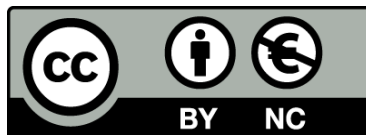




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**EUDONORGAN a blended-learning programme
to improve organ donation knowledge
in the European Union and Neighbouring countries:
Prospective study**

Patricia Peralta Lasso



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EUDONORGAN a blended-learning programme to improve organ donation knowledge in the European Union and Neighbouring countries : Prospective study

Doctoral thesis dissertation
Patricia Peralta Lasso



UNIVERSITAT DE
BARCELONA

EUDONORGAN a blended-learning programme to improve organ donation knowledge in the European Union and Neighbouring countries: Prospective study

Doctoral thesis dissertation presented by Patricia Peralta Lasso to apply for the degree of doctor at the University of Barcelona

Directed by Ricard Valero Castell directing the thesis and affiliation (Departament de Cirurgia i Especialitats Medicoquirúrgiques. Facultat de Medicina i Ciències de la Salut. Universitat de Barcelona)

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The future belongs to those who believe in the beauty of their dreams.
(Eleanor Roosevelt)

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ABBREVIATIONS

- **AP:** Action Plan
- **DBD:** Donation after brain death
- **DCD:** Donation after circulatory death
- **DG SANTE:** Directorate-General for Health and Food Safety
- **EC:** European Commission
- **EP:** European Parliament
- **EU:** European Union
- **HCPs:** Healthcare professionals
- **ICU:** Intensive care unit
- **MD:** Medical doctor
- **ODT:** Organ donation and transplantation
- **OKPs:** Other key players
- **ONT:** Organización Nacional de Trasplantes
- **OSCE:** Objective structured clinical examination
- **PAs:** Priority Actions
- **RN:** Registered nurse
- **SD:** Standard deviation
- **TDC:** Transplant Donor Coordinator
- **TFEU:** Treaty on the Functioning of the European Union
- **WP:** Working packages

LIST OF ARTICLES

Thesis in classic format with 1 article annexed.

The thesis consists of the analysis of EUDONORGAN as a blended-learning program implemented to improve organ donation knowledge in the European Union and Neighbouring countries. The thesis consists of 12 objectives and 1 article.

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RESUM

EUDONORGAN, a blended-learning programme to improve organ donation knowledge in the European Union and Neighbouring countries: Prospective study.

Desenvolupar accions formatives en donació i trasplantament d'òrgans és clau per millorar viabilitat, eficiència i taxes de donació. La Unió Europea i països veïns han impulsat iniciatives educatives, com EUDONORGAN, un projecte de 36 mesos de durada promogut per la Comissió Europea i com a iniciativa del Parlament Europeu. El projecte desenvolupat per un consorci internacional va implicar quatre països del centre i el sud d'Europa: Croàcia, Itàlia, Eslovènia i Espanya, amb models similars de donació d'òrgans i taxes de trasplantaments d'èxit, i pioners en el desenvolupament de programes de formació educativa en donació d'òrgans i teixits amb resultats destacats. El projecte es va dur a terme en dues fases consecutives amb l'objectiu d'oferir, per una banda, una formació pels professionals de la salut (HCPs) i altres actors clau (OKPs) com pacients i grups de suport al pacient, representants d'organismes públics i governamentals, representants d'institucions de salut, líders d'opinió i mitjans de comunicació en l'àmbit de la donació d'òrgans i teixits. Per una altra, organitzar, amb el suport dels professionals formats, actes de sensibilització i de difusió així com estratègies de seguiment i avaluació per garantir el màxim impacte possible. L'estudi prospectiu proposat s'enfoca en l'estudi de la primera part del projecte segons la hipòtesis: Les accions formatives milloren el coneixement i canvien l'actitud i de les percepcions dels HCPs i OKPs cap a una perspectiva positiva, ajudant a organitzar activitats de donació i promovent la conscienciació als hospitals i a la resta de la societat. Els objectius específics de l'estudi van consistir, per una banda, en avaluar els coneixements, les habilitats i les actituds dels HCP i OKP, proporcionant un programa de formació a mida basat en una metodologia de formació mixta. Per una altra, avaluar si el desenvolupament d'un programa de formació promou canvis en el coneixement, l'actitud i la percepció dels professionals de la salut i altres actors claus cap a una perspectiva positiva de la donació d'òrgans i teixits.

La metodologia utilitzada es va basar en l'anàlisi de les tendències en educació i la investigació de la literatura per garantir estratègies educatives efectives, utilitzant mètodes d'aprenentatge semipresencials. La formació es va proporcionar a través d'una WebApp creada específicament per al projecte, que va seguir metodologies de storytelling i microaprenentatge. A més, les sessions formatives presencials van incorporar estratègies d'aprenentatge per a adults basades en els principis d'andragogia, aprenentatge transformador, aprenentatge vivencial i cognició situada. Aquestes estratègies van fomentar l'aprenentatge pràctic, la col·laboració en xarxa i la interactivitat.

Per avaluar l'eficàcia de la formació, es va utilitzar el model d'avaluació proposat per Kirkpatrick. En aquest cas, el model es va adaptar parcialment per ajustar-se al disseny del programa personalitzat "Train the trainers". Es van tenir en compte els nivells de satisfacció i aprenentatge, incloent coneixements, actituds i percepcions dels participants. La formació es va dividir en set mòduls i es va utilitzar una escala Likert de 5 punts per avaluar els aspectes mèdics, els consells educatius i les activitats pràctiques.

Els resultats de l'avaluació van mostrar que les puntuacions mitjanes globals de satisfacció van ser superiors a 4 en cada mòdul, sense diferències significatives entre els HCPs i els OKPs. A més, en l'enquesta realitzada durant les sessions formatives presencials, es van obtenir puntuacions similars per sobre de 4 per a la majoria dels ítems.

Pel que fa a l'aprenentatge, es va observar una millora significativa tant en els HCPs com en els OKPs, així com en els coordinadors de trasplantaments/donants, metges, infermeres col·legiats, anestesiòlegs/intensivistes i infermeres de cures intensives. A més, es van observar millores en les actituds i percepcions respecte a la donació d'òrgans, especialment entre els HCPs.

La donació d'òrgans continua sent un procés complex que afecta tant als professionals de la salut com a tota la societat. Els projectes finançats per la UE i altres iniciatives educatives representen un paper clau a l'hora d'oferir formació contínua per augmentar el coneixement i promoure actituds i percepcions positives cap a la donació i el trasplantament d'òrgans. EUDONORGAN va ser una de les iniciatives, innovadora i pionera, que a nivell europeu va oferir una formació d'èxit amb l'objectiu principal d'emfatitzar els aspectes positius de la donació d'òrgans i fomentar la conscienciació pública sobre aquest tema. Aquest estudi mostra que la metodologia educativa utilitzada en els professionals sanitaris també s'aplica a altres actors clau rellevants, i destaca la necessitat d'una educació permanent dels experts implicats en la donació i el trasplantament d'òrgans.

Keywords: blended-learning, adult education, organ donation.

INTRODUCTION

1. INTRODUCTION

Due to medical advances over the past 50 years, organ transplantation has become the most cost-effective treatment for end-stage renal failure (1). For end-stage heart, liver, and lung failure, organ transplantation is the only treatment currently available (2). Therefore, organ transplantation recoups potential years lost and improves quality of life for patients with little alternative. One of the major limiting factors affecting organ transplantation, however, is the low quantity of donor organs available. For countries with high numbers on their organ transplant waiting list, it is of particular importance to develop strategies to improve their respective organ donation rates (2).

While the deceased donation rate is considered as the gauge for the health of a country's organ donation program, according to the Directive of the European parliament and of the council on standards of quality and safety of human organs intended for transplantation, the use of living donors is an increasing alternative given the failure to meet the growing need for organs with cadaver donation. The increase in living organ donation can be attributed to multiple factors, including pressure created by the shortage of deceased donors, surgical advances, and strong evidence of favourable transplant outcome and low donor risk (1). Moreover, living donation is primarily used for kidney transplants and to a limited extent for liver and lung transplants. According to the Factor Study and data from 2017, the number of living organ donors has increased by an average of 4.2% per year, which is higher than the average increase of 1.8% per year in deceased organ donors (2). Deceased donation can provide organs for kidney, liver, heart, lung, pancreas, and small bowel transplants, with kidney transplant being the most common. Most deceased donations come from donors after brain death (DBD), but donation after circulatory death (DCD) is a potential new source of donors that is being explored in only a few countries. Other countries considering DCD programs would need to address ethical and legislative issues and develop expertise in the field (2).

Spain, along with other European countries and the United States, holds a worldwide privileged position and went from 14 to 33.7 organ donors per million population in 2002 (a 140% increase), by far the highest donor rate ever reached by a country (3).

The Spain's model of organ donation is widely considered the gold standard internationally. The *Organización Nacional de Trasplantes* (ONT) is responsible for training experts and formulating organ donor policy as this model also includes a great effort in continuous medical training and education for new and old transplant coordinators financed and directed by the central health administration, including various training programs for health professionals, specifically dedicated to every step of the process (donor detection and management, legal aspects, family approach, organizational aspects, management of resources, and so on) (3). The success of Spain's program can be attributed to the efforts of ONT to standardize and bring large organizational changes to the practice of organ donation. It is difficult to make direct comparisons between countries due to differences in

healthcare systems, population size and communities (3). An observation of organisational models is the large difference between countries in number of organs transplanted per transplant centre. There are numerous good reasons for the variation that are not linked to efficiency (geography, size of country, number of donors and patients on the waiting list, type, and severity of disease as well as political factors which are to be considered (2). However, there are common key elements which are usually seen in successful national organ donation reform initiatives.

Most of the EU Member States have national organizations in place already that oversee organ donation. In countries where such organizations do not yet exist, there are suitable organizations in place which take on this task. The factors that influence the development of an organ donation program mainly are (3,4):

- An appropriate legal and ethical framework.
- A national coordinating body.
- Hospital-based clinical donation specialists.
- Specialist training for clinical staff in management of the deceased donation process and family donation conversations.
- Implementation of a clinical governance framework that supports quality assurance and audit of hospital clinical practice.
- Financial support to donor hospitals to ensure that costs related to donor management are not a barrier to donation.
- Media engagement and national community awareness and education.
- International cooperation to share best practice.

1.1. State of the art in 2015: situation, figures, and background

The situation in Europe when EUDONORGAN was implemented regarding organ and tissue donation and transplantation activities as well as policies and actions undertaken in this field at EU level to provide specialized training and raise awareness in the field. Data provided is based on the FACTOR study analysis (2):

- Patients on waiting lists.
- Organ and tissue donation activity in Europe and globally.
- Transplantation in Europe and globally.

Patients on waiting lists

The demand for organs in the EU far exceeds the supply. This is observed in all countries, albeit to varying degree for specific organs. There are transplant waiting lists in all countries with transplant programmes. On 31 December 2015, a total of 56 thousand patients were on waiting lists in the EU (figure 1):

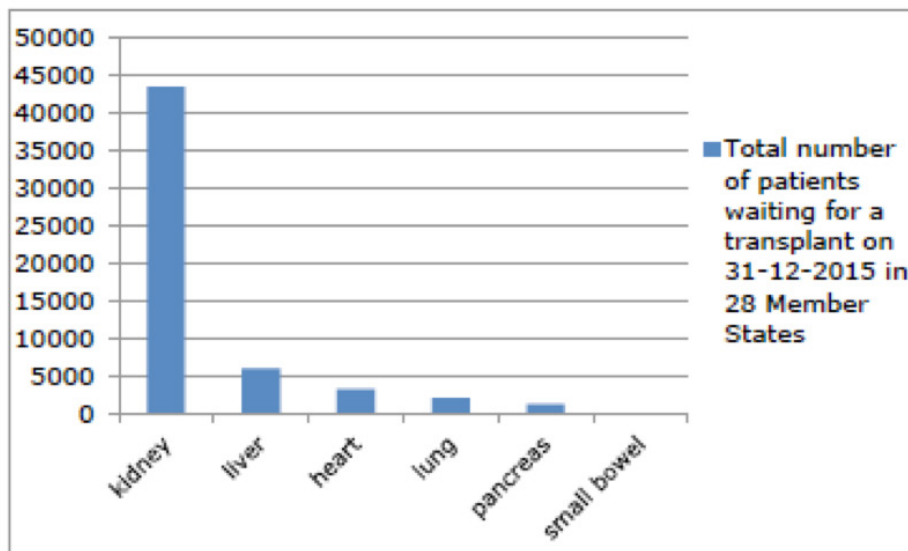


Figure 1. Total number of patients waiting for a transplant (only active candidates).
Source: FACTOR Study, 2017.

Organ and tissue donation activity in Europe and globally

During the period of the Action Plan (AP), organ donation rates showed an overall increase. At the EU level, the total number of organ donors rose from 12,369 in 2008 to 14,953 in 2015, representing a 21% increase (see figure 2). In all Member States except one living donation was performed. The increase in the number of living organ donors (on average 4.2% more per year) was larger than the increase in the number of deceased organ donors (on average 1.8% more per year) (2).

Deceased donation is the more common source for kidney, liver, heart, lung, pancreas, and small bowel transplants, and most donations come from DBD. Most deceased donations come from DBD. These are deceased organ donors in whom death has been determined by neurological criteria. This is the standard method, and thus used by all countries where organ donation is performed (2).

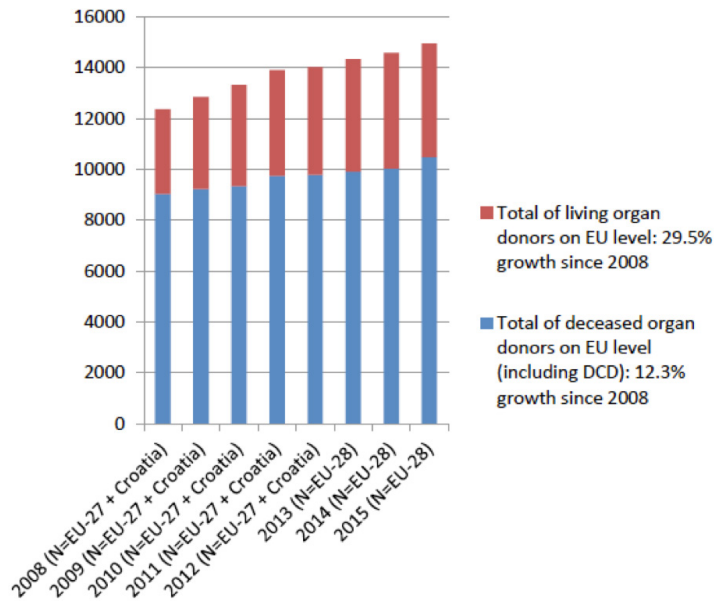
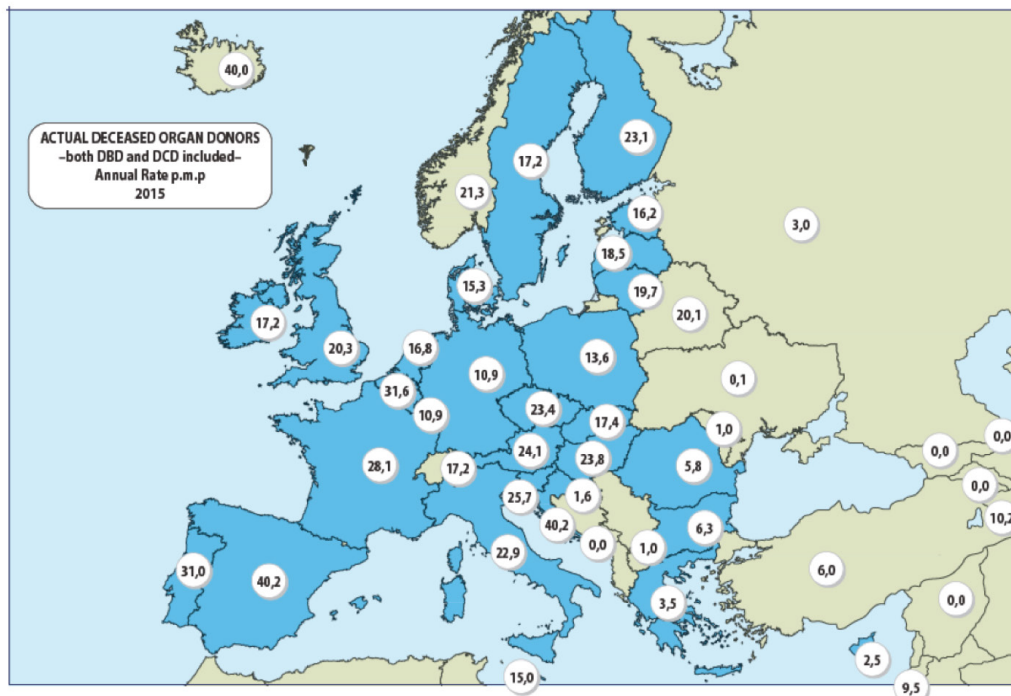


Figure 2. Total number of deceased and living organ donors in the EU in 2008-2015. Source: FACTOR Study, 2017.

DCD emerged as a potential new source of donors. Although DCD programs are explored in only a few countries, the number of DCD donors increased over the years. In 2008, 10 out of 27 EU Member States had DCD programs with 569 donors, and by 2015, 10 out of 28 Member States had 1113 donors after circulatory death (figure 3). Implementing or expanding DCD programs would require countries to develop their expertise and address legislative or ethical considerations (2).

Figure 3. European Donation rates for 2015. Living donation rates per million population

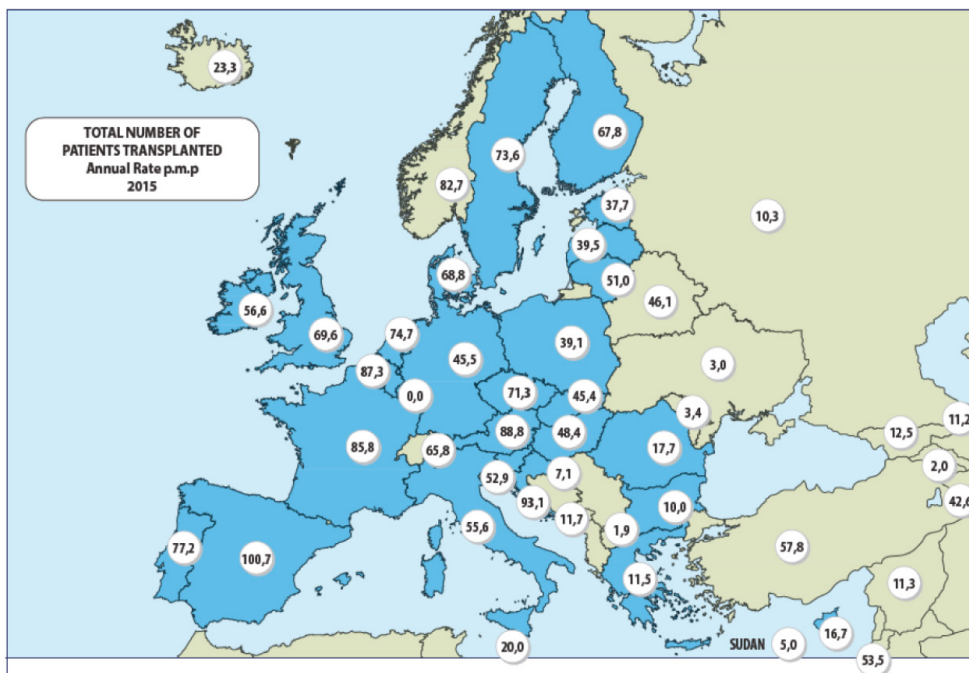


kidney transplants from living donors. Source: FACTOR Study, 2017.

