?	
Yes	753 (94.5)
No	18 (2.3)
Don't know	26 (3.3)

(Continued)

Table 2. Descriptive analysis of the responses of hospital emergency department professionals (continued)

	N = 797 n (%)
Do you consider that the identification of potential donors should be part of the competencies of emergency professionals?	
Yes	755 (94.7)
No	15 (1.9)
Don't know	27 (3.4)
Have you participated as an emergency professional in any of the following activities during the past 4 years? (Multiple answers)	
Identification of potential donors	379 (47.6)
Maintenance of potential donors	171 (21.5)
Communication with families about severe brain injury	279 (35)
Notification to the transplant coordinator	304 (38.1)
Pre-donation interview	83 (10.4)
Are there protocols in your unit for identifying potential donors?	
Yes	247 (31)
No	269 (33.8)
Don't know	281 (35.3)
Are there protocols in your unit for limiting or adjusting life-support treatment?	
Yes	301 (37.8)
No	279 (35)
Don't know	217 (27.2)
Are there visible posters in the emergency department indicating procedures for identifying potential donors?	
Yes	98 (12.3)
No	636 (79.8)
Don't know	63 (7.9)
Do newly hired professionals in your unit receive training on the role of the emergency department in identifying potential donors?	
Yes	70 (8.8)
No	610 (76.5)
Don't know	117 (14.7)
What aspect do you consider most difficult for developing the donation process in the emergency department?	
Informing the family about the patient's situation and possible poor prognosis	210 (26.3)
Assessing the suitability of a patient as a potential donor	196 (24.6)
Estimating a poor prognosis in advance	146 (18.3)
Loss of potential donors	145 (18.2)
Admission of a patient to the intensive care unit solely as a potential donor	83 (10.4)
Other	17 (2.1)
What aspect(s) do you consider most important to facilitate the donation process in your emergency department? (Multiple answers)	
Greater involvement of emergency professionals	515 (64.6)
Greater involvement of intensivists	209 (26.2)
Greater involvement of the transplant coordinator	172 (21.6)
Better coordination between Emergency and Transplant Coordination	574 (72)
Have you read the recommendations "The emergency professional and the donation process"?	
	387 (48.6)

26.6% (n = 212) of cases, professionals received follow-up information about the outcome of donations in which they were involved.

The most significant barriers to donor detection in EDs were communicating with the family (26.3%), assessing the potential donor (24.6%), and predicting the patient's poor prognosis (18.3%).

Table 3. Descriptive analysis of the responses of medical emergency service professionals

	N = 610 n (%)
Have you received any training on donation in the past 3 years?	
Yes	252 (41.3)
No	347 (56.9)
Don't remember	11 (1.8)
What type of training?	
SEMES-ONT course	54 (21.4)
In-person lecture	132 (52.4)
Online training	34 (13.5)
Workshops or congresses	101 (40.1)
Other	51 (20.2)
Rate your level of training on donation and transplantation from 0 (none) to 10 (excellent).	
Mean (SD)	4.2 ± 2.9
Median [25%-75%]	5 [2-7]
Minimum <-> Maximum	0 <-> 10
Do newly hired professionals in your unit receive training on the role of the EMS in identifying donors?	
Yes	68 (11.1)
No	421 (69)
Don't know	121 (19.8)
Do you consider yourself qualified to identify a donor in your professional setting?	
Yes	313 (51.3)
No	177 (29)
Don't know	120 (19.7)
Do you consider that donor identification should be part of the competencies of professionals working in the EMS?	
Yes	584 (95.7)
No	9 (1.5)
Don't know	17 (2.8)
Rate from 0 (none) to 10 (crucial) the impact that EMS professionals' involvement can have on the donation process.	
Mean (SD)	8.5 ± 1.9
Median [25%-75%]	9 [8-10]

(Continued)

A total of 72% (n = 547) believed that greater coordination with the TC was needed, and 64% (n = 515) thought that EDs should play a larger role in the process.

Finally, 48.6% (n = 387) of participants had read the SEMES-ONT recommendations on donation in emergency settings, rating them at 7.7 (SD, 1.9) on a 1-10 scale.

Results of the EMS survey (Table 3)

A total of 610 professionals responded: 231 physicians (38%), 178 nurses (29%), and 201 EMTs (33%). Most were men (54.6%) with a mean age of 44 years (SD, 9.2).

Of these, 66.2% had permanent contracts and had worked an average of 14 years (SD, 8.3) in EMS.