Transplantation in Europe and globally

Over the years, there has been a general increase in kidney and lung transplant procedures across most countries, with a slight uptick in liver transplants seen in several regions. However, the number of heart transplants has remained relatively stable. Some countries have relatively high numbers of specific transplant procedures such as pancreas transplant for Norway, United Kingdom, and Sweden, or lunch transplants in Austria and Belgium (2).

The ability of a country to perform a variety of transplant procedures is often tied to its population size and the capacity of its healthcare sector. Larger countries are more equipped to handle transplantation of less common organs, such as the pancreas or small bowel. In smaller nations with populations under five million, Slovenia and Croatia stand out for their high pancreas transplant rates. Pancreas transplantation, though not as rare as small bowel transplantation, is considered a developing field. As of 2015, 23 countries, including Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Lithuania, Netherlands, Poland, Portugal, Romania, Slovenia, Spain, Sweden, UK, Croatia, Norway, Switzerland, and Turkey have performed pancreas transplants (2) as indicated in figure 4.



1.2. European approaches to organ donation strategies

One of the major limiting factors, however, is the shortage of organs available and the time constraints in the process of organ donation and transplantation (1). In 2003 the European Commission (EC) conducted a survey on legal requirements related to organ transplantation in the 25 European Union (EU) Member States and neighbouring countries: Bulgaria, Norway, Romania, and Turkey. The survey collected information on the legal framework related to ethical, organisational, technical aspects and the status in the field of organ transplantation (5). Moreover, in 2007 the European Parliament (EP) informed, through the resolution on Organ donation and transplantation: Policy actions at EU level, that more than 60.000 patients on waiting lists across the EU needed transplants and whereas a significant number of patients died as a result of the chronic shortage of organs, the increase in the number of donors did not lead to a reduction in the waiting lists (6). This was generally observed in all countries, as it was not possible to draw direct comparisons in terms of: differences between health care systems, number of patients on waiting list and criteria for admission, population size, the development of transplant programmes, people attitude towards organ donation and many other factors focused on organ and tissue donation reforms in EU countries. Shortage of organs was listed as a main priority, and it was also stressed the importance of addressing the quality and safety aspects of the situation regarding the supply and demand for organs. According to this, in 2007 the EC issued a Communication on Organ Donation and Transplantation with the intention to respond to major challenges in the field of organ transplantation (7). It proposed a dual mechanism of action: the **Action Plan on Organ Donation and Transplantation (AP)**, with the main aim of enhancing cooperation between the EU Member States and which contained the basic principles on the quality and safety of organs intended for transplantation (7), complemented by the **Directive of the European Parliament and of the Council** (Directive 2010/53/EU), a legal instrument on standards of quality and safety principles of human organs intended to transplantation.

1.2.1. Action Plan on Organ Donation and Transplantation (2009 – 2015): Strengthened Cooperation between Member States

The AP was a mechanism of action proposed by the Commission of European Societies to strength cooperation between Member States (2) and to increase the availability of organs, to enhance the efficiency and accessibility of transplantation systems, and to improve the quality of safety of organs (7). Throughout the Communication on organ donation and transplantation, different suggestions for actions at Community and Member State levels were designed to help increase the supply of organ donors across the EU and ensure the quality and safety of the procedures (8). The AP aimed at reinforcing the cooperation between Member States, through the identification and development of common objectives and guidelines, jointly agreed indicators and benchmarks, regular reporting, and identification and sharing of best practices (8). A process of consultation started with the collaboration of national experts and key stakeholders that identified 10 priority actions (table 1) grouped under three main challenges (2,8):

- Challenge 1: Increasing organ viability.
- Challenge 2: Enhancing the efficiency and accessibility of transplant systems.
- Challenge 3: Improving quality and safety.

1.2.2. Priority actions: quick review

The Priority Actions (PAs) were proposed to reinforce cooperation and exchange of best practices between countries in the field of organ donation and transplantation.

<p>Challenge 1. To increase organ viability</p>	<ul style="list-style-type: none"> ■ Priority action (PA.1): Appointing of transplant donor coordinators ■ Priority action (PA.2): Promoting quality improvement programmes in hospitals hence optimizing deceased organ donation ■ Priority action (PA.3): Exchanging best practice on donation from living donors ■ Priority action (PA.4): Strengthening communication skills of professionals and patient support groups ■ Priority action (PA.5): Facilitating identification of donor across Europe and cross- border donation in order to increase public awareness
<p>Challenge 2. To enhance efficiency of transplant systems</p>	<ul style="list-style-type: none"> ■ Priority action (PA.6): Enhancing organisational models in the Member States ■ Priority action (PA.7): Establishing EU-wide agreements ■ Priority action (PA.8): Facilitating organ exchange between countries
<p>Challenge 3. To improve quality and safety</p>	<ul style="list-style-type: none"> ■ Priority action (PA.9): Evaluating post-transplant results ■ Priority action (PA.10): Developing accreditation systems for organ donation, procurement and transplant programmes

*Table 1. Action Plan. Priority Actions.
Source: FACTOR Study, 2017.*

PA.1 This first action appointed the importance of promoting the role of Transplant Donor Coordinators (TDC) in every hospital with potential donors (2). As indicated in the Action Plan, the presence of a staff member dedicated to donation at the hospital level (i.e., a transplant donor coordinator), whose main responsibility is to develop a proactive donor identification/detection programme, is the most important step towards optimising organ donation and improving the donor detection rate (8). The Action Plan also emphasized the need of continuous education of TDC as well-trained and skilled professionals. It proves to be the basic to success as the analysis of best practices shows that a trained donor coordinator within every hospital is one of the major key factors to maximize deceased donor potential and eventually increase donation rates (9).

PA.2 It was focused on the importance of promoting quality improvement programmes of organ donation, considering quality from the perspective that involves self-evaluation of the whole process of organ donation (2) according to the characteristics of the hospital and the health systems and, consequently, evaluate performance. So far focused on quality assurance program in the deceased donation process, it aimed to monitor deceased organ donation potential, evaluate performance, and identify key areas for improvement (10).

PA.3 It emphasized the importance of living donation as a real alternative for improving the availability of organs for transplantation (2). The AP promoted the implementation of programmes to exchange best practices, gave support to the international cooperation, and encourage participation between the Member States (11) and implement systems on living donor registries. As indicated, countries that have not taken up efforts regarding this exchange of practices, may benefit from the experience of other countries (2).

PA.4 This action specifically referred to strengthening communication skills of professionals and patient support groups as nowadays there is also a need of promoting public awareness actions. Following this specification, the AP specifically indicated that great attention must be paid to facilitate appropriate information to the media, when developing public awareness campaigns (8). Some key indicators provided in the AP referred to the implementation of communication guidelines for informing the public, proposing meetings with journalists, monitoring the mention in newspapers or on other media (2).

PA.5 According to the article 4 of the Directive 2010/53/EU Member States shall ensure that a national quality program is established to cover all stages of the chain from donation to transplantation or disposal, to ensure compliance with the rules laid down in this Directive (1). This priority action aimed to facilitate the identification of organ donors across Europe and cross-border donation in Europe (2) to give special support to patients in the need for a specific treatment such as patients requiring high urgent treatment, hypersensitized or specially for certain types such as pediatric transplants (12).

PA.6 This priority action prioritized the importance of enhancing organisational models as it seems effective to exchange best practices between countries, often achieved through 'twinning projects' (1) due to winning activities may promote that the experience and knowledge developed by one Member State is transferred to others who request such transference and will implement the advance willingly (12).

PA.7 It emphasized the relevance of bilateral agreements needed to improve transplant results by an optimised match between donor and recipient, to improve the follow-up of transplanted patients, to agree on common principles for allocation criteria (2). Examples of agreements reported by some countries are Czech Republic indicate with agreements in place about basic rules for internal EU patient mobility and transplantation and organ trafficking or Poland regarding common priorities and strategies for future research programmes, among others (2).

PA.8 This priority action was focused on the relevance of interchanging organs between member states to improve the allocation process (2). In this regard, the Commission supports them in the development of a structured system for exchanges of surplus organs between them (8). An information technology tool is also mentioned as an option to support this action.

PA.9 It was focused on the evaluation of post-transplant results which will in turn help to develop good medical practices in organ donation and transplantation (8). Considering the evaluation of post-transplant results in compliance with the European legal framework, in specific data protection directives, help promote the compilation of registers throughout Europe.

PA.10 Following the previous priority actions this last priority action considered the option of promoting a common accreditation system for organ and donations programmes (8). As indicated in the ACTOR Study, activities could be knowledge acquisition, development of tools, and exchanges of knowledge (2).

1.2.3. Objectives of the Action Plan

The objectives of the AP related to the priority actions are summarized as it follows (1,2):

- **Objective 1:** Reach the full potential of deceased donations. Within this objective, PA.1 and PA.2 were highlighted to promote the role of transplant donor coordinators as main responsible for developing proactive donor detection and quality improvement programmes at hospital level.
- **Objective 2:** Promote living donation programmes following best practices. PA. 3 was focused on living donation as it should be a complementary source of organs. EU Member States should contribute to the exchange of best practices and encourage the registration of living donors.
- **Objective 3:** Increase public awareness of organ donation. PA.4 was proposed to promote social initiatives to increase public awareness of organ donation which implied improving knowledge and communication skills of health professionals and patient support groups. PA.5 emphasized the fact of facilitating organ donor identification and cross-border donation in the EU.
- **Objective 4:** Support and guide transplant systems to make them more efficient and accessible. It prioritized PA.6 on the importance of proposing organizational models of organ donation and transplantation level, emphasising PA.7 and PA.8 on establishing agreements on aspects of transplantation medicine and the interchange of organs between EU Member States and EU-wide level.
- **Objective 5:** Improve the quality and safety of organ donation and transplantation. PA.9 and PA.10 were emphasized within this objective. PA.9 followed the indications provided within article 24 of the Directive on the relevant key role, that competent authorities of the Member States played in ensuring the quality

and safety of organs during the entire chain from donation to transplantation and in evaluating their quality and safety throughout patients' recovery and during the subsequent follow-up (1). It also stressed the importance of the collection of relevant post-transplantation data needed for a more comprehensive evaluation of the quality and safety of organs intended for transplantation (1). The PA 10. was focused on a common accreditation system for organ donation and procurement and transplantation programmes, with the aim of improving quality and safety (2).

1.2.4. Directive 2010/53/EU

The Directive 2010/53/EU was a legally binding instrument focused on quality and safety aspects in accordance with the article 168 on public health of the Treaty on the Functioning of the European Union (TFEU) (2,11). It required that all EU Member States needed to adopt minimum standards regarding key aspects of organ donation and transplantation (7). It also specified that each Member State had to assign a competent authority that should issue appropriate guidance to healthcare establishments, professionals and other parties involved in all stages of the chain from donation to transplantation (2) and be responsible for the establishment of a framework at national level (7). The proposal for the Directive covered human organs for transplantation during all the phases of the process – donation, procurement, testing, preservation, transport, and use – and aimed to ensure their quality and safety and hence a high level of health protection (1). This Directive did not intend to cover research using human organs, for purposes other than transplantation. However, organs that are transplanted into the human body in clinical trials should comply with the quality and safety standards laid down in this Directive (1).

1.2.5. ACTOR study. Study on the set-up of organ donation and transplantation in the EU Member States, uptake and impact of the EU Action Plan on Organ Donation and Transplantation (2009-2015)

After a first-half period of the AP implementation, the EC undertook the ACTOR study or Study on the set-up of organ donation and transplantation in the EU Member States, uptake and impact of the EU AP on Organ Donation and Transplantation (2009-2015) on the setup of organ donation and transplantation in the EU Member States, uptake, and impact of the AP. This mid-term review aimed at analysing to what extent the activities related to the various PAs in the AP were carried out (12) within 35 countries, considering all EU Member States as well as Iceland, Norway, Croatia, Macedonia (fYRoM), Switzerland, Turkey, Liechtenstein, and Montenegro and at the European level (12). Conclusions of the study revealed that countries undertook activities in all PAs and some progress was made (2) at EU level. It was also emphasized the importance of continue implementing activities and improving as there were many opportunities for countries to share experiences and to learn from each other (2,12). In specific the study highlighted the PA.1, PA.3 and PA.8 that referred to transplant donor coordinators, living donation programmes and cross-border exchange (2), respectively. As the report indicated, several EU-funded were proposed with the aimed at providing training, sharing of knowledge, implementation, development

of tools and at identifying the best organisational models, exchanging best practices on living donation programmes among EU Member States and interchanging organs between National Authorities (12). It was considered that these PAs had great potential for an EU-wide implementation (2). The study also concluded on PAs focused on PA.2, PA.6 and PA.9 related to the promotion of quality improvement programmes in every hospital with potential for organ donation, enhancing the organisational models of organ donation and transplantation within the EU Member States and on collecting and analysing post-transplant results to improve the quality of the donation and transplantation process (12). Further recommendations were given within the report that are summarized as (2):

- Defining the role and profile of the Transplant Coordinator in each country together with the need of implementing continuous training and education.
- Developing guidance documents and follow-up registers to protecting and care for the living donor was stressed by several representatives.
- Promoting knowledge exchange, twinning projects, and expertise sharing. The new instrument of joint actions that became available with the Directive as a valuable instrument, especially the promotion of quality improvement programmes in hospitals with potential for donors the evaluation and learning of post-transplant results.
- Defining a logical order in pursuing PAs that leads to the proposal of a roadmap.
- Increasing the complementarity of EU-funded projects and continue with further actions.
- Identifying the needs of new EU Member States to give them support to build their own systems for organ donation and transplantation.
- Establishing continuous follow up meetings essential for the progress of the AP.

1.2.6. FACTOR study. Study on the uptake and impact of the EU Action Plan on Organ Donation and Transplantation (2009-2015) in the EU Member States

The final review of the AP was presented in the Study on the uptake and impact of the EU AP on Organ Donation and Transplantation (2009-2015) in the EU Member States: The AP on Organ Donation and Transplantation (2009 – 2015) or FACTOR study was undertaken during 2016-2017 and performed in close cooperation with representatives from the European Commission, Directorate-General for Health, and Food Safety (DG SANTE). Throughout the study, National Competent Authorities in charge of organ donation and transplantation were regularly consulted and asked for inputs.

This study aimed at evaluating the uptake and the impact of the AP in the Member States and provided an overview of organ donation and transplantation activities implemented at national and EU levels and the state of the implementation of the PAs between 2009-2015. Results of the study were indicated according to each challenge.

In Challenge 1, general conclusions underlined that PA.1, PA.2, PA.3 and PA.4 were taken up well by the participating countries (2). It remarked that in almost all countries, transplant donor coordinators were appointed (PA.1), countries implemented quality improvement programmes (PA.2), directed living donation programmes (PA.3) and were working on public awareness (PA.4). It also emphasized the importance that supporting EU-funded projects implemented within the AP offered support to the national policies (2). The results reported for Challenge 2 indicated PA. 6 and PA.8 were taken up well (2) and EU-funded projects, in which many European countries participated, played a key role factor in addressing this challenge successfully. The outcomes achieved in Challenge 3 and which involved PA.9 and PA.10 on quality assurance aspects and preconditions for organ donation were taken up to a lesser extent within the AP (2). The study reported on other PAs (PA.5 and PA7) were addressed to a lesser extent by individual countries (2).

The study also reported the EU funded initiatives and other activities developed within the AP, how they had significantly contributed to the implementation of the priority actions and their contributions to the goals (2). The study emphasized the importance that these projects allowed acquiring knowledge to implement the priority actions established within the AP, with the development of tools such as guidelines, trainings, and manuals to facilitate their application, to exchange knowledge and best practices among countries; and to directly implement initiatives and achieved concrete changes (2). These initiatives are explained in a specific section on specialized training programmes of this research.

Further recommendations were also given within the FACTOR Study (2) and summarize as it follows:

- Defining objectives jointly at the professional, political, administrative, and public levels as this bottom-up approach could create opportunities for bringing up additional ideas and allow for successful implementation.
- Mutual learning and exchange of know-how with continuous cooperation among countries.
- Building expertise about and with related areas of expertise based on cross sectional learning and with the creating of common initiatives in organ and tissues and cells sectors might increase expertise.
- Focusing on countries with less well-developed systems as the Commission could provide some support and the proposal of a platform for the development of donor programmes in other countries.
- Optimising planning, dissemination, and sustainability of outcomes to improve effective dissemination of results and focus more on sharing results of different EU-funded Actions in Europe.
- Specific elements of the AP that merit continuation and continuity of Joint Actions.

- Further areas to explore with countries on developing accreditation and audit systems, inspections, training for inspections and the collections of more data on quality performance.
- Proposing a new AP with new elements to be considered: The potential for an EU expansion in DCD, the further uptake of living donor follow-up, and with that of living donor registries, communication and public awareness actions, further education on different topics on organ donation and transplantation, exchanges of experiences with minorities and groups, etc.

1.2.7. Educational initiatives and activities within the European framework

A. EU Health Programme Funded Projects

The EU Health Programme refers to a specific funding period dedicated to health-related initiatives within the European Union. During this period, the EU Health Programme provided financial support for projects aimed at improving public health, preventing diseases, and promoting health across EU member states. The European Commission implemented the EU Health Programme funded projects mainly focused on five types of activities: projects, conferences, joint actions, tenders, and operating grants. All activities and results were explained in the FACTOR study (2).

The EU funded initiatives and activities that responded to PA.1, PA.2 and PA.4 are indicated as they are directly related to the objectives of this research.

The EU funded projects funded under the Public Health Programme directly and related to the PA.1 were: “ETPOD”, “Transplant coordinators - Train the Trainers”, “ODEQUS” and “ACCORD”.

- **European Training Program on Organ Donation (ETPOD)** was a project committed to design and validate a professional training at three different professional levels: health workers, junior transplant coordinators and managers. It was a successful project as it achieved a significant improvement in both numbers of utilized donors and organs recovered (9). It resulted in identifying the educational needs of healthcare professionals involved in organ donation and implementing effective training programs with a positive impact upon donation parameters (13).
- **Transplant coordinators - Training the Trainers** was a blended learning programme that involved 2 onsite training sessions and web-based phases with the aim to train 80 national or regional transplant coordinators with training responsibilities. This course was meant for experienced transplant donor coordinators at hospital, regional and national level with the goal that the experts selected obtained additional tools and are therefore “consolidated” as (or become) trainers in charge (2) of the professional training locally.

- **Organ Donation European Quality System (ODEQUS)** was a project that aimed to create useful tools meant to increase the organ donation rates and improve the efficiency of the donation process in all European countries. The main objective was to develop a methodology to assess the performance of organ procurement at the hospital level (14) and to design quality indicators to assess the organizational structures, clinical procedures, and outcomes; to test those indicators in selected hospitals to assess their feasibility and usefulness; and to train healthcare professionals on how to use the quality indicators, check- lists, and auditing procedures (14).
- **Achieving Comprehensive Coordination in Organ Donation throughout the European Union (ACCORD)** was a project that intended to strengthen the full potential of Member States in the field of organ donation and transplantation to improve the cooperation between them and to contribute to the effective implementation (15). It aimed at improving the links between Intensive Care Units and Transplant Coordinators, proposing guidance and tools to EU member states to develop national living donor follow-up different registries, and exchanging best practices across the twining activities.

The EU funded projects under the Public Health Programme directly and related to the PA.2 were: “COORENOR” and “MODE”.

- **Coordinating a European initiative among national organizations for organ transplantation (COORENOR)**. This project aimed to establish a “Co-ordinated Network” between existing national programmes in the field of organ transplantation. The main objective was to build a network of donor and transplant organizations from several European countries to identify benchmarking programs and improve existing systems (16).
- **Mutual Organ Donation and Transplantation Exchanges (MODE)**. It was a Joint Action aimed at improving and developing deceased organ donation and transplantation programmes to contribute to the on-going EU policy allowing transmission of best practices in different fields (quality and safety, organ donation, efficiency, and accessibility of transplant systems) (17).

The EU funded projects under the Public Health Programme directly and related to the PA.4 were specifically: “EDD”, “FOEDUS” and “ELPAT”. ETPOD, the Train the trainers’ course and ODEQUS also contributed to this priority action:

- **ELPAT conferences** (Organ Transplantation: Ethical, Legal and Psychosocial Aspects. Outreach from the European Platform) was a European platform that brought together professionals, such as transplant surgeons, transplant coordinators, specialist nurses, (bio-)ethicists, lawyers, psychologists, physicians, sociologists, anthropologists, policy makers, and criminologists, to debate and stimulate research on the issues surrounding transplantation (18). The ELPAT congresses also covered legal aspects of organ donation and transplantations (2).

- **European Donation Day (EDD).** It aimed to develop guidelines for organising European organ donation days. The main purpose was the preparation of a theoretical basis for the organisation of guidelines. A result of the project was a toolkit for event organisers. As indicated in the FACTOR study, Slovenija-Transplant was the initiator and the main partner of the project: developing guidelines for the Organisation of a European Donation Day (2).
- **Facilitating Exchange of Organs Donated in EU member states (FOEDUS).** In continuation of COORENOR, FOEDUS was implemented to identify a common methodology for the exchange of supranational organs, and to create share communication strategies (16) and improved the previous project by offering a more complete platform for managing cross border organ exchanges.
- **Public awareness events.** In 2010-2014 the European Commission organised journalists' workshops in line with the PA.4 to make journalists aware of their key role in this issue, of the complexity of the issue and of the added value of working at the EU level, and generally indirectly to increase public awareness (2) on organ donation.

B. TEMPUS project funded by the European Commission

The Council of the European Communities adopted on 7 May 1990 a Decision establishing a trans-European mobility scheme for university studies (TEMPUS). TEMPUS concerned countries of Central and Eastern Europe designated as eligible for economic aid. The objectives were focused on promoting increased exchanges and mobility of teaching staff and trainers as part of the cooperation process. The project related to Organ Donation and Transplantation was the **European – Mediterranean Postgraduate Programme on Organ Donation and Transplantation (EMPODaT)**. It aimed at developing and implementing a specialized training programme, in accordance with the European Space for Higher Education guidelines in 3 countries benefitting from the European Neighbourhood Policy Partnership Instrument (Morocco, Egypt and Lebanon). The training design that included blended methodology, innovative simulations, practical cases, and hands on traineeships in small groups encouraged multidisciplinary team-work spirit and proactive involvement in the activities at national level from an inter-hospital perspective (19).

C. Projects financed under the Programme of Community Action in the Field of Public Health (2003-2008)

The Programme of Community action in the field of public health (2003-2008) was prepared with a view to contributing to the achievement of a high level of health protection in Europe. To this end, it focused on health information, the Community's capacity to react to health threats, and the prevention of diseases and illness. The project related to organ donation and financed was the **European Quality System for Tissue Banking (EQSTB)**. The main objective of the project was to analyse throughout different working areas the factors that influenced the final tissue quality and safety for transplantation, providing greater

benefit to recipients (20). The results of the project involved among other the creation of a guide of recommendations, a guide for Auditing Tissue Establishments and training model (21).

D. EU Health Programmes 2008 – 2013

The overall aim of the programme was to complement, support and add value to Member States' policies and contribute to increased solidarity and prosperity in the European Union by protecting and promoting human health and safety and improving public health.

The projects related to organ donation that were implemented within the EU Health programmes were:

- **The European Union Standards and Training for the Inspection of Tissues Establishments (EUSTITE)** was an EU-funded project launched in 2006 with the key objectives of promoting coordination in the inspection of tissue and cell banks and developing common tools and guidance for implementation of vigilance systems (22).
- **The Vigilance and Surveillance of Substances of Human Origin (SOHO V&S)** was an EU-funded project that developed guidance documents for vigilance and surveillance of tissues and cells for transplantation and in assisted reproduction. In collaboration with EURO CET, European network, collaborated to increase transparency through the enhancement of its online platform to incorporate vigilance and surveillance information (new and emerging donor risks, vigilance system reports, published articles, rapid alerts for tissues and cells, news and comments, V and S guidance, dedicated projects) (23).
- **European Good Tissue Practices (Euro-GTPs)**. The project aimed to develop Good Tissue Practices (Euro-GTPs Guide), training and guidelines for tissue establishments regarding recovery, processing, and preservation of tissues to ensure and guarantee the highest level of quality and safety of tissues for transplantation. It supposed a co-funded project, rational and tissue specific (24) to contribute to a higher confidence in the exchange of tissues for transplant throughout Europe.
- **Joint Accreditation Committee of the ISCT and the EBMT (JACIE)** was an initiative supported by the European Commission under the Public Health Programme 2003-2008. It was launched to establish a committee for the assessment and accreditation in the field of haematopoietic stem cell transplantation (HSCT). The implementation of Directive 2004/23/EC provided an impetus for the implementation of JACIE in EU member states and in particular the requirements for safety of imported tissues and cells have emphasised the need for global harmonisation (25).
- **European Living donation and public Health**. The project aimed to contribute to the improved health and safety of living organ donors and possibly more transplantations by reaching a consensus on European common legal and ethical standards regarding protection and registration practices related to living organ donors (26).

- **Promoting Optimisation, Safety, Experiences sharing and quality Implementation for Donation organisation and networking in unrelated haematopoietic stem cell transplantation in Europe (POSEIDON).** According to the information provided in the Health Programmes Data Base: https://webgate.ec.europa.eu/chafea_pdb/health/projects/2006210/summary), the project aimed to improve the safety of unrelated haematopoietic stem cell transplantation, optimised haematopoietic stem cell donation policy, and promoted equal access to this therapy throughout the EU. No publications were found.

E. Twinning projects

Twinning was a European Union instrument for institutional cooperation between Public Administrations of EU Member States and of beneficiary countries. It was originally designed in 1998 to help candidate countries of the time to acquire the necessary skills and experience to adopt, implement and enforce EU legislation. Twinning projects brought together public sector expertise from EU Member States and beneficiary countries with the aim of enhancing peer to peer activities.

Twinning projects were considered as a good way of achieving successful cooperation (2). An example of twinning activities was found in the ACCORD project that promoted expertise, knowledge, or practical tools developed by one Member State in another Member State (2). The objective of this type of collaboration was to reinforce through cooperation and be in line with the national AP and/or the Directive of the Member State. Some other similar collaborations that can be mentioned are:

- Establishment of institutional control on the safety and quality of human tissues and cells used for transplantation – Development of a National Centre for Tissue and Cell Banking (PL2004/IB/SO/02).
- Strengthening the Institutional Capacity for Blood, Tissues, and Cells (HR/2009/IB/SO/02).
- Strengthening the Transplant Agency of the Republic of Moldova and support in legal approximation in quality and safety of substances of human origins (MD10/ENP-PCA/HE/11b).

1.3. Educational framework in medical education

The establishment of an educational framework is essential for medical educators in terms of designing and delivering the most effective educational programs. One of the critical aspects is the identification of main adult learning models utilized in medical education. By understanding these models, educators can tailor their teaching methods to suit the needs and preferences of their adult learners. In EUDONORGAN, the educational framework proposed explore current blended learning methods, which combine traditional classroom-

based learning with online learning tools and resources. Finally, the framework includes the proposal of different models for evaluating training and educational programs to identify the evaluation model used thin the project's scope.

1.3.1. Adult learning

Due to the increasing need for lifelong learning, adult learning becomes a growing field of study that gains more attention in different fields. In medical education, applying adult learning principles will probably need changing the roles of the educators and learners. As stated by Taylor and Hamdy, (27) adult educators may consider adopting a view of themselves as both learners and educators. The role of the learner is not only to receive knowledge but also to search, challenge, construct knowledge and change their own perception, views, and attitudes (28). As there are many theories that explain how adults learn, the following summary refers to those focused on the three domains: knowledge, skills, and attitudes, that are directly related to the train the trainers' program implemented in EUDONORGAN and which are grouped into four main models: andragogy, transformative learning, experiential learning, and situated cognition.

A. Andragogy learning model

This model, developed by Malcolm Knowles in 1984 is based on the premise that adult learners have unique characteristics and need that require specific attention and strategies. According to this author these principles include (28,29):

- **Self-direction:** Adult learners are independent and self-directed. They need to be involved in the planning and evaluation of their learning experiences. Self-directed learning suggests that adults can plan, conduct, and evaluate their own learning. It has often been described as the goal of adult education emphasising autonomy and individual freedom in learning (27). This principle reflects a fundamental aspect of the andragogy model since it emphasizes the need for adult learners to take an active role in their own learning. Moreover, Knowles defines it as a process, in which an individual takes the initiatives, with or without the help of others in diagnosing their learning needs, formulating goals, identifying human and material resources for learning, choosing, and implementing appropriate learning strategies and evaluating learning outcomes (28). Several factors contribute to the importance of self-directed learning in the andragogy model including adult learners having unique learning needs and goals, the development of essential skills and competencies, and the empowerment and autonomy it provides to learners. Through active participation, self-directed learners can adapt their learning experiences to meet their individual needs, become more self-confident and independent, and have greater control over their personal and professional growth (27, 30).
- **Prior experience:** Adult learners have a rich and diverse background of knowledge, skills, and life experiences that are brought into the learning environment and justifies the need for inquiring about the levels of knowledge and frames of

reference that already exist at the beginning of the learning experience (31). Their experiences or various degrees of experiences (28) can be particularly useful in fields that require practical application, such as medical education. Prior experiences of the learner provide a rich resource for learning (30).

- **Readiness to learn** and growing orientation to the developmental tasks of the learner's social roles (31) becomes a key factor in determining the success of training programs. Adults become ready to learn those things they need to know and be able to do to cope effectively with their real-life situations (30). A way to include it in medical education is to ensure that the curriculum is relevant and practical for the learners and can be achieved by aligning it with the latest research and trends in the medical field and by providing opportunities for learners to apply their knowledge at the bedside. There are ways to induce readiness through exposure to models of superior performance, career counselling, simulation exercises, and other techniques (30). In this way, medical experts previously trained can implement workshops, case studies, discussions, simulations, group studies, and other active learning strategies to promote deeper learning and critical thinking skills in learners.

- **Internal motivation:** As Knowles states, adult learners are self (intrinsically) motivated (28). When adult learners perceive a need for the knowledge or skills being taught, they are more likely to be motivated to learn and to retain the information. Although adult learners are expected to be self-motivated, they will also have a host of competing concerns. Balancing two or more imperatives is a normal situation for both learner and educator. It is the responsibility of the educator to ensure that the task will engage the learner for long enough to allow the learner's enthusiasm to be captured (27). In medical education, trainers need to create learning experiences that are relevant and practical, and that allow learners to apply new knowledge and skills to their professional roles. Additionally, creating a supportive learning environment, onsite or online as some training might be convenient and accessible (31) that values and respects the experiences and contributions of adult learners can further enhance their motivation to learn. There needs to be more awareness of the role of the teacher in acting as a catalyst for motivation (28).

- **Problem-Centred:** Adult learners are more interested in immediate problem centred approaches (28). Their approach to the problem involves not simply listening to a lecture, but instead involving the participants in an authentic, hands-on approach to learning, as is available through simulation (31) that allows teaching through guided experiences in safe contexts, facilitating adequate learning and standardized assessment of the skills necessary to face a changing world (32). This principle has two main advantages. The first is that it helps ensure that connections are made between the new information and previous knowledge, ensuring that everything is learnt in the context of what is already known. The second is that it reinforces our natural tendency to be appropriately inventive and to think widely (31). Medical trainers implement problem-based learning as it aims at efficient acquisition and structuring of knowledge arising out of working through in active, interactive, and self-directed ways. The type of activities that are implemented are working in groups where learners identify what they already know, what they need to know, and how and where to access new information that may lead to resolution of the problem

(33). The role of the trainers is critical in facilitating and guiding the learning process. Furthermore, problem-centre activities comprise a progressive framework of problems providing context, relevance, and motivation (problem-first learning), builds on prior knowledge integration, critical thinking, reflection on learning and enjoyment, achieves its goals via facilitated small-group work and independent study, and relates to problem solving only in so far as knowledge becomes more accessible and can therefore be applied more efficiently during this process (34).

B. Transformative learning model

Transformative learning in adult education is defined by his author Mezirow as learning that transforms problematic frames of reference—sets of fixed assumptions and expectations (habits of mind, meaning perspectives, mindsets)—to make them more inclusive, discriminating, open, reflective, and emotionally able to change (35). This model is a unique andragogical theory because it focuses not only on the individual experiencing the simulation, but also the importance of self-reflection and discourse with peers; the individual sees that others have navigated the same dilemma and the sharing of ideas helps transform the individual's paradigm (36). It also stresses the importance of the trainer in facilitating learners to question and reflection their own and others' assumptions (28). The 10-step process proposed (36) are summarized as follows:

1. A **disorienting dilemma** is an experience that creates a sense of confusion and challenges an individual's assumptions and attitudes.
2. **Self-examination** involves critical reflection on one's assumptions and attitudes, and an examination of the underlying reasons for these attitudes and values.
3. **Critical assessment.** Learners recognize that their previous assumptions and attitudes are no longer adequate to deal with the situation.
4. The **recognition** phase often involves a sense of discontent or dissatisfaction, and the process of transformation.
5. **Exploration of options.** Learners explore alternative perspectives and options that may help them address the disorienting dilemma.
6. **Planning a course of action** as learners develop a plan for implementing the new roles and behaviours.
7. **Acquisition of knowledge and skills.** Learners acquire new knowledge and skills to implement their planning.
8. **Trial application of new roles** in a safe and supportive environment that can be a classroom, workshop, simulation, or other type of learning environments.
9. **Building competence and self-confidence** in applying their new roles and relationships.
10. **Reintegration into life** with the application of new roles and behaviours in real-world situations and adjusting as needed.

As indicated by Taylor and Hamdy (27), the process of perspective transformation involves a disorienting dilemma that triggers an individual to review their own perspectives, leading to a realization of what they do not know. The context, including personal, professional, and social factors, plays a role in this transformation. Critical reflection is also necessary, and they also remark that Mezirow identifies different forms of reflection in transformation of meanings, structures, context, process, and premise (27).

Transformative learning is beneficial in medical education as it promotes critical thinking, which is an essential skill in clinical practice. Critical thinking involves actively analysing and synthesizing information to determine a course of action. This learning approach enables students to engage in both individual and group-based critical reflection, which enhances the learning journey (37). Furthermore, as students are exposed to individual and group-learning experiences, they can build on the collaborative skills that are fundamental to working effectively (37). In medical education, methods that may be particularly useful in this situation include critical incident analysis, small group work to formulate ideas on topics, and reflective practice (28).

C. Experiential learning model

Kolb's experiential learning theory (1984), which is based on the theory of constructivism learning, has influenced adult education by making educators responsible for creating, facilitating access to, and organising experiences to facilitate learning (27). This model focuses on learners reflecting on their experience of doing something, to gain conceptual insight as well as practical expertise (33). Through their reflection they can formulate abstract concepts and make appropriate generalisations and to consolidate their understanding by testing the implications of their knowledge in new situations. This, then provides them with a concrete experience, and the cycle continues (33). Kolb's experiential learning model suggests four stages in this process (38):

- Active experimentation.
- Concrete experience.
- Reflective observation.
- Abstract conceptualization.

The application of this model in medical education is relevant because it focuses on developing competences and practising skills in specific context (33) and can be an effective approach for clinical training in healthcare education (39). Learners can be exposed to simulations that offer a good scope for training of interdisciplinary medical teams (40) that require them to apply their knowledge and skills in a realistic and challenging environment. Following Bates (33), he identifies different contexts where to implement it and emphasizes some examples in clinical practices in medicine. In specific, in case-based learning that can also work in onsite or online environments, particularly valuable for

dealing with complex, interdisciplinary topics or issues which have no obvious ‘right or wrong’ solutions, or where learners need to evaluate and decide on competing, alternative explanations (33). Moreover, the trainer encourages learners to think about the value they attribute to “facts”, and the way in which they think about them, helping them shift from duality to early multiplicity, and look beyond the obvious first impressions, is crucial to bedside teaching (27). Irby recommends five steps in case-based learning (33,41):

- Anchor teaching in a (carefully chosen) case.
- Actively involve learners in discussing, analysing, and making recommendations regarding the case.
- Model professional thinking and action as an instructor when discussing the case with learners.
- Provide direction and feedback to learners in their discussions.
- Create a collaborative learning environment where all views are respected.

Experiential learning has been shown to be highly engaging and lead to better long-term memory, while also developing problem-solving, critical thinking, communication skills, and knowledge management. It enables learners to better manage highly complex situations that cross disciplinary boundaries and subject domains where knowledge boundaries are challenging to navigate (38).

D. Situated cognition model

Situated cognition theory, one of the social cognitive theories, posits that cognition emerges from the complex interplay of human beings with each other and the environment (27). The model proposed by Wilson (1993) is based on three main assumptions (27):

- Learning and thinking are social activities.
- Thinking and learning are structured by the tools available in specific situations.
- Thinking is influenced by the setting in which learning takes place.

The application of this model to the clinical environment is relevant. Learning and teaching approaches at the bedside are different from the operating room, emergency department or in the community (27). Each context has its educational power and value. Observing the performance and behaviour of a trainer as role model, defined in the medical literature as a person considered to demonstrate a standard of excellence to be imitated (42). It becomes a powerful strategy by which to inspire professional behaviour in young doctors through learning by observation (42). Another example is the application in clinical reasoning assessment. As stated by Rencic et al. (43), the situated cognition model for

clinical reasoning performance assessment encourages trainers to consider how contextual factors can impact assessment goals. One example is modifying patient complexity based on the duration of a clinical reasoning OSCE (objective structured clinical examination) station to assess competence in a time-constrained environment (43). He also concludes that greater understanding of these interactions can improve educators' ability to provide both formative and summative clinical reasoning performance assessment (43).

As stated, there are other theories and models of adult learning and focused on clinician-learner. Following Davis et al. (44), they emphasized:

- Geertsma (1982), who suggests that clinicians go through three phases in their learning process: priming, which involves identifying a knowledge gap through clinical experience; focusing, which involves understanding the extent and nature of the learning gap; and following up with a learning plan, such as reading or consulting with colleagues.
- Bandura (1963), who emphasizes the importance of social and environmental context in learning, indicating that learning and its application occur within the clinical setting.
- Candy (1991), who elaborates on the traits of self-directed learners, including discipline, motivation, analytical abilities, self-awareness, curiosity, openness, flexibility, independence, information-seeking skills, and good general learning skills. These traits are considered desirable for learners, even if they may not always be fully achievable.

In summary, in the field of medical education, theories like andragogy, transformative learning, experiential learning, and situated cognition find practical application. These approaches help educators create engaging learning experiences, preparing healthcare professionals to excel in organ donation with skills, empathy, and knowledge.