More than half (56.9%) had not received training on donation, and they rated their knowledge at 4.2 (SD, 2.9) on a 1-10 scale. Although 51.3% felt capable of identifying a potential donor, only 11% stated that they provided donation training to newly incorporated staff.

Most participants (95.7%) believed that identifying potential donors falls within the scope of EMS professionals, rating their involvement in the process at 8.5 (SD, 1.9) on a 1-10 scale.

Table 3. Descriptive analysis of the responses of medical emergency service professionals (continued)

	N = 610 n (%)
Does your EMS have a protocol for uDCD?	
Yes	313 (51.3)
No	157 (25.7)
Don't know	140 (23)
Have you participated as an EMS professional in any of the following activities during the past 4 years?	296 (48.5)
Notification to the transplant coordinator	138 (22.6)
Identification of a donor	215 (35.2)
Transport of a donor	217 (35.6)
Regarding the role of EMS in uDCD programs, are you concerned about any issue?	563 (92.3)
Determination of irreversible cardiac arrest	347 (56.9)
Informing the family	430 (70.5)
Possible conflict with therapeutic ECMO program during cardiac arrest	258 (42.3)
Other	43 (7)
If the uDCD procedure is implemented in your EMS, is a capnograph used in donor management?	
Yes	261 (42.8)
No	21 (3.4)
Don't know	184 (30.2)
No capnograph available	30 (4.9)
uDCD not performed	114 (18.7)
If the uDCD procedure is implemented in your EMS, is a mechanical chest compressor used for donor transport?	
Yes	317 (52)
No	47 (7.7)
Don't know	97 (15.9)
No mechanical compressor available	49 (8)
uDCD not performed	100 (16.4)
Have you read the recommendations "The emergency professional and the donation process"?	275 (45.1)

uDCD: uncontrolled donation after circulatory death; SD: standard deviation; EMS: emergency medical services.

51.3% worked in EMS systems with uDCD protocols, and 48.5% had participated in at least one case. A donation reference person was identified in 25.1% of EMS units.

The main barriers in the uDCD process were communicating with the family (70.5%) and declaring irreversible cardiac arrest (56.9%). A total of 42.8% reported having capnography available, and 52% had mechanical chest compression devices.

Finally, 45.1% were familiar with the SEMES-ONT recommendations on donation and rated them at 7.5 (SD, 2.2) out of 10.

Discussion

The results of our study highlight the need for a comprehensive approach to the training of emergency and prehospital professionals in the field of organ and tissue donation and transplantation. Certain striking findings allow us to infer a lack of adequate training and engagement of professionals in these processes.

The data reveal modest figures regarding both the training and the ability of professionals to participate in donor detection: less than half had received any training in

the past three years, just over half felt prepared to identify a donor, and their average self-rated knowledge score was 4.6 out of 10. In contrast, the vast majority considered their department to be an ideal setting for donor detection and believed that this responsibility should be part of their professional duties—findings consistent with previous publications.^{8,9}

With respect to the specific factors that complicate the work of healthcare professionals in this area, the main challenges identified were communicating with the family—in both ED and EMS settings—and understanding the conditions a donor must meet. The first of these is particularly difficult in EMS, where the immediacy of the uDCCD process and the frequent presence of family members make the situation even more complex.¹⁰

As a potential solution, most professionals emphasized the need for greater coordination with hospital transplant coordinators (TCs). Collaboration between these professionals and emergency department staff is essential, and the ONT guidelines support this approach.⁴ The lack of awareness and sensitivity toward donor detection is a direct consequence of this coordination gap: only one-third of respondents reported having donor detection proce-

dures in their departments, merely 12% of services displayed informational posters (a simple and inexpensive measure), and just 8% included donor detection in the training of new professionals.

The recommendations jointly issued by ONT and SEMES in 2016 constitute an excellent document that has served as the foundation for many initiatives in this field. However, only half of the participants reported being familiar with these recommendations, suggesting that it may now be time to update and reinforce them in light of the present findings.

In similar studies, this trend has persisted for years without meaningful change.¹¹ The first publications emphasizing emergency departments as key units in donor detection date back to 2010.^{12,13} Since then, real involvement of these services has not been fully achieved, although—as noted by Martínez-Soba et al.—significant progress has been made toward this goal.⁴ In several hospitals, the active participation of the ED has been a key driver of change, increasing the number of donors, and the proportion of TCs who are emergency physicians continues to rise. Nevertheless, much work remains to be done, as clearly reflected in our results.

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