1.3.2. Blended learning in medical education

Blended learning in medical education is a teaching approach that combines traditional face-to-face instruction with online and digital resources, providing students with a more flexible, interactive, and engaging learning experience. The extensive use of Internet technologies as well as the networked learning made it possible to design and utilize new generation learning environments that are realistic, authentic, and engaging (29). In this digital era, blended learning is confidently emerging (45) and as stated by Tang and Chaw (46) students employ digital technology for various learning-related tasks, such as emailing, accessing learning management systems, reading e-books and e-journals, taking online quizzes, and engaging in online discussions (46).

Many definitions of blended learning have been proposed. However, due to the characteristics of the project, in EUDONORGAN it is followed the general definition applied in adult education that combines a traditional classroom learning and online learning as methods to create a student-centered, self-paced and flexible approach to student learning (46) and allowing students to access learning management systems from anywhere and at any time. eLearning technologies offered educators a new paradigm based on the adult learning theories discussed previously, which states that adults learn by relating new learning to past experiences, by linking learning to specific needs, and by practically applying learning, resulting in more effective and efficient learning experiences (33).

This methodology promotes independent learning and online collaboration while still retaining some face-to-face instruction (46). Following Driscoll (47), blended learning in adult learning refers to four different concepts that integrate:

- Different models of web-based technology.
- Various pedagogical approaches to produce optimal learning outcomes.
- Forms of instructional technology such web-based training with face-to-face instructor-led-training.
- Instructional technology with current job tasks to create a harmonious effect of learning and working.

From a competence-based perspective, blended-learning methods allowed participants to further fine-tune their skills and capabilities, which optimize direct application of experience and knowledge in their own professional environment (48) and promote efficiency, motivation, cognitive effectiveness, and flexibility of learning style (49).

Some of the key aspects of this approach are referred to in the online and face-to-face methods considered in the project:

A. Online training methods

a. Flipped classroom

In flipped classrooms, teachers provide students with short, pre-recorded video lectures, vodcasts, and podcasts to deliver primary course content outside of the classroom (50). Two variations are considered: just in time teaching and team-based learning. According to Rowlee and Green (51), the just in time teaching method is a blended-learning approach that is it uses a combination of face-to-face teaching and learning with digital and online learning where the traditional lectures are replaced, sometimes entirely, by interactive sessions. To complete the preparation for the interactive session, the just-in-time teaching' approach is often used, in which the preparatory material is tested in online quizzes, and students can also post questions

online to clarify aspects that they did not understand. This strategy aims to establish a strong connection between the pre- and in-class activities by making use of introductory web-based assignments (51). These exercises require students to engage in various tasks, such as reading or watching videos, and then answer questions related to the activity. It is important to consider that this strategy relies on digital technology, such as the internet and virtual learning environments, which must function optimally for a successful learning experience. When implementing a flipped classroom, it is essential to consider staff, students, the virtual and physical learning environment as well as the quality of the resources, quizzes and interactive exercises need to be taken into consideration (51). Following Jacobsen and Knetemann (50), the team-based learning is a method in which students learn the primary course content outside of class and spend class time working in teams to apply that content. It includes the delivery of primary course content outside of the classroom, allowing for class time to be used to apply course content using properly structured permanent teams, ensured readiness, application exercises, and accountability for learning through peer evaluations (50).

b. Online – WebApp

A WebApp or Web based application consists of a computer program stored on a remote server and run by its users via a Web browser (52). In medical education, it becomes increasingly popular (53) as a variety of Internet technologies, instructional methods and presentation formats are being used to provide both asynchronous and synchronous forms (54). The main benefits involved improved access, convenience, and flexibility; reduced travel expenses and time; adaptability to learning styles; just-in-time learning; and an interactive multimedia format (53). Following Curran and Fleet's (53), they emphasize the potential benefits in medical education in terms of learner satisfaction and knowledge acquisition and Davis et al (44) point out that in web based continuous medical education collaborative activities are essential in engaging learners and improving the impact of educational materials, interactive cases encourage critical thinking and problem-solving. They also emphasized that content should: fit easily on a web 'page'; be in short blocks; allow text to be limited and printed in easy-to-read read fonts; allow design to be appealing and create interactivity with the learner (44).

c. Storytelling

As a pedagogical method, it incorporates primary and fruitful link between lived experienced and curricular content, a connection integral to adult learning (55). In specific, digital storytelling combines the art of telling stories with a mixture of digital media, including text, pictures, recorded audio narration, music, and video. These multimedia elements are blended using computer software, to tell a story that usually revolves around a specific theme or topic and often contains a particular point of view (56). It has the potential to meaningfully capture participants' lived experiences and share research findings in a highly engaging manner (57) and involves the creation of visual narratives with no more than 5 minutes length that (58). Lambert et al.

(59) summarized seven fundamental elements of digital storytelling that adapted to a training program involves:

- **Owning the insights:** Identify the key insights, the story or themes related to a topic that are important to convey in a training program.
- **Owning the emotions:** By identifying the emotions in the story, trainers can then decide which emotions they would like to include in their story and how they would like to convey them to their students.
- **Finding the moment:** Select a single moment that trainers can use to illustrate their insight. In this step the script is proposed as it is important to select the scenes with care and establish them concretely to ensure that they are contributing to the overall piece.
- **Assembling resources:** Gather and organize the visual and audio resources that will be used to illustrate the story, such as video recordings, drawings, pictures, graphs, tables, and music. Record a narration of the script, using video and audio.
- **Editing the story:** Edit and assemble your resources into a rough cut of the story.
- **Refining your story:** Review and revise your rough cut to refine the pacing, transitions, and overall impact of the story.
- **Sharing your story:** Publish and share the story online or onsite to engage with your audience and inspire discussion.

As stated by Lambert, creating a digital story can be a challenge, and many storytellers may only create one digital story and it is recommended digital storytellers connect with others to share ideas and work through these steps together (59). In medical education, digital storytelling emphasizes that reflection is a critical skill for healthcare professionals. It supports the principles of actively engaging students in reflecting upon knowledge they have gained as well as on their experiences, rather than passively receiving information from the world (60). As stated Lal et al. (60), digital stories can be used to support reflective practice in students and prepare them for their transition to clinical practice. This innovative research method holds potential to elucidate complex stories in a compelling and accessible manner and increase participants' engagement (60).

d. Microlearning

This method is related to e-learning, content and training which are presented in smaller sections sequentially (61), offering bite-sized learning content in the form of short videos, interactive quizzes, and microcapsules of curated content as forms of learning in which learning processes consist of fine grained, interconnected, but

loosely coupled learning opportunities. Such learning opportunities can range from didactically prepared learning objects, via microcontents that are defined as small units of digital information. They can be remixable and reusable (62) and can be used to create a new pattern (63). In medical education, it is enjoying a rapid growth and importance among the changing management and learning professionals (62). It has demonstrated a positive effect on the knowledge and confidence of health professions students in performing procedures (64), retaining knowledge, studying, and engaging in collaborative learning (65). Moreover, when delivering a blended learning programme, some of the advantages of microlearning involve short time burst, little effort from individual sessions, simple and/or narrow topics and engaging (62). The effectiveness of microlearning for health care professionals has been reported in clinical studies (65) and has been endorsed by many health professions educators, programs, and organizations as a means of facilitating student learning, training, and continuing education (65).

B. Face-to-face training components

The face-to face methods are proposed to ensure that students are well-equipped with the necessary skills and knowledge. Some of these methods include process mapping, case-based learning or case studies, and simulation-based learning. Each approach serves a different purpose and plays a crucial role in creating a comprehensive learning experience in medical education. Thus, the face-to-face methods proposed in this project followed the adult learning principles discussed previously and adapted to the project are summarized:

a. Process mapping

The process mapping was developed by Novak and Gowin in 1984 (66) and is based on Ausubel's assimilation theory of learning (67) that is based in three principles (68,69):

1. Concepts are meaningful only when the student can visualize them.
2. Always proceed from the most generic concepts to the most specific one.
3. Students' readiness, which include their current knowledge, stage of cognitive development, and predominant mode of intellectual functioning.

This method consists of a systematic representation for organising and concept maps are useful tools to help students learn about their knowledge structure and the process of knowledge construction (69). According to Daley and Torre to create a concept map, the learner engages in an active process that includes the following steps (68):

- Select the most general concepts related to the topic and place them at the top of the concept map.

- Identify specific concepts that relate to the general ones in some way and add them to the map.
- Connect concepts with linking words to establish relationships between general and specific concepts using meaningful linking words or phrases.
- Look for cross-linkages or connections between concepts from different parts of the map to create a comprehensive understanding of the topic.

In medical education, as a resource for learning, concept maps allow students to demonstrate their mastery of the concepts associated with a particular body of knowledge. Concept mapping is a creative activity that fosters reflection on one's own understanding (68).

b. Case-based learning

This method refers a long-established pedagogical method, which is defined in several ways depending on the discipline and type of 'case' employed.

In medical education, it refers to a tool that involves learning activities often based on patient cases – patients' being real (on the wards, in clinics and in the community), simulated (people acting as patients with specific problems), virtual (online patients of varying degrees of authenticity and sophistication) or text-based (70). Thus, it involves matching clinical cases in health care-related fields to a body of knowledge in that field, in order to improve clinical performance, attitudes, or teamwork (71). It has been shown to enhance clinical knowledge, improve teamwork, improve clinical skills (71). As stated by Thistlethwaite et al. (70) according to the National Centre for Case Study Teaching in Science, cases should:

- Be authentic (based on real patient stories).
- Involve common scenarios.
- Tell a story.
- Be aligned with defined learning outcomes.
- Have educational value.
- Stimulate interest.
- Create empathy with the characters.
- Include quotations in the patient voice to add drama and realism.
- Promote decision making.
- Have general applicability.

In relation to the adult theories discussed previously, this method aligns well with the andragogical principles, as it engages learners in real-life clinical scenarios, encourages self-directed learning, promotes active participation and problem-solving and facilitates the development of reflective thinking and deeper conceptual understanding (70). It also aligns with the Kolb's experiential learning theory, as students are actively engaging with real-life clinical cases, reflect on their experiences, formulate new understandings, and apply their learnings in future situations. From the trainers' perspective, as stated by Thistlethwaite, more engaged and motivated students make for a more enjoyable teaching experience (70).

c. Simulation

It refers to an innovative methodology for medical education and has been developing rapidly in recent years. It is defined as a technique, not a technology, to replace or amplify real experiences with guided experiences that evoke or replicate substantial aspects of the real world in a fully interactive manner (32,40). Simulation is also an "active" learning methodology, because it involves the participation and observable actions of the student (32).

The skills requirement which can be enhanced with the use of simulation include (40):

- Technical and functional expertise training.
- Problem-solving and decision-making skills.
- Interpersonal and communications skills or team-based.
- Competencies.

Moreover, the educational benefits of simulation in medical education include the following (40):

- Deliberate practice with feedback.
- Exposure to uncommon events.
- Reproducibility.
- Opportunity for assessment of learners.
- The absence of risks to patients.

In summary, blended learning in medical education combines online and digital resources with traditional face-to-face instruction to promote a flexible, interactive, and engaging learning experience. This approach, grounded in the adult learning theories explained previously, allows stu-

dents to relate new learning to past experiences, link learning to specific needs, and apply learning practically, leading to more effective and efficient learning experiences. Blended learning offers flexibility and promotes independent learning and online collaboration while maintaining some face-to-face instruction. It combines different models of web-based technology, various pedagogical approaches, forms of instructional technology, and current job tasks to create learning and working experiences. From a competence-based perspective, blended learning allows participants to refine their skills and capabilities, enhancing the application of experience and knowledge in their professional environments. This approach fosters efficiency, motivation, cognitive effectiveness, and flexibility of learning styles.

The blended learning approach in the EUDONORGAN project incorporates both online and face-to-face methods to create a student-centred, self-paced, and flexible learning experience.

1.3.3. Evaluation models of training programmes

Following Tejada, evaluation in training programmes, refers to the systematic gathering of information that implies a value judgment for the commitment of making decisions (72). He also adds that as far as the process of evaluating training actions concerns, it is performed according to three main purposes:

- **Diagnostic:** prior the learning process.
- **Formative:** during the learning process.
- **Summative:** at the end of the learning process.

Hence, the evaluation process of the training programmes occurs in different moments. From the beginning, with the analysis of the training needs and the design of the programme, during its implementation, and once it ends with the analysis of the results obtained after the training. The different moments of the evaluation provide information of indicators as: efficiency, effectiveness, validity and rentability at professional and social levels. All of them constituted the “impact evaluation” context. Within this framework, impact evaluation results as an improvement strategy in the organizations, so this evaluation allows to verify the quality of the training actions (73). According to Biencinto (74), these indicators are structured in three main dimensions:

- **Satisfaction:** that measures learner’s reactions to the training programme.
- **Knowledge:** Added value that refers to knowledge improvement and job applicability.
- **Applicability:** Professional improvement or professional competencies improvement.

Kirkpatrick emphasizes that even these previous dimensions are identified, impact evaluation is not always considered as an improvement strategy. Moreover, impact evaluation is reduced to only assess the first dimension, without considering the other. From an educational perspective, is relevant to evaluate the impact of the training programmes considering the changes produced, not only at “satisfaction” level, but also considering improvement of “knowledge”, changes in “attitude and perception” and professional “applicability”, that is, the degree to which participants in the training action transfer the knowledge and skills acquired to the job (73).

Different models of impact evaluation consider this educational perspective. In this research, and due to the type of train the trainers’ program, the models identified are the stated by Biencinto (73) and summarized as it follows:

A. Chang’s impact evaluation model

The model proposed by Chang (73) is a theoretical framework that can be very useful for those responsible for planning, delivering, and evaluating training from a practical perspective. This model is presented as a cyclical process (figure 5) with differentiated phases, making it a practical and easy-to-implement tool. The cyclical process begins with identifying training needs, followed by planning and designing the training. Once the program is designed, implementation takes place, and corresponding evaluations are carried out to measure the results. Based on the results, training programs are adjusted, and a new cycle begins. This model can be useful for training managers as it provides them with a structured framework for planning and executing effective training programs. By following this model, training managers can ensure that they are identifying appropriate training needs, designing training programs that meet those needs, implementing programs effectively, and evaluating the results to continuously improve the process.

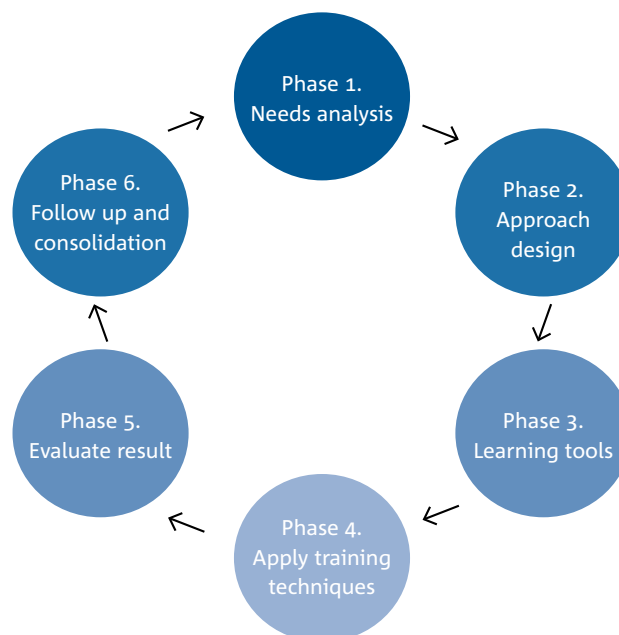


Figure 5. Chang’s impact evaluation model.

Source: Revisión de modelos de evaluación del impacto de la formación en el ámbito sanitario: de lo general a lo específico.

B. Cervero's impact evaluation model

The model proposed by Cervero and Rottet in 1984 and complemented by Dimmock in 1993 (73) is based on a series of constructs or blocks that are considered independent variables. Firstly, there is the continuous training program that is designed and planned according to the subjects' needs. Secondly, there is the professional in practice with their differential and unique characteristics. Thirdly, there is the nature of the change that is proposed to be produced through the training program, and fourthly, there is the social system of reference for the subjects under evaluation. These four blocks (figure 6) act as independent variables, and the professional development of the subject acts as the dependent variable. Each of these blocks is further subdivided into different indicators.

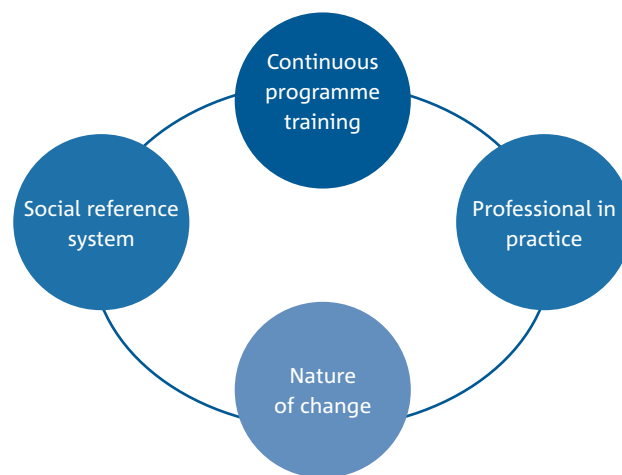


Figure 6. Cervero's impact evaluation mode.

Source: *Revisión de modelos de evaluación del impacto de la formación en el ámbito sanitario: de lo general a lo específico.*

C. Grotelueschen's impact evaluation model

It is based on Tyler's theoretical framework (74), who complements Tyler's definition of evaluation by including and proposing a series of categories (figure 7). The first category refers to summative evaluation or accountability evaluation. The second category refers to formative evaluation. Finally, the third category refers to future actions and decisions to be taken regarding the planning of training programs. Grotelueschen proposes to consider three dimensions when evaluating a training program: the purpose of the evaluation (this dimension must be clearly specified and defined beforehand), the elements of the program, and the characteristics or components of the program. These dimensions are further specified by eight fundamental questions to consider both in the planning and evaluation of training programs. These questions are focused on purposes, audiences, issues, resources, evidence, data gathering, analysis, and reporting.

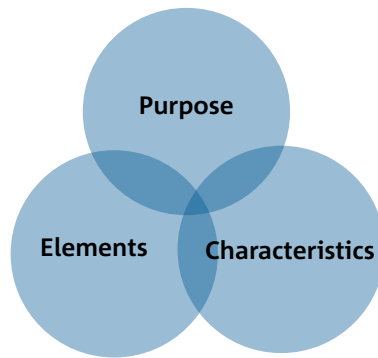


Figure 7. Grotelueschen's impact evaluation model.

Source: *Revisión de modelos de evaluación del impacto de la formación en el ámbito sanitario: de lo general a lo específico.*

D. Jackson's results-oriented impact evaluation model

Jackson provides an overview of the different impact evaluation models developed in the field of business (74). In this analysis, he concludes that those responsible for designing and delivering training to workers must consider the objectives pursued to measure the results obtained. This model is based on various assessment models used to evaluate the impact of the training implemented and he identifies seven phases as key elements in the training: Needs identification, training needs analysis, objectives of the training, program development, program implementation, program evaluation, communication of results (figure 8).

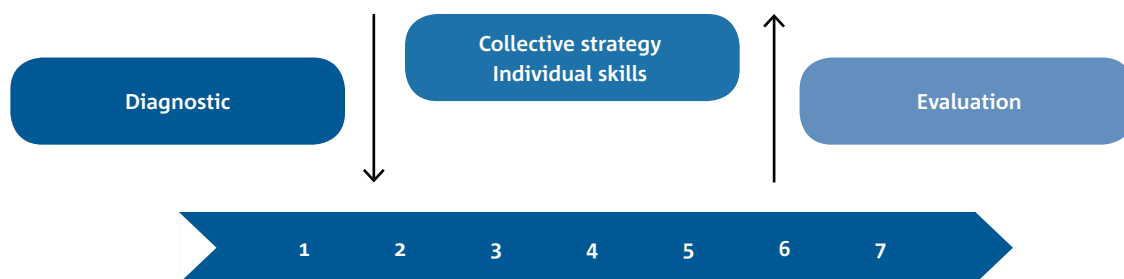


Figure 8. Jackson's results-oriented impact evaluation model.

Source: *Revisión de modelos de evaluación del impacto de la formación en el ámbito sanitario: de lo general a lo específico.*

1.3.4. Evaluation models in medical education

Various education evaluation models exist depending on the meaning and perspective of the model (75) and choosing the most suitable model depends on the specific context, goals, and resources of the organization implementing the training program.

A. CIPP Model

The Context, Input, Process, and Product (**CIPP**) evaluation model is a comprehensive framework for conducting formative and summative evaluations of programs, projects, personnel, products, organizations, policies, and evaluation systems (76). It is focused on four interconnected components to facilitate continuous improvement and decision-making (figure 9):

- **Context evaluation.** It involves identifying the relevant elements in the educational environment as well as identifying problems, needs, and opportunities in a context or educational situation (77). In context evaluations, evaluators assess needs, problems, assets, and opportunities, plus relevant contextual conditions, and dynamics (76).
- **Input evaluation** assists in the decision-making of how facilities, human resources, and budget will be determined and constituted to achieve the goal of the education (75). It focuses on policies, educational strategies, barriers, and limitations of the education system (77) and help identify and assess competing program strategies and procedural designs for meeting recipients' assessed needs (76).
- **Process evaluations** includes an ongoing check on a plan's implementation and documentation of the associated processes (76). It focuses on the way the program is implemented and determines the effect of the educational program on learners. Process evaluation involves evaluation of teaching–learning activities as well as instructors' behaviours, knowledge, and experiences and examines the management and supervision procedures (76).
- The purpose of a **Product evaluation** is to measure, interpret, and judge an enterprise's outcomes. Its main objective is to ascertain the extent to which the evaluand met the needs of all the rightful beneficiaries (76).

As illustrated by Stufflebeam and Coryn (76), the key aspects of the CIPP model within are based on three concentric circles, emphasizing the significance of well-defined values. The innermost circle symbolizes the core values, which should be established and employed as the foundation of any evaluation. The second circle, surrounding the core values, is segmented into four parts representing the four focal points of any program or initiative: goals, plans, actions, and outcomes. The outermost circle designates the type of evaluation aligned with the four components.

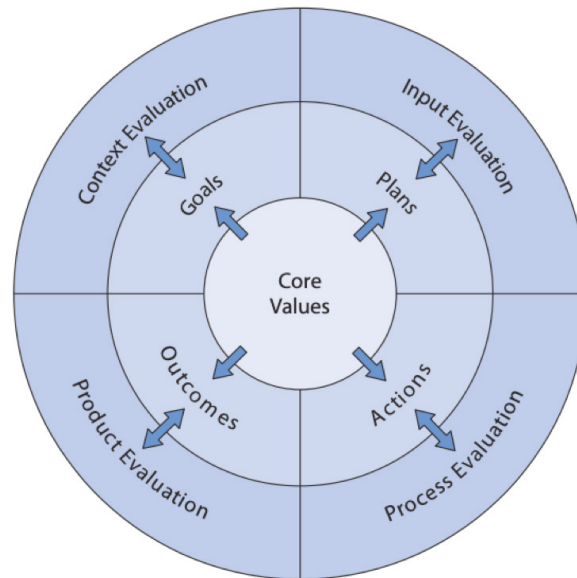


Figure 9. Key Components of the CIPP Evaluation Model and Associated Relationships with Programs by Daniel Stufflebeam.

Source: *Evaluation theory, models, and applications*.

B. Realist Evaluation

Realist Evaluation is used for investigating how programmes work, for whom and in which circumstances (78). It seeks to understand the underlying theories about what is leading to change, data collection needs to enable testing of programme theories and therefore should include data on programme impacts and the processes of programme implementation, the specific aspects of the programme context that might impact on the programme outcomes, and how these contexts shape the specific mechanisms that might create change. This model proposes content-mechanism-outcome (79).

C. Theory-driven evaluation.

It also considers both the implementation of a programme and the underlying causal mechanisms when assessing the outcomes (79). In this model, the evaluation is focused on a change model (programme rationale), and action model (programme plan) or both (79). The key elements are focused on determinants, intervention, and outcomes.

D. RE-Aim framework

RE-Aim framework refers to a model used to assess the public health impact of health promotion interventions. It consists of five dimensions: Reach (target population), Effectiveness (impact of an intervention on important outcomes), Adoption (plans that will adopt this intervention), Implementation (extent to which the intervention is implemented) and maintenance (extent to which a programme is sustained over time) (79).

Programme evaluation models in medical education are vital for assessing and enhancing the quality of educational initiatives. These models provide frameworks and guidelines

to measure the effectiveness and impact of educational programs, ensuring continuous improvement and better outcomes.

Because of the specific attributes of the project, the Kirkpatrick method was employed to assess and analyze the effectiveness of EUDONORGAN. The Kirkpatrick model is a framework used for evaluating training and educational programs, consisting of four levels that progressively measure different aspects of the program's impact and outcomes as explained in this research. In this context, it means that the EUDONORGAN project used this method to comprehensively evaluate its performance and outcomes based on the unique features of the project.

1.3.5. Kirkpatrick model: four levels of training evaluation

The Kirkpatrick model highlights the need for evaluating training programs at multiple levels (figure 10) to ensure effectiveness and achieve desired outcomes. In addition, the author proposes 10 key factors that should be considered in all training programs, including needs assessment, objective setting, content design, participant selection, planning action, infrastructure, expert selection, training resources selection, training coordination, and evaluation.

Considering the evaluation factor, the author proposes 4 different levels (73):

- “Reaction” refers to the degree to which learners find the training favourable, engaging, and relevant.
- “Learning” refers to the degree to which learners acquire the knowledge and attitude.
- “Behaviour” measures the degree to which learners apply what they have learned in their workplaces.
- “Results” refer to the degree to which the targeted outcomes occur as a result of all the previous training part.

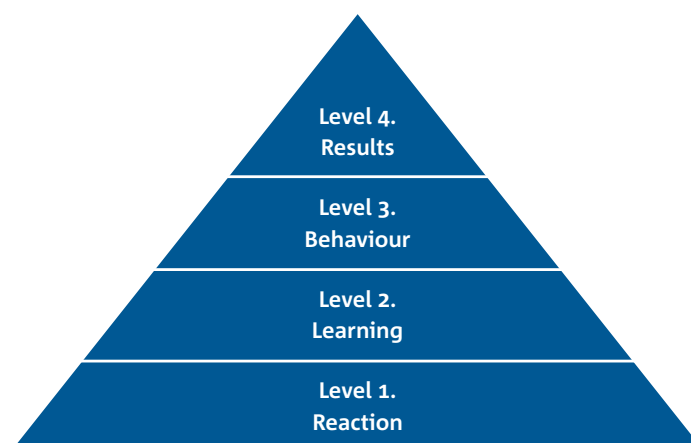


Figure 10. Kirkpatrick's model of training evaluation.

The adaptation proposed years later considers new teaching contexts (Figure 11). As Kirkpatrick mentions, the advent of computers has created a generally faster pace of business; e-learning and online events have changed the face of training; easy access to information and learning on the Internet anytime someone wants it has changed how learning generally is viewed (73). These new developments in technologies are applied in training programmes. They have created the basis for a revolution in education, allowing learning to be individualized (adaptive learning), enhancing learners' interactions with each other (collaborative learning), and transforming the role of the teacher from disseminator to facilitator (49). Moreover, informal learning takes place in the workplace (on the job learning), different teaching methodologies are used, and multimedia offers learners the flexibility to select from a large menu of media options to accommodate their diverse learning styles (49). The author mentions the over-emphasis on levels 1 and 2 when this methodology was first applied in evaluating training programmes. It was commonly considered that level 3 and level 4 were too expensive and difficult to evaluate (73).

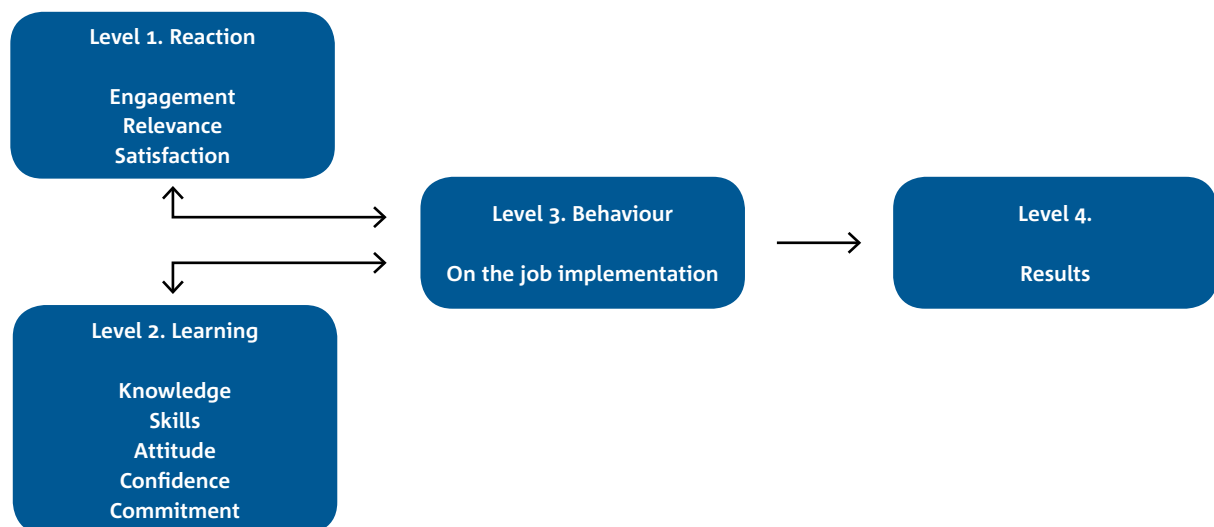


Figure 11. Kirkpatrick & Kirkpatrick adaptation of the impact evaluation model at 4 levels.

Kirkpatrick training evaluation model partially adapted to EUDONORGAN

The Kirkpatrick model based of different levels of training evaluation is proposed to measure satisfaction, learning, application of knowledge and the overall success of a programme or an educational project. Most training professionals are used to evaluating training programs for the purpose of improving them, using formative and summative methods. In EUDONORGAN, however, the training programme involved the implementation of a common curriculum for both groups of professionals that contained knowledge and skills that they were expected to learn and apply in the workplace. By gathering data during the training and after its implementation, related to the effective training and the training effectiveness, learning and actions developed during and after the training can credibly show the value that this educational project brought. This model of evaluation was considered, and the four-stages model was partially adapted. Each level contained specific indicators that facilitate the assessment of the train the trainers' program (Figure 12).

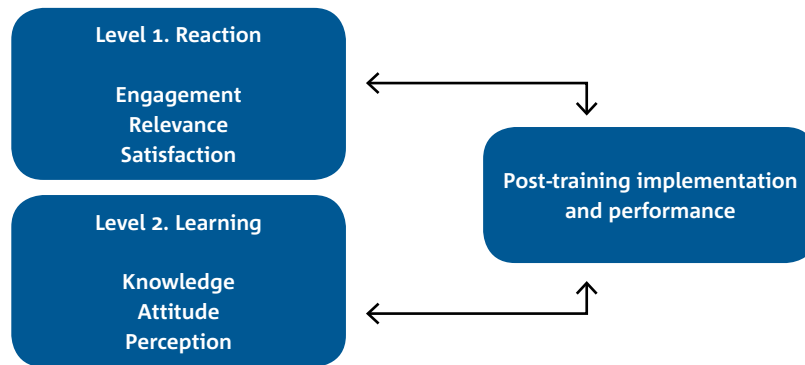


Figure 12. Adaptation of Kirkpatrick 4 stages training evaluation model to EUDONORGAN.

In summary, different evaluation models have been developed to assess the effectiveness of educational programs and, in specific, on medical education. The models mentioned provide with various frameworks to evaluate educational programs, enabling comprehensive assessments and contributing to the field of education. Among these models, Kirkpatrick's Four-Level Evaluation Model is widely recognized. It evaluates participants' reactions, learning, behaviour changes, and overall program results. This model offers a comprehensive framework for evaluating educational programs in diverse contexts and it was partially adapted to EUDONORGAN due to the specificities of the project.

1.4. EUDONORGAN. Training and social awareness for increasing organ donation in the European Union and neighbouring countries

Different educational initiatives have been undertaken within the European Union and neighbouring countries in the last years. All have the common aim of giving support to develop organ donation and transplantation training and awareness actions as key factors to increase organ viability, enhance the efficiency of transplantation systems and eventually increase donation rates. This prospective interventional study is focused on one of the projects that directly contributed to the PA1, PA2 and PA4.

1.4.1. European Commission, DG Health, and Food Safety (SANTE). Tender Specification

EUDONORGAN was a service contract awarded by the European Commission on the initiative of the European Parliament. It responded to the open call for tender SANTE/2015/D4/037 proposed by Directorate General for Health and Food Safety (SANTE) that concerned training and social awareness for increasing organ donation in the European Union and neighbouring countries. As neighbouring countries were considered: Albania, the former Yugoslav Republic of Macedonia, Montenegro, Serbia, and Turkey (five candidate countries); Bosnia and Herzegovina, Kosovo (two potential candidates); Norway, Iceland, and Liechtenstein (the three EFTA States of the European Economic Area).

As stated in the contract, the objectives of the project were focused on:

- Training health care professionals (HCPs) and other key players (OKPs) such as patients and patient support groups, representatives of public and governmental agencies, representatives of health institutions, opinion leaders, and the media in the field of organ and tissue donation.
- Organising – possibly with the support of the trained professionals and actors – awareness raising events such as journalist workshops or donation days to implement dissemination actions as well as monitoring and evaluation strategies to ensure the highest possible impact.

This project was proposed to be implemented according to different working packages (WPs). The whole timeframe of the project was proposed to be implemented according to the policies established for EU Member States in the field of transplantation and it required to consult and involve competent authorities to establish a European network, following the indications of the Directive 2010/53/EU⁵ (1).

1.4.2. Working Packages

The Working Packages established within the project were defined as:

- **WP1. Train the trainers' program.** This course was proposed to assist and provide experts in organ, tissues and cells donation and other non-healthcare relevant players with knowledge, educational and communication techniques to monitor and improved overall performance in the management of donated and transplanted organs. As it is the focused of this study, it is further explained in the different sections.
- **WP2. Social Awareness:** It involved the organisation of several communication events (information days, journalist workshops or awareness actions). These events included information on deceased and living donation as well as on organ, tissue, and cell donation and within the project 6 events are planned to be implemented in the EU Members States. The second phase involved the organisation of several events that included information on deceased and living donation as well as on organ, tissue, and cell donation. The social awareness events aim of organising and implementing six communication events, each of them taking place in different EU Member States, with the active support and contribution of the participants trained during in the first phase. The objectives of these events were focused on:
 - Raising awareness and boost better cooperation within hospitals, with patients' support groups media and the society in general for ultimately improving donation rates and the best use of donated organs.
 - Implementing it at a regional scale, inviting neighbouring countries and reaching as much audience as possible.

- Reaching countries with low donation rates, with special attention to Eastern European countries, as those whose residents are the most reluctant to donate their organs, according to the Special Eurobarometer 333a (80).

The organizers of these events were beneficiaries of the train the trainers’ program also agreed upon by the consortium partners. To ensure an efficient organization of the six communication events, the project consortium carefully considered the EU policies (1) and initiatives taken both to raise public awareness and develop useful tools towards HCPs and OKPs. The Organ donation and transplantation: policy actions at European level underlined the importance of increasing public awareness of organ donation and transplantation to facilitate the identification of organ donors and thus increase organ availability (6) and the important role played by registered donors in promoting organ donation among family members and friends and encouraging them to become donors themselves (2,6).

- **WP3. Dissemination:** It was established as a horizontal activity that gave support to the WP1 and WP2.
- **WP4. Evaluation:** It was also established as a horizontal quality plan that gave support to the WP1 and WP2. It monitored the project implementation to improve the work in progress and guarantee its success (81).

1.4.3. EUDONORGAN international consortium

The project was developed by an international consortium that involved four countries from Central and Southern Europe: Croatia, Italy, Slovenia, and Spain, with similar organ donation models and successful transplantation rates. These countries were also pioneering in the development of Educational Training Programs in organ and tissue donation with outstanding results (82). Moreover, the partners possessed a valuable expertise in the field of organ, tissues, and cell donation, as well as the skills and competencies required to ensure the efficient implementation of the programme. Responsibilities were established according to each working package (table 2):

WP1	University of Barcelona (UB) & Donation and Transplantation Institute (DTI) – Spain
WP2	Institute for transplantation of Organs and Tissues (ITOT) – Slovenia The Institute for Organ and Tissue Transplantation of the Republic of Slovenija, Slovenija-transplant and The Institute for Transplantation and Biomedicine – Ministry of Health of the Republic of Croatia (ITB) – Croatia
WP3	Centro Nazionale Trapianti (CNT) – Italy
WP4	Dinamia – Spain

Table 2. Working packages in EUDONORGAN.

The current research is focused on the educational intervention conducted through WP. 1 and WP. 2

HYPOTHESIS

2. HYPOTHESIS

Training actions improve knowledge and change attitude and perceptions of healthcare professionals and other key players towards a positive perspective about organ donation, help organize donation activities, and promote awareness rising within the hospitals and the rest of society.

Applying the Kirkpatrick four-level model of assessment to organ donation training leads to a more comprehensive understanding of participants' engagement, knowledge and behaviour, and impact on donation outcomes.

OBJECTIVES

3. OBJECTIVES

The specific objectives are stated below:

1. Assess the **knowledge of health care professionals** through a comprehensive assessment process on their understanding of medical concepts and procedures on organ donation.
2. Assess the **skills of health care professionals** by observing their practical abilities on practical simulations, workshops and clinical cases solving.
3. Assess the **attitudes and perceptions of health care professionals** towards organ donation with the identification of areas for targeted intervention and education.
4. Assess the **knowledge of other key players** through a comprehensive assessment process, on their understanding of medical concepts and procedures on organ donation.
5. Assess the **skills of other key players** by observing their practical abilities on practical simulations, workshops and clinical cases solving.
6. Assess the **attitudes and perceptions of other key players** towards organ donation with the identification of areas for targeted intervention and education.
7. Evaluate whether the **implementation of a training program promotes changes in the knowledge of the health care professionals** towards a positive perspective on organ and tissue donation.
8. Evaluate the **effectiveness** of the training program in **inducing positive attitude** changes among **health care professionals** towards organ and tissue donation.
9. Evaluate the **impact** of the implemented training program on the **perception of per health care professionals** towards organ and tissue donation.
10. Evaluate whether the **implementation of a training program promotes changes in the knowledge of the other key players** towards a positive perspective on organ and tissue donation.
11. Evaluate the **effectiveness** of the training program in inducing **positive attitude** changes among **other key players** towards organ and tissue donation.
12. Evaluate the **impact** of the implemented training program on the **perception of other key players** towards organ and tissue donation.
13. **Implement a comprehensive training methodology** to empower health care professionals and other key players with the necessary knowledge and skills.
14. Foster the capacity of health care professionals and other key players to effectively **implement social awareness events** aimed at promoting organ donation.

The objectives from 1 to 12 correspond to the published article.

METHODOLOGY

4. METHODOLOGY

4.1. Train the trainers' program

According to the Special Eurobarometer 333a (80), that included questions on behaviours and attitudes in relation to organ donation and transplantation and implemented a survey to 26.788 European citizens in October 2009, education is a very strong socio-demographic factor in supporting organ donation. Thus, education of both HCPs and OKPs is essential to successfully pass on the main positive aspects of donation within the hospitals and to the rest of the society (13). Moreover, specialized training programs in organ donation and transplantation are influential and have positive effects for a significant percentage of health care workers in the field on professional competence development and career evolutions (48). Within this framework, the train the trainers' program was proposed. The objective of the program was to assist and provided HCPs and relevant OKPs with knowledge, educational strategies, and communication techniques to monitor and improve overall performance in the management of donated and transplanted organs (83). The training included the implementation of a curriculum to support capacity-building efforts and train professionals who will, in turn, be able to conduct future training actions. The design of the program started by establishing a training methodology, the educational contents, and the selection of participants according to the criteria agreed upon by the consortium partners.

4.2. Educational methodology

4.2.1. Educational contents

The educational contents were proposed in compliance with the EU legislation (1,8). According to the high-quality standards required (83), the contents should ensure that healthcare personnel directly involved in the chain from donation to transplantation or disposal are suitably qualified or trained and competent and shall develop specific training programs for such personnel (1) and, consequently, needed to cover the most relevant information on organ and tissue donation. Seven educational modules were designed and adapted to each group of HCPs and OKPs, with the support of international experts, and finally agreed by the members of the consortium. The educational modules included the following contents: organ donation programs, donation pathway for brain death deceased donors, family approach in case of deceased donation, living donor donation, tissues and cells donation, communication aspects in organ donation, and quality improvement methodologies (Table 3).

Content	Topics	Learning objectives
<p>Module 1 Organ donation programs</p>	<ul style="list-style-type: none"> ■ Living donation ■ Donation after brain death ■ Donation after circulatory death (DCD) ■ Educational tips 	<ul style="list-style-type: none"> ■ To understand the different types of organ donation programs ■ To facilitate participants with update information on living donation as a therapeutic alternative, ethical considerations, and international recommendations ■ To gain knowledge on the different types of deceased donation, their main characteristics and world distribution ■ To gain sound knowledge on the main aspects of uncontrolled and controlled DCD ■ To gain valuable knowledge on teaching and learning strategies related to the topics of this module
<p>Module 2 Donation pathway for brain death deceased donors</p>	<ul style="list-style-type: none"> ■ The brain death organ donation process ■ The brain death donor critical pathway ■ Educational tips 	<ul style="list-style-type: none"> ■ To understand the process of organ donation, the different steps that have to be taken and the actors involved ■ To know the basic terminology of organ donation and understand the critical pathway ■ To gain deep knowledge on the steps for deceased organ donation, (identification and referral, brain death diagnosis, donor maintenance, organ recovery, preservation and allocation) the actors involved in each process and the barriers to their correct implementation ■ To gain valuable knowledge on teaching and learning strategies related to the topics of this module
<p>Module 3 Family approach in case of deceased donation</p>	<ul style="list-style-type: none"> ■ Breaking bad news: concepts and communication skills ■ Family interview for donation ■ Educational tips 	<ul style="list-style-type: none"> ■ To get knowledge on communication methodologies required to break bad news ■ To get familiar with strategies used on how to request the consent for donation ■ To obtain a complete medical history and detect conditions or behaviours that might imply a risk for the recipient ■ To gain valuable knowledge on teaching and learning strategies related to the topics of this module
<p>Module 4 Living organ donation</p>	<ul style="list-style-type: none"> ■ Kidney living donor ■ Similarities/differences with liver living donor ■ Educational tips 	<ul style="list-style-type: none"> ■ To enable participants to learn how to screen a living donor and how to carry out short and long-term follow-up after donation with attention to physical and psycho-social well-being ■ To identify key factors for protecting the health and safety of living donors ■ To understand living donation in terms of communication, both to the families and to the broader public ■ To gain valuable knowledge on teaching and learning strategies related to the topics of this module

Content	Topics	Learning objectives
Module 5 Tissues and cells donation	<ul style="list-style-type: none"> ■ Tissue donation ■ Interlinks with organ donation ■ Cell donation ■ Educational tips 	<ul style="list-style-type: none"> ■ To gain basic knowledge of the tissue and cell donation ■ To understand the types of tissues and cells that can be donated, their characteristics and selection process of the do-nors ■ To know the different uses and applications of donated tissues ■ To understand the procedures carried out from tissue donation to their transplantation ■ To understand the interlinks between tissue donation with organ donation. ■ To gain valuable knowledge on teaching and learning strategies related to the topics of this module
Module 6 Communication aspects in organ donation	<ul style="list-style-type: none"> ■ Contemporary social landscape ■ Understanding of both the public and the process of behavioural change ■ Basic principles of communicating with different target groups ■ Guidelines for strategically approaching communication ■ How to communicate with mass media and manage adverse publicity ■ Social media as new communication channels to raise awareness ■ Educational tips 	<ul style="list-style-type: none"> ■ To understand public communication, key elements, and guidelines ■ To get familiar with the communication interaction, activities and tools developed at EU level ■ To acquire sound knowledge on the role of media and social media in social awareness ■ To learn how to manage adverse publicity ■ To gain valuable knowledge on teaching and learning strategies related to the topics of this module
Module 7 Quality improvement methodologies	<ul style="list-style-type: none"> ■ The importance of quality management in health care and organ donation ■ How to apply quality criteria and indicators in organ donation ■ Resources already available in quality management and biovigilance ■ Educational tips 	<ul style="list-style-type: none"> ■ To understand how quality management applies in organ donation ■ To get familiar with methodologies already developed and implemented in EU ■ To gain valuable knowledge on teaching and learning strategies related to the topics of this module

Table 3. Educational contents for all participants implemented during the blended learning program.

4.2.2. Selection of participants

Participants from the 24 EU Member States and 4 neighbouring countries were invited to participate in the training. The objective was to create a heterogeneous pool of trained and dedicated professionals on organ donation that will continue improving in the working environment. Participants were trained on how to best identify donors, how to best organize donation activities (considered national specificities) and how to pass on the main positive aspects of donation within the hospitals and to the rest of society (83).

The criteria for the selection of HCPs included professionals that were able to demonstrate medical expertise in the field of organ/tissue and cell donation and transplantation. Eligible candidates could be medical doctors (MD) and registered nurses (RN) with different specialties, such as transplant/donor coordinators, anaesthesiologists, intensivists, nephrologists, internal medicine physicians, general nurses, or intensive care nurses. The selection of OKPs was focused on actors with proven capacity and motivation to learn and to transfer the knowledge acquired in organ and tissue donation and transplantation via the training course, such as active members of patient support groups, communication officers of national and regional authorities, journalists in the field of care, healthcare establishments, journalists, and key opinion leaders.

All participants needed to demonstrate:

- Experience as trainers or similarly assurance that participants could provide future training.
- Practical experience or prove interest in the field of organ and tissue donation and transplantation. Participants were asked to whether they were ready to support their organizations by organizing or participating in social awareness events.
- Language skills and in particular proficiency in English.
- Organizational capacity to transmit knowledge acquired during the training and perform future training in their hospitals or organizations.

Participant's selection process followed three different phases. Firstly, participants were requested to send their curriculum vitae, a motivation letter, and a letter of support from their sending hospital, organization, or association. Secondly, applications were carefully reviewed by a group of experts to consider gender equity, professional profiles, levels of expertise and equitable geographical representation. Thirdly, all candidates proposed were further discussed with the Competent Authorities where necessary and when agreed, participants were informed.

4.2.3. Training implementation

The train the trainers' program started in June 2017 with a series of informative webinars to get all participants familiar with the main topics of the program, the training objectives, and the characteristics of the methodology.

The webinars were followed by the training offered via the WebApp, which presented two different routes: one for HCPs and another for OKPs.

Before beginning the training, participants were requested to complete an 18-item test of knowledge and a survey on attitudes and perceptions towards organ and tissue donation. The content of knowledge questionnaires was based on information included in the educational modules. Knowledge questionnaires were different for HCPs and OKPs, whereas the survey on attitudes and perceptions remained the same.

After completing the questionnaires, participants gained access to the training program, taking direct responsibility for their self-paced learning by following the educational content. It included motion videos, information and tips that employed storytelling with characters, effectively encompassing all the material, engaging participants, and sustaining their interest (figure 13).

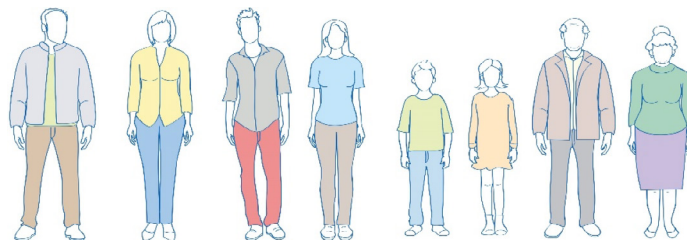


Figure 13. Methodology in EUDONORGAN. Family of characters.

These characters were integrated into scenarios and stories that gradually introduced the content on organ donation in an interactive, enjoyable, and easily understandable manner. The motion graphics played a crucial role in the learning process, as they informed, entertained, and engaged them (figure 14).

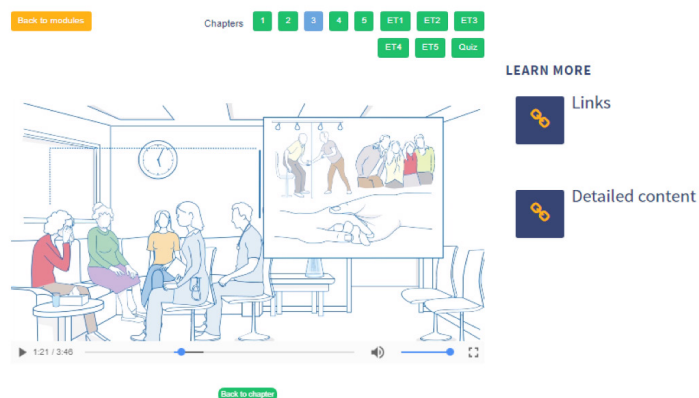


Figure 14. Microlearning content in EUDONORGAN.

With this approach, the training aimed to inform and engage participants, fostering understanding and actively spreading the awareness on the importance of organ donation.

The program continued with face-to-face sessions. A total of 9 guests and 11 international experts from six EU countries (Croatia, France, Italy, Slovenia, Spain, and Netherlands) joined the on-site training. The on-site sessions were designed to put into practice the knowledge acquired previously during the online part and to facilitate the switch from the theoretical knowledge to hands-on practice (figure 15).



Figure 15. Methodology in EUDONORGAN.

A learning culture centered around organ and tissue donation topics was established, with allocated in-class time for in-depth exploration. This approach enriched the learning experience throughout the entire pathway (figure 16).

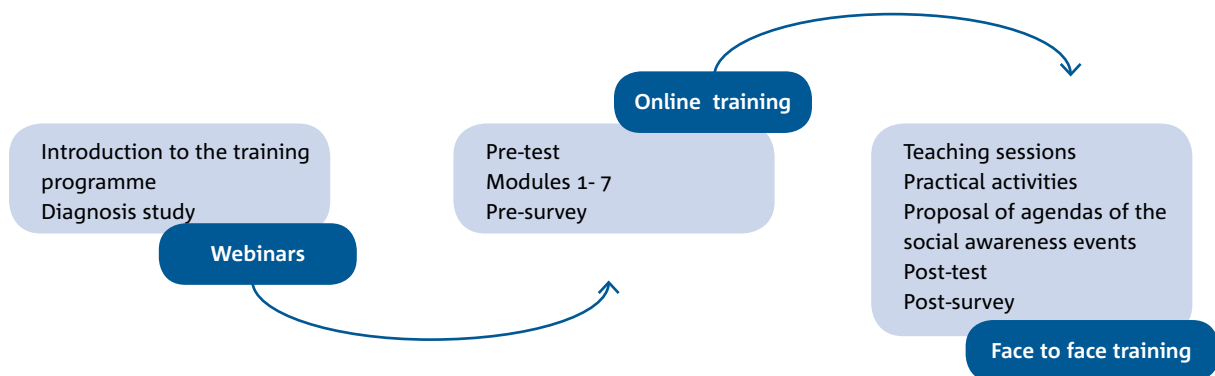


Figure 16. Learning pathway in EUDONORGAN.

Apart from the educational contents, an educational kit (figure 17) was provided to participants with essential knowledge on adult learning in medical education and tips on teaching methodologies and strategies.



Figure 17. Educational KIT shared during the face-to-face training.

The training course finished in September 2017. Certificates of achievement were issued and delivered to participants who completed the program successfully (figure 18).



Figure 18. Group of participants and experts during the face-to-face training in EUDONORGAN.

4.2.4. Training evaluation

Level 1. Reaction

It refers to the degree to which learners find the training favourable, engaging, and relevant (73). The method used to evaluate was a summative form that consisted in an online post-programme assessment questionnaire that included overall satisfaction of the programme. As the training was implemented via the WebApp and the face-to-face sessions, two different questionnaires were designed.

Online training reaction evaluation

Once participants finished the online training via WebApp, they were voluntarily asked to complete an assessment questionnaire on the quality of the training, by rating on a five-point Likert scale ranging: 5 =Excellent; 4 =Very Good; 3 = Good; 2 = Average; 1 = Poor to what extent they agreed on 3 different categories: Medical aspects, educational tips, and Practical activities. The assessment was proposed in each of the 7 online modules:

- Module 1. Organ donation programmes.
- Module 2. Donation pathway for brain death deceased donors.
- Module 3. Family approach in case of deceased donation.
- Module 4. Living organ donation.
- Module 5. Tissues and Cells donation.
- Module 6. Communication aspects in organ donation.
- Module 7. Quality improvement methodologies.

Face to face training reaction evaluation

The assessment questionnaire was a form consisting of 18 items that participants filled in voluntarily. They were asked to rate on a five-point Likert scale, ranging from 1 = Poor to 5 =Excellent to what extent they assessed 3 different categories: educational contents, oral presentation and questions and answers proposed during the sessions. Items were related to the lectures given during the four days of training and the organization of the whole face to face course.

Level 2. Learning

This level refers to the degree to which learners acquire the knowledge and attitude (73). Due to the specificities of the project, confidence and commitment dimensions were not considered, but perception is included as complementary dimension (see table 4). The methods used to assess were formative surveys designed considering three different dimensions:

Knowledge

A pre-test was designed for each group, HCPs and OKPs. Questions were tailor-made according to each group as participants followed two different learning pathways. The assessment consisted of a test with 18 different questions related to the topics given within the 7 modules. It consisted in a multiple-choice test, only one correct answer from 4 options and the scale of achievement was used, considering from 1 to 10 options, with a minimum of 80% correct answers. Once both groups of participants completed the training, they were required to complete a post-test. Only one attempt was allowed and the minimum grade to approve was 7.

Attitude

A pre-test was designed with 7 different closed-ended questions, 5 of them were yes-no questions and the other 2 provided different options. The same test was proposed to both groups of participants, and they were asked to complete it before starting the online training. When finishing the training, both groups completed a post-test with the same questions.

Perception

To evaluate this dimension, a pre-test was administered, comprising 20 distinct terms—10 positive and 10 negatives. The terms included solidarity, positive, organized, opportunity, correct, dignified, encouraging, clear, easy, and respectful, as well as stressful, complicated, painful, awkward, strange, mistrustful, barbaric, dubious, chaotic, and discreditable. Both groups of participants were asked to choose only 5 of them based on their perceptions the process of donation after brain death. A post-test with the same 20 terms was proposed once they finished the training.

Levels	Outcomes For HCPs and OKPs	Methods	Evaluation criteria	Analysis
Reaction	Learners' satisfaction	Post-programme assessment questionnaire	Face to face: lectures (contents, presentation and questions answered); organization, course information and general evaluation. Online training: course modules (educational tips, practical activities, and medical aspects); resources and technology.	Likert scale: 1= poor 2= average 3= good 4= very good 5= excellent
Learning	Knowledge	Pre-test and post-test	Educational modules: 1. Organ donation programmes 2. Deceased organ donation 3. Family approach in case of deceased donation 4. Living organ donation 5. Tissue and cell donation 6. Communication aspects in organ and tissue donation 7. Quality improvement methodologies	Scale of achievement 1-10 Minimum of 80% correct answers
	Perception and attitude	Pre-test and post-test	20 perception terms	Scale: a = Yes b =No
		Pre-test and post-test	5 Yes/no questions 2 closed-ended questions with options	Scale: a = Yes b = No c = I don't know

Table 4. Reaction and learning levels to evaluate the train the trainers' program.

Post-training implementation and performance

A post-training behaviour and performance monitoring survey was designed to evaluate the participants' actions after the training. This monitoring action was proposed within the years 2018 and 2019. The survey was structured in 20 close-ended items to be evaluated following by rating on a five-point Likert scale ranging: 5 =Excellent; 4 =Very Good; 3 = Good; 2 = Average; 1 = Poor, and open questions. This survey was structured in two main parts considering the implementation of training action and participation in the organization of the social awareness events.

4.3. Social awareness events implementation

The aim of this WP was focused on organising and implementing six communication events according to the guidelines agreed by all participants during the previous phase, each of them taking place in different EU Member States. The objectives of these events, as stated previously, were:

- To raise awareness and boost better cooperation within hospitals, with patients' support groups, media, and the society in general for ultimately improving donation rates and the best use of donated organs.
- To implement it at a regional scale, inviting neighbouring countries and reaching as much audience as possible.
- To reach countries with low donation rates, with special attention to Eastern European countries.

The organizers of these events were the participants of the train the trainers' program, also agreed with DG SANTE and the competent authorities.

4.3.1. Selection of countries

The cities selected to implement the events (figures 19 and 20) were Athens (Greece), Brussels (Belgium), Budapest (Hungary), Lisbon (Portugal); Stockholm (Sweden), and Warsaw (Poland), based on the following criteria:

- Good balance between Northern/Southern, Western/Eastern European countries.
- Different European Organ Exchange Organisations they belong to different donation rates (from 4,7 in Greece to 32,7 in Portugal).
- Expressed support from the national competent authorities.



Figure 19. Stockholm and Lisbon social awareness events.

According to the tender (83), the following countries expressed their interest in hosting the events or were recommended by the European Commission:



Figure 20. Geographical distribution of the 6 social awareness events.

- Sweden (belongs to Scandiatransplant): 19,7 donors pmp. MS and neighbouring countries to be invited: Denmark, Finland, Estonia, Norway, and Iceland.
- Poland: 14 donors pmp. MS and neighbouring countries to be invited: Latvia, Lithuania, Czech Republic, Slovakia.
- Belgium (belongs to Eurotransplant) – 30,8 donors pmp. MS and neighbouring countries to be invited: The Netherlands, Germany, Northern France, Luxembourg, Ireland, Liechtenstein, and UK.
- Hungary (belongs to Eurotransplant): 18,6 donor pmp. MS and neighbouring countries to be invited: Austria, Croatia, Slovenia, Romania, Bosnia and Herzegovina, Montenegro, and Serbia.
- Greece: 4,7 donors pmp. MS and neighbouring countries to be invited: Bulgaria, Cyprus, Albania, Kosovo, Former Yugoslav Republic of Macedonia (FYRoM) and Turkey.
- Portugal (belongs to South Alliance for Transplants): 32,7 donors pmp. MS and neighbouring countries to be invited: Southern France, Italy, Malta, and Spain.

4.3.2. Selection of the participants of the events

The social awareness events were addressed to healthcare professionals, journalists; patients, support groups and Non-Governmental Organizations, key local and national opinion leaders, including academic staff of the faculty of journalism and media, editors of the most impacting media channels, social media experts, representatives of potential donor hospitals and representatives of social services (figures 21, 22 and 23). The selection of the target groups included the following criteria:

- A total of 30 to 50 participants per event.
- Equitable geographical representation.
- Gender equity.
- Profile diversity.
- Intermediate knowledge of English as common language spoken.



Figure 21. Brussels social awareness event.



Figure 22. Athens social awareness event.

The experts selected for each event also met several criteria to ensure best practice exchange in organ and tissue donation.

- Recommendation from competent authorities of the 28 EU countries.
- CV and professional profile.
- Recognized knowledge and experience in their field.
- Gender equity.
- Geographical diversity.



Figure 23. Warsaw and Budapest social awareness events

4.3.3. Development of the programs

The EUDONORGAN international consortium proposed a unique core structure for the program, applicable to all events. The final programs for each of the events were prepared by the national representatives in close cooperation with the leaders of the WP2. The programs were tailored to the specific needs and wishes of the hosting and neighbouring countries.

The programs of all 6 events included the following components:

- Presentation of the EUDONORGAN project and the European activities in the field of Organ Donation and Transplantation.
- Media coverage was pivotal in the success of each implemented event, with a range of strategies employed, including press conferences, press releases, surveys, and on-site interviews, all aimed at securing comprehensive local coverage. The EUDONORGAN WebApp proved instrumental in facilitating continuous communication with the media, offering a highly valuable resource for this purpose.
- To enhance social awareness events' impact, various promotional methods were suggested before each host country's event to promote organ and tissue donation. Promotional materials included folders, pens, and project leaflets, emphasizing the importance of donation in the region. While initially in English, these materials were suggested for translation or subtitling in local languages if necessary.

The participants responsible for organizing awareness events in the host countries were trained during the train the trainers' program. In addition to this core group, the organizing committees included individuals from diverse backgrounds, covering various ages and professional profiles. Notably, transplant patients and their associations were also extended invitations to share their personal experiences. As needed, volunteers were also welcomed to join the committee. Collaboration between the local organizing committees, the competent authorities, and the leaders and coordinators of WP2 was integral to shaping the event's agenda. This collaborative effort encompassed the selection of experts, participants, event planning, venue choices, and accommodations.

In the pursuit of enhancing the event's impact, endorsements from the highest political figures or local community leaders were actively sought. Recognizing the valuable insights, they could provide; these authorities had the potential to champion actionable programs or advocate for legislative changes relating to organ and tissue donation. In instances where their face to face was not feasible, video messages and supportive statements were proposed.

The foreseen time frame for the events

The planned duration for each event was one day, with the option of including the night before or after, depending on participants' arrivals and departures. The final date for each event was confirmed no later than 3 months before the event (and potentially even earlier).

Language of the events

English was the primary language for the events. However, if determined and facilitated by the local organizing committees, event-related materials and resources could be translated in the local language.

4.4. Ethical aspects

This research is undertaken according to the principles of responsibility, rigor, and honesty established in the code of good practices agreed upon by the bioethics commission of the University of Barcelona. Regarding these principles, before administering any qualitative and quantitative techniques, all participants were informed that they were part of a project that guaranteed the protection of their data, anonymity, and confidentiality, in accordance with the data collected in this document. These measures were taken in compliance with the limitations set forth in the Spanish Organic Law 3/2018, dated December 5th, and Article 13 of Regulation (EU) 2016/679 of the European Parliament and of the Council of April 27, 2016, on the protection of personal data (GDPR) for safeguarding personal information. Participants were also requested to sign a document stating their understanding of the project's purpose and duration, the expected benefits, anticipated risks or discomforts, the exclusion/inclusion criteria, the methodology, and the criteria for project completion.

4.5. Statistical analysis

All data were analysed using the Statistical Package for Social Sciences (SPSS), version 10.0 for Windows. Categorical data were expressed as frequencies and percentages, while continuous data were presented as mean and standard deviation (SD). In the bivariate analysis, the chi-square test or Fisher's exact test was used to compare categorical variables, and the Student's t-test, Wilcoxon signed-rank test, or Kruskal-Wallis test was employed to compare pre- and post-test quantitative data based on the conditions of application. Data for healthcare professionals (HCPs) and other key players (OKPs) were also stratified by gender, age decades, profession, specialty, and position. Statistical significance was set at $p \leq 0.05$.

RESULTS

5. RESULTS

5.1. Train the trainers' program

Results obtained after the analysis of the data are analysed according to each of the four levels of training evaluation.

A total of 96 participants (HCPs, n = 79; OKPs, n = 17) from 24 EU and neighbouring countries completed the training program. In the group of HCPs, there were 32 men and 47 women, with a mean (SD) age of 40.1 (8.4) years, whereas in the group of OKPs, there were 4 men and 13 women, with a mean age of 40.8 (11.4) years. In the group of HCPs, 51.1% of participants were anaesthesiologists or intensivists and 25.3% were RN. Thirty-seven (46.8%) were transplant/donor coordinators. In the group of HCPs, 51.1% of participants were anaesthesiologists or intensivists and 25.3% were RN. Thirty-seven (46.8%) were transplant/donor coordinators. In the group of OKPs, patients' group representatives accounted for 41.2% of participants followed by communication experts (29.4%). Profession related characteristics and countries of origin of participants are shown in table 5 and 6.

Gender	
Female	47 (59.5)
Male	32 (40.5)
Age	40.1 ± 8.4
Profession	
Medical Doctors	49 (62)
Registered Nurses	27 (34.2)
Medical students	2 (2.5)
Health Care manager	1 (1.3)
Specialities	
Anaesthesiology/Intensive Care	41 (51.1)
General Nurses	20 (25.3)
Intensive Care Unit Nurses	5 (6.3)
Transplant / Donor Coordinators	3 (3.8)
Nephrologist	2 (2.5)
Internal Medicine	2 (2.5)
Other specialities	6 (3.8)

Position	
Transplant/Donor Coordinators	37 (46.9)
Anaesthesiologist / Intensive Care	26 (32.9)
Medical doctors	3 (3.8)
Other	13 (16.5)
Countries (number of participants per country)	
Turkey; Germany	1
Finland; Netherlands; Portugal; Romania; Serbia; Slovenia	2
Bosnia-Herzegovina; Bulgaria; Croatia; Cyprus; Hungary; Ireland; Latvia; Malta; Sweden	3
Estonia; Greece; Lithuania; Spain	4
Belgium; Poland	5
France; Italy	6

Table 5. Demographic data and characteristics of healthcare professionals. Data expressed as frequencies and percentages in parenthesis unless otherwise stated.

The total number of OKP was 17, among those 13 (76.5%) were women and 4 (23.5%) were men; the mean age was 40.8±11.4 years old. Profession and countries origin are indicated in table 6.

Gender	
Female	13 (76.5)
Male	4 (23.5)
Age	40.8 ± 11.4
Profession	
Patients' group representative	7 (41)
Communication expert	5 (29)
Journalist	3 (18)
Documentalist	1 (6)
Countries (number of participants per country)	
Bulgaria; Ireland; Spain	2
Croatia; Cyprus; France; Hungary; Lithuania; Portugal; Romania. Serbia; Slovenia; Slovakia; Sweden	1

Table 6. Demographic data and characteristics of other key players. Data expressed as frequencies and percentages in parenthesis unless otherwise stated.

5.1.1. Level 1. Reaction. Online training

For the web-based training considering medical aspects, educational tips, and practical activities of the seven modules, the overall mean (SD) scores of satisfaction were higher than 4 for each module, with 4.4 (0.6) for module 1, 4.5 (0.5) for module 2, 4.5 (0.5) for module 3, 4.5 (0.6) for module 4, 4.4 (0.6) for module 5, 4.4 (0.6) for module 6, and 4.3 (0.7) for module 7, without significant differences between HCPs and OKPs (table 9).

In the group of HCPs (table 7), women scored significantly higher than men in modules 3, 5, and 7, but significant differences by age, profession, specialty, or position were not found. In the group of OKPs (table 8), mean scores were also higher than 4 for all modules, but significant differences by gender, age, and profession were not observed.

Categories	Participants	Module 1	Module 2	Module 3	Module 4	Module 5	Module 6	Module 7
Gender								
Female	47	4.5±0.6	4.6±0.5	4.6±0.5	4.6±0.5	4.6±0.6	4.4±0.6	4.5±0.7
Male	32	4.2±0.6	4.3±0.6	4.3±0.6	4.3±0.6	4.0±0.7	4.0±0.7	4.0±0.7
	<i>p</i> =	0.098	0.102	0.017	0.071	0.003	0.221	0.007
Age								
From 25 to 34	16	4.4±0.5	4.6±0.4	4.5±0.5	4.6±0.4	4.5±0.5	4.4±0.6	4.4±0.6
From 35 to 44	37	4.3±0.7	4.5±0.6	4.5±0.5	4.5±0.7	4.4±0.7	4.4±0.7	4.3±0.8
From 45 to 54	20	4.5±0.7	4.5±0.6	4.6±0.6	4.5±0.6	4.5±0.7	4.3±0.7	4.4±0.6
From 55 to 64	6	4.3±0.6	4.5±0.5	4.6±0.4	4.6±0.3	4.3±0.5	4.4±0.7	4.2±0.7
	<i>p</i> =	0.882	0.258	1.083	0.668	1.324	0.177	0.464
Profession								
Medical Doctor	49	4.4±0.6	4.5±0.6	4.6±0.5	4.5±0.6	4.5±0.6	4.3±0.7	4.4±0.7
Registered Nurse	27	4.3±0.3	4.6±0.6	4.5±0.6	4.5±0.6	4.4±0.7	4.4±0.6	4.3±0.7
Manager	1	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Medical student	2	4.3±0.0	4.7±0.5	4.3±0.0	4.5±0.2	4.3±0.0	4.0±0.5	4.3±0.9
	<i>p</i> =	0.846	0.644	0.887	0.97	0.672	0.561	0.726
Speciality								
Anaesthesiology/ Intensive Care	41	4.4±0.6	4.4±0.6	4.5±0.5	4.5±0.6	4.5±0.7	4.3±0.7	4.4±0.7
General nurse	20	4.2±0.7	4.5±0.6	4.5±0.5	4.4±0.6	4.3±0.7	4.4±0.6	4.2±0.7
Intensive care unit nurse	5	4.3±0.8	4.5±0.7	4.3±0.7	4.5±0.7	4.3±0.7	4.5±0.7	4.3±0.8
Internal medicine	2	4.3±0.9	4.2±1.18	4.7±0.5	4.5±0.7	4.7±0.5	4.3±0.9	3.9±1.65
Medical student	1	4.3	4.3	4.3	4.7	4.3	4.3	5.0
Nephrology	2	4.7±0.5	4.7±0.5	5.0	5.0	5.0	4.5±0.7	4.5±0.7
Other	5	4.3±0.5	4.5±0.5	4.5±0.4	4.5±0.4	4.5±0.5	4.3±0.5	4.3±0.5
Transplant / Donor coordinator	3	4.4±0.7	4.7±0.6	5.0±0.0	4.7±0.6	4.9±0.2	4.7±0.6	4.9±0.2
	<i>p</i> =	0.898	0.937	0.483	0.885	0.498	0.989	0.726

Position								
Transplant / Donor coordinator	37	4.5±0.5	4.6±0.5	4.6±0.5	4.6±0.4	4.5±0.6	4.4±0.6	4.4±0.7
Anaesthesiology/ Intensive Care	26	4.2±0.7	4.4±0.7	4.0±0.6	4.4±0.7	4.4±0.7	4.2±0.7	4.2±0.7
Other	13	4.5±0.7	4.6±0.6	4.6±0.5	4.5±0.7	4.5±0.7	4.5±0.7	4.4±0.7
Medical doctor	3	4.2±0.9	4.6±0.4	4.3±0.7	4.6±0.5	4.4±0.5	4.1±1.02	4.8±0.4
	<i>p</i> =	0.49	0.401	0.447	0.651	0.97	0.756	0.491
Total	79	4.4±0.6	4.5±0.6	4.5±0.5	4.5±0.5	4.4±0.6	4.3±0.6	4.3±0.7

Table 7. Satisfaction level, online post-programme assessment questionnaire results in the health care participants (HCPs). Data expressed in mean ± standard deviation.

Categories	Participants	Module 1	Module 2	Module 3	Module 4	Module 5	Module 6	Module 7
Gender								
Female	13	4.6±0.4	4.8±0.3	4.6±0.5	4.6±0.5	4.7±0.3	4.5±0.5	4.3±0.6
Male	4	4.3±1.0	4.6±1.0	4.3±1.0	4.3±1.0	4.3±1.0	4.3±1.0	4.3±1.0
	<i>p</i> =	0.589	0.469	0.631	0.589	0.469	0.861	0.772
Age								
From 25 to 34	6	4.6±0.3	4.7±0.3	4.7±0.7	4.7±0.4	4.7±0.3	4.4±0.7	4.4±0.7
From 35 to 44	3	4.7±0.6	4.8±0.4	4.6±0.5	4.8±0.4	4.8±0.4	4.7±0.3	4.6±0.5
From 45 to 54	7	4.3±0.7	4.5±0.8	4.3±0.7	4.1±0.8	4.4±0.7	4.3±0.7	4.1±0.8
From 55 to 64	1	5.0	5.0	5.0	5.0	5.0	5.0	4.0
	<i>p</i> =	0.585	0.742	0.491	0.351	0.723	0.592	0.582
Profession								
Patients' group representative	7	4.6±0.5	4.6±0.4	4.4±0.6	4.6±0.5	4.6±0.4	4.5±0.5	4.3±0.5
Communication expert	5	4.3±0.8	4.5±0.9	4.4±0.9	4.2±1.0	4.5±0.8	4.3±0.8	3.9±0.9
Journalist	3	4.8±0.4	4.9±0.2	4.7±0.6	4.8±0.4	4.8±0.4	4.8±0.4	4.9±0.2
Documentalist	1	4.3	4.3	5.0	4.7	4.3	3.3	3.3
Other	1	5.0	5.0	4.7	5.0	5.0	4.6	4.7
	<i>p</i> =	0.609	0.55	0.847	0.765	0.7	0.486	0.207
Total	17	4.5±0.5	4.6±0.5	4.5±0.6	4.5±0.6	4.6±0.5	4.4±0.6	4.3±0.7

Table 8. Satisfaction level, online post-programme assessment questionnaire results in the Other Key Players (OKPs). Data expressed in number of cases, mean ± standard deviation.

Categories	Participants	Module 1	Module 2	Module 3	Module 4	Module 5	Module 6	Module 7
Health Care Professionals	79	4.4±0.6	4.5±0.6	4.5±0.5	4.5±0.6	4.4±0.6	4.3±0.6	4.3±0.7
Other Key Players	17	4.5±0.5	4.6±0.5	4.5±0.6	4.5±0.6	4.6±0.5	4.4±0.6	4.3±0.7
Total	96	4.4±0.6	4.5±0.5	4.5±0.5	4.5±0.6	4.4±0.6	4.4±0.6	4.3±0.7
	<i>p=</i>	0.410	0.434	0.859	0.904	0.300	0.628	0.704

Table 9. Comparative HCPs and OKPs online assessment questionnaire. Data expressed in number of cases, mean ± standard deviation.

5.1.2. Level 1. Reaction. Face to face training

Regarding the face-to-face training survey, data from HCPs and OKPs were gathered, with more than 80 participants who completed the survey in most of the items, and a highest response rate at 85 participants (88.5%). Results of the face-to-face training also showed high scores (above 4) for all items evaluated, except for communication workshop with scores above 3. In the global evaluation, standard deviation (SD) scores of 4.4 (0.8) were obtained for both categories of “applicability to my job” and “overall course assessment” (table 10).

Items	Categories	Participants (n)	Mean & standard deviation
1. Welcome session	Contents	81	4.2±0.9
	Presentation	81	4.2±0.9
	Questions and Answers	81	4.3±0.9
2. Project overview and training methodology	Contents	82	4.4±0.9
	Presentation	82	4.4±0.9
	Questions and Answers	82	4.4±0.9
3. Online training experience	Contents	82	4.5±0.8
	Presentation	82	4.6±0.9
	Questions and Answers	81	4.5±0.9
4. Living donation	Contents	84	4.4±0.9
	Presentation	83	4.4±0.8
	Questions and Answers	84	4.5±0.8
5. Deceased donation	Contents	84	4.6±0.8
	Presentation	83	4.7±0.7
	Questions and Answers	84	4.7±0.7

Items	Categories	Participants (n)	Mean & standard deviation
6. Quality management presentation	Contents	82	4.3±0.9
	Presentation	81	4.4±0.8
	Questions and Answers	83	4.3±0.9
7. Quality management workshop	Contents	84	4.2±0.9
	Presentation	82	4.2±0.9
	Questions and Answers	83	4.3±0.9
8. Teaching and learning strategies	Contents	83	4.1±0.9
	Presentation	83	4.1±0.9
	Questions and Answers	83	4.3±0.9
9. Communication workshop	Contents	83	3.7±1.2
	Presentation	84	3.7±1.1
	Questions and Answers	84	3.9±1.2
10. Subject specific debates	Contents	74	4.2±0.9
	Presentation	74	4.2±0.9
	Questions and Answers	75	4.2±1.0
11. Megacase practical exercise	Contents	84	4.7±0.8
	Presentation	84	4.7±0.8
	Questions and Answers	84	4.7±0.8
12. Communication exercise	Contents	83	4.0±1.1
	Presentation	83	4.1±1.1
	Questions and Answers	83	4.1±1.0
13. Group work	Contents	77	4.5±0.7
	Presentation	75	4.6±0.7
	Questions and Answers	76	4.5±0.7
14. Group work presentation	Contents	59	4.4±0.7
	Presentation	58	4.5±0.7
	Questions and Answers	59	4.5±0.7
15. Wrap up and next steps	Contents	52	4.6±0.7
	Presentation	52	4.5±0.9
	Questions and Answers	52	4.6±0.7
16. Organization	Level of organization	85	4.4±0.9
	Level of teaching	85	4.4±0.8
	Technical direction	84	4.8±4.4
	Secretariat	85	4.5±0.8
	Educational material	85	4.5±0.7
	Audiovisual support	85	4.3±0.7

Items	Categories	Participants (n)	Mean & standard deviation
17. Course information provided	Before registration	85	4.2±1.0
	After registration	85	4.4±0.8
	During the course	85	4.5±0.8
18. Global Evaluation	Applicability to my job	85	4.4±0.8
	Overall course assessment	84	4.4±0.8

Table 10. Face-to-face assessment survey results (HCPs and OKPs).
Data expressed in number of cases, mean ± standard deviation.

5.1.3. Level 2. Learning. Dimension Knowledge

Knowledge acquisition after training showed a statistically significant improvement in both HCPs and OKPs, with mean (SD) percentages of correct responses increasing from 72% (13.4) to 96.2% (5.6) and from 64% (18.3) to 92.8% (7.3), respectively (table 11). In the group of HCPs, improvement in knowledge acquisition was significant in all age categories, professions, and specialties. Pre- and post-test comparisons were particularly significant for RN versus MD and intensive care unit nurses vs. general nurses and other specialties (Table 11). Transplant/donor coordinators showed a meaningful improvement (pre-test 71.5% [13.8] vs. post-test 96.7% [5.6], $p < 0.0001$) as well as anesthesiologists and intensivists. In the group of OKPs, statistically significant improvements in knowledge acquisition were observed in women, age segments 25-34 and 45-54 years, patients' group representatives and communication experts (table 12). However, between-group differences either in pre-test or post-test results in HCPs or OKPs were not observed.

Finally, in the 39-item questionnaire to assess the accomplishment of the learning process, a successful pass mark of 95% was obtained.

Categories	Participants	Pretest % correct answers	Posttest % correct answers	$p=$
Gender				
Female	47	72±14.3	97±4.5	0.000
Male	32	71.4±12	94.8±6.9	0.000
	$p=$	0.693	0.67	
Age				
From 25 to 34	16	72.2±14.8	95.8±6.6	0.001
From 35 to 44	37	70.7±14.1	97.3±4.6	0.000
From 45 to 54	20	75.4±12.9	96.8±5.6	0.000

Categories	Participants	Pretest % correct answers	Posttest % correct answers	p=
From 55 to 64	6	70.4±8.5	92.6±6.4	0.027
		p= 0.688	0.479	
Profession				
Medical Doctor	49	74.1±12.4	95.38±6.5	0.000
Registered Nurse	27	69.8±14.7	97.3±4.2	0.000
Manager	1	66.6	100	
Medical student	2	55.5±7.9	100	
		p= 0.93	0.173	
Speciality				
Anaesthesiology/ Intensive Care	41	75±12.5	94.8±6.6	0.000
General nurse	20	70.8±15.8	97.2±4.2	0.000
Intensive care unit nurse	5	62.2±10.7	94.4±5.5	0.042
Internal medicine	2	75.0±11.8	97.2±3.9	
Medical student	1	61	100	
Nephrology	2	55.5	100	
Other	5	65.3±13.8	100	0.043
Transplant / Donor coor-dinator	3	77.7	100	
		p= 0.243		
Position				
Transplant / Donor coor-dinator	37	71.5±13.8	96.7±5.6	0.000
Anaesthesiology/ Intensive Care	26	75±12.5	95.3±6.02	0.000
Other	13	69.4±13.9	96.3±5.5	0.001
Medical doctor	3	72.2±11.1	96.3±6.4	
		p= 0.349	0.852	
Total	79	72±13.4	96.2±5.6	0.000

Table 11. Demographic data and learning (knowledge) scores in the group of HCPs. Data expressed in number of cases, mean ± standard deviation.

Categories	Participants	Pretest % correct answers	Posttest % correct answers	p=
Gender				
Female	13	67±11.8	94.4±6.4	0.002
Male	4	54.1±32.5	87.5±8.3	0.109
	p=	0.281	0.096	
Age				
From 25 to 34	6	70.4±5.7	96.3±2.9	0.026
From 35 to 44	3	57.4±12.8	88.8±11.1	0.102
From 45 to 54	7	75±19.5	95.8±5.31	0.042
From 55 to 64	1	55.5	94.4	
	p=	0.281		
Profession - position				
Patients' group representative	7	69±15	94.4±3.2	0.027
Communication expert	5	67.7±17.7	92.2±6.3	0.068
Journalist	3	42.6±23.1	85.1±12.8	0.109
Documentalist	1	66.6	100	
Other	1	72.2	100	
	p=	0.297	0.232	
Total	17	64±18.3	92.8±7.3	0.000

Table 12. Demographic data and learning (knowledge) scores in the group of OKPs. Data expressed in number of cases, mean ± standard deviation.

5.1.4. Level 2. Learning. Dimension attitude

Attitudes regarding organ and tissue donation in HCPs and OKPs are shown in tables 13 and 14. Answers recorded in the post-test survey showed a statistically significant change towards a positive attitude when referring to the willing to donate organs of their relatives both in HCPs and OKPs. Also, 100% of HCPs and OKPs answered “yes” regarding donation of their own organs after death. An improvement in the percentage of participants that considered that organ and tissue donation should be part of the end-of-life care, both in HCPs and OKPs was also found.

Questions	Pre test frequency (%)	Post test frequency (%)	p
Would you donate your organs after death?			
Yes	78 (98.7)	64 (100)	0.321
No	0	0	
I don't know	1 (1.26)	0	

Questions	Pre test frequency (%)	Post test frequency (%)	p
Would you donate the organs of your relatives after death?			
Yes	69 (86)	60 (93.8)	0.000
No	1 (1.3)	0	
I don't know	10 (12.7)	4 (6.2)	
If you choose "No" or "I don't know" in any of the previous two questions, why? (More than one answer was accepted)			
Religious reasons	0	1(1.6)	Non applicable
Lack of trust in the health system	2 (2.5)	1 (1.6)	
Not knowing the wish of the deceased	14 (17.8)	4 (6.3)	
Ethical reasons	1 (1.3)	0	
Fear of body disfiguration	0	0	
Other reasons	25 (31.6)	0	
Organ and tissue donation should be part of the end of life care			
Yes	75 (94.9)	64 (100)	0.182
No	3 (3.8)	0	
I don't know	1 (1.3)	0	
When do you consider that it is the most appropriate moment to talk about organ and tissue donation?			
Anytime	29 (36.7)	24 (37.5)	0.000
When the death of the patient is predictable	28 (35.4)	22 (34.3)	
After the patient's death	22 (27.9)	18 (28.1)	
Do you agree with the admission to the Intensive Care Unit (ICU) of patients with devastating injuries in whom the treatment has been deemed futile, for the solely reason of facilitating organ and tissue donation?			
Yes	70 (88.6)	60 (93.8)	0.810
No	4 (5.06)	0	
I don't know	5 (6.3)	4 (6.3)	
Do you consider appropriate to employ the same resources to maintain a potential brain-dead donor as in any other critical patient?			
Yes	75 (94.9)	61 (95.3)	0.000
No	0	0	
I don't know	4 (5.1)	3 (4.7)	
Total	n=79	n=64	

Table 13. Demographic data and learning (attitude) in the HCPs. Data expressed in number of cases, mean ± standard deviation.

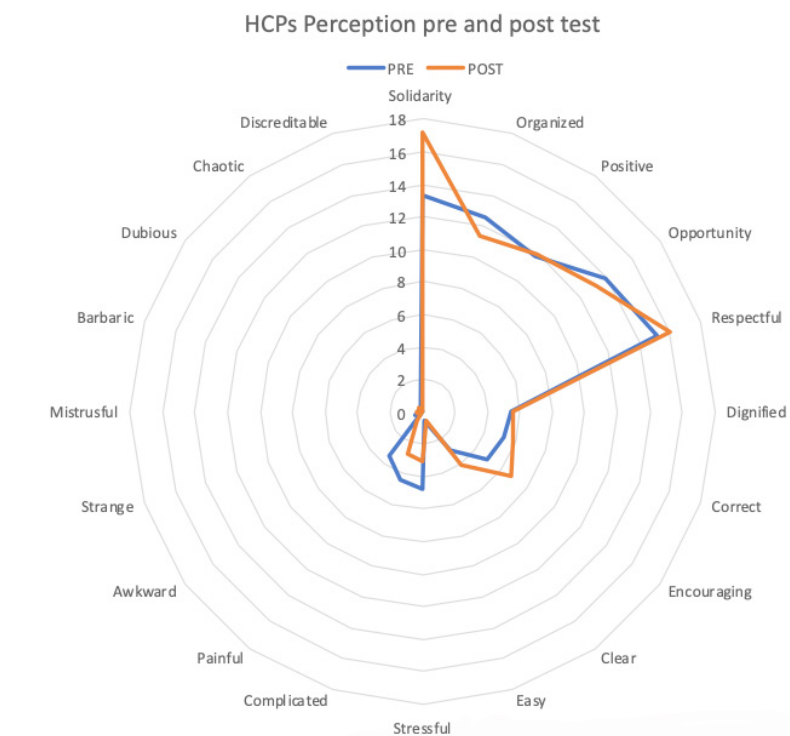
Questions	Pre test frequency (%)	Post test frequency (%)	<i>p</i>
Would you donate your organs after death?			
Yes	13 (76.5)	13 (100)	Non applicable
No	1 (5.9)		
I don't know	3 (17.6)		
Would you donate the organs of your relatives after death?			
Yes	16 (94.1)	13 (100)	Non applicable
No	1 (5.9)		
I don't know			
If you choose "No" or "I don't know" in any of the previous two questions, why? (More than one answer was accepted)			
Religious reasons	0	13 (100)	Non applicable
Lack of trust in the health system	0		
Not knowing the wish of the deceased	3 (17.6)		
Ethical reasons	0		
Fear of body disfiguration	1 (5.9)		
Other reasons	4 (23.6)		
Organ and tissue donation should be part of the end of life care			
Yes	13 (7.4)	12 (70.6)	0.689
No	1 (5.9)		
I don't know	3 (17.6)		
When do you consider that it is the most appropriate moment to talk about organ and tissue donation?			
Anytime	15 (88.2)	7 (41.2)	0.246
When the death of the patient is predictable	2 (11.8)	1 (5.9)	
After the patient's death		4 (23.5)	
Do you agree with the admission to the Intensive Care Unit (ICU) of patients with devastating injuries in whom the treatment has been deemed futile, for the solely reason of facilitating organ and tissue donation?			
Yes	13 (76.4)	12 (70.5)	0.494
No	2 (11.7)	1 (5.9)	
I don't know	2 (11.7)		

Questions	Pre test frequency (%)	Post test frequency (%)	p
Do you consider appropriate to employ the same resources to maintain a potential brain-dead donor as in any other critical patient?			
Yes	10 (58.8)	12 (70.5)	0.559
No	3 (17.6)		
I don't know	4 (23.5)	1 (5.9)	
Total	n=17	n=13	

Table 14. Demographic data and learning (attitude) in the OKPs. Data expressed in number of cases, mean ± standard deviation.

5.1.5. Level 2. Learning. Dimension perception

Results of the perception survey showed that both HCPs and OKPs selected more positive than negative terms that better described the process of donation after brain death as compared with pre-test assessment (figure 23). HCPs significantly improved the selection of solidarity, opportunity, and dignified concepts, and significantly reduced the selection of negative items such as stressful and painful ($p < 0.05$). Positive perceptions were also recorded among OKPs, but differences between pre- and post-test analysis were not statistically significant. The radial graphs represents changes in perception, evaluated through pre- and post-tests in both participant groups.



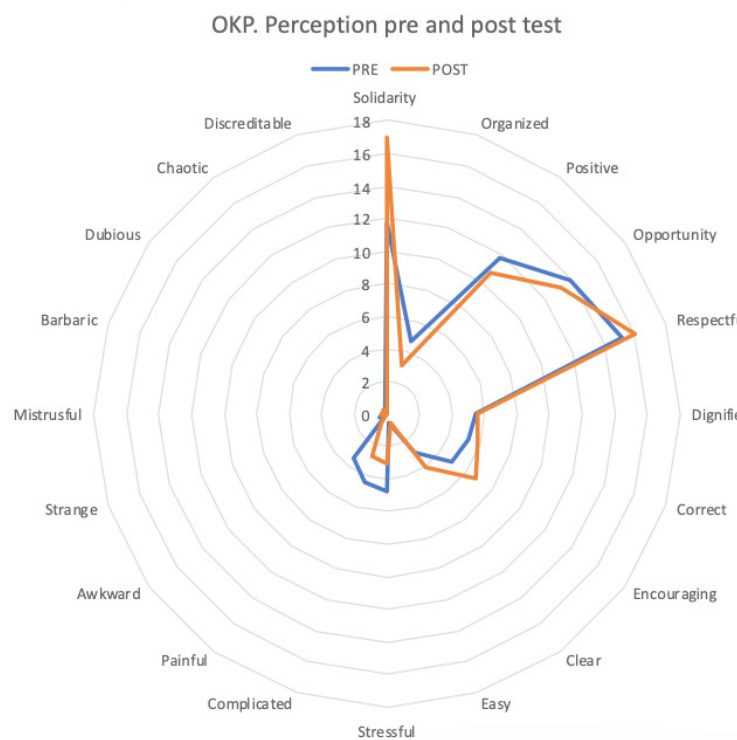


Figure 24. Comparison on perception pre- and post-training in HCPs (A) and OKPs (B). The blue line on the graph signifies the selection of concepts by participants before the training, while the orange line represents the selection after the training, for both groups.

5.1.6. Post-training implementation and performance

Post-training actions performed by the HCPs and OKPs are shown in tables 15 and 16. Overall, both groups showed a commitment to training others in their organizations about organ donation after participating in the EUDONORGAN program. 78.3% of HCPs conducted training mostly in 2018, specifically at their own workplace, often involving 2-5 actions like workshops or seminars. The audience was mainly professional colleagues and over 30 experts attended. The focus was mainly on deceased organ donation after brain death and family approach. The preferred methods were workshops and clinical case studies, evaluated primarily. In the group of OKPs, 70.6% of participants organized training, primarily in 2019. Most hosted 2-5 workshop-style trainings, largely targeting patient support groups. Training sessions, usually attended by 11-30 participants, were focused on deceased organ donation after brain death and living donation.

Categories	Number of answers (%)
Have you organized and implemented any training action after participating in the blended-learning EUDONORGAN program?	
Yes	47 (78.3)
No	12 (21.7)
If yes, which years?	
2018	21 (45.6)
2019	8 (17.4)
Both years	17 (37)
Where have you organized and implemented the training actions?	
In my own workplace	28 (43.2)
The whole hospital	12 (18.4)
University	8 (12.3)
Patient's association	8 (12.3)
Other	9 (13.8)
How many training actions?	
1 training action	17 (36.2)
2 -5 training action	30 (63.8)
What type of training actions have you organized and implemented?	
Master class	8 (12.8)
Seminar	20 (31.7)
Workshop	21 (33.3)
Other	14 (22.2)
Who was your target audience?	
Professional colleagues	18 (38.3)
Medical students	10 (21.3)
Medical staff	9 (19.1)
Other	10 (21.3)
How many participants have attended the training actions?	
1-5 participants	7 (14.9)
11 to 30 participants	15 (31.9)
More than 30 participants	25 (53.2)

Categories	Number of answers (%)
What topics have the training actions covered?	
Deceased organ donation after brain death	44 (32.1)
Deceased organ donation after circulatory death	17 (12.4)
Family approach in case of deceased donation	33 (24.3)
Living donation	8 (5.8)
Breaking bad news and family interview	20 (14.5)
Communication with the media/society	15 (10.9)
What methodological approaches have you proposed during the training?	
Workshops	25 (29.4)
Simulations	9 (10.6)
Role play	9 (10.6)
Clinical case	25 (29.4)
Mapping	7 (8.3)
Other	10 (11.7)
What type of evaluation?	
Pre-test	9 (15.8)
Post-test	19 (33.3)
Observation check list	6 (10.5)
Satisfaction surveys	19 (33.3)
Other	4 (7.1)

Table 15. Post-training implementation and performance of healthcare professionals. Data expressed as frequencies and percentages in parenthesis unless otherwise stated.

Categories	Number of answers (%)
Have you organized and implemented any training action after participating in the blended-learning EUDONORGAN program?	
Yes	12 (70.6)
No	5 (29.4)
If yes, which years?	
2018	6 (21.4)
2019	5 (35.7)
Both years	3 (42.9)
Where have you organized and implemented the training actions?	
In my own workplace	
The whole hospital	1 (7.7)
University	1 (7.7)
Patient's association	5 (38.5)
Other	6 (46.1)
How many training actions?	
1 training action	5 (45.5)
2 -5 training action	6 (54.5)
What type of training actions have you organized and implemented?	
Master class	1 (7.1)
Seminar	2 (14.3)
Workshop	9 (64.3)
Other	2 (14.3)
Who was your target audience?	
Professional colleagues	3 (17.6)
Medical students	3 (17.6)
Medical staff	2 (11.9)
Patients support groups	9 (52.9)
How many participants have attended the training actions?	
1-5 participants	2 (18.2)
11 to 30 participants	5 (45.4)
More than 30 participants	4 (36.4)

Categories	Number of answers (%)
What topics have the training actions covered?	
Deceased organ donation after brain death	8 (27.6)
Deceased organ donation after circulatory death	3 (10.3)
Family approach in case of deceased donation	4 (13.8)
Living donation	7 (24.2)
Breaking bad news and family interview	3 (10.3)
Communication with the media/society	4 (13.8)
What methodological approaches have you proposed during the training?	
Workshops	8 (50)
Clinical case	2 (12.4)
Mapping	3 (18.8)
Other	3 (18.8)
What type of evaluation?	
Pre-test	
Post-test	3 (30)
Satisfaction surveys	6 (60)
Other	1 (10)

Table 16. Post-training implementation and performance of other key players. Data expressed as frequencies and percentages in parenthesis unless otherwise stated.

5.2. Social awareness events general results

A total of 517 participants joined the social awareness events (figure 25).

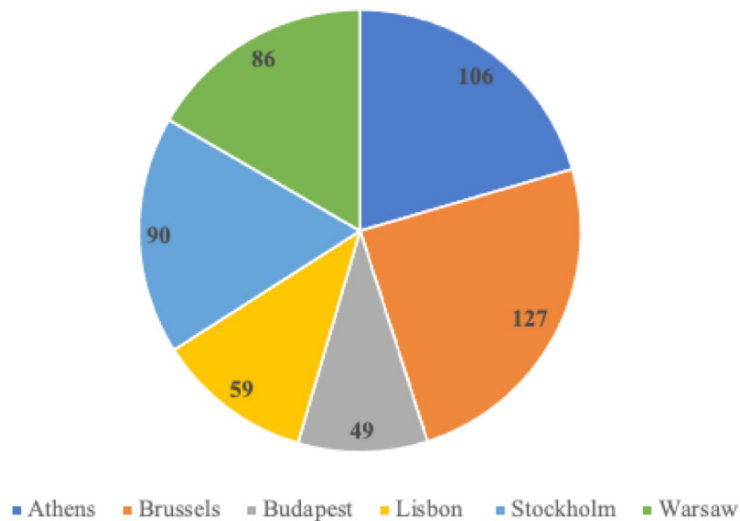


Figure 25. EUDONORGAN Social Awareness Events. 517 participants.

General results

- The six social awareness events were implemented. Regional areas were tackled in Eastern, Northern, and South-Western Europe including low donor rates countries. Gender equity, English command and quality of contents and speakers was achieved.
- Different type of events was proposed in which participation, target audience and countries' structure were innovative by:
 - Engaging OKPs, mainly patients, patients' associations, communication specialists and journalists.
 - Putting together health care professionals and other key players speakers to discuss communication on organ donation and transplantation and the impact towards expanding the organ donors pool in the European Union.
 - Promoting “regional areas” around each of the six events through the participation of neighbouring countries.
- 517 European professionals, along with activists, joined forces to boost organ donation and transplantation in their home countries. The six events exceeded expectations in audience turnout, highlighting the strong interest generated by EUDONORGAN's proposals and content. This success was made possible by effective collaboration between local organizing committees and the EUDONORGAN Consortium.

- EUDONORGAN message spread through local, national, and European media. Media coverage occurred at each event, involving press conferences, releases, and on-site interviews for local and international audiences (figure 26). WP3 leader and local committees played a key role, backed by an updated EUDONORGAN website.



Figure 26. EUDONORGAN press release in Poland.

- The EUDONORGAN Facebook page was created (figure 27) by participants from Finland and Sweden which has grown to include 124 members, including both trainers and trainees as of June 2019 (<https://www.facebook.com/groups/340412829742498>). Furthermore, there have been successful instances of replicating the train the trainers' program at the national level, as reported by the Finnish team, with different responsible professionals engaging in active learning methods, networking, and discussing challenging situations in donor care, as well as the media's impact on attitudes.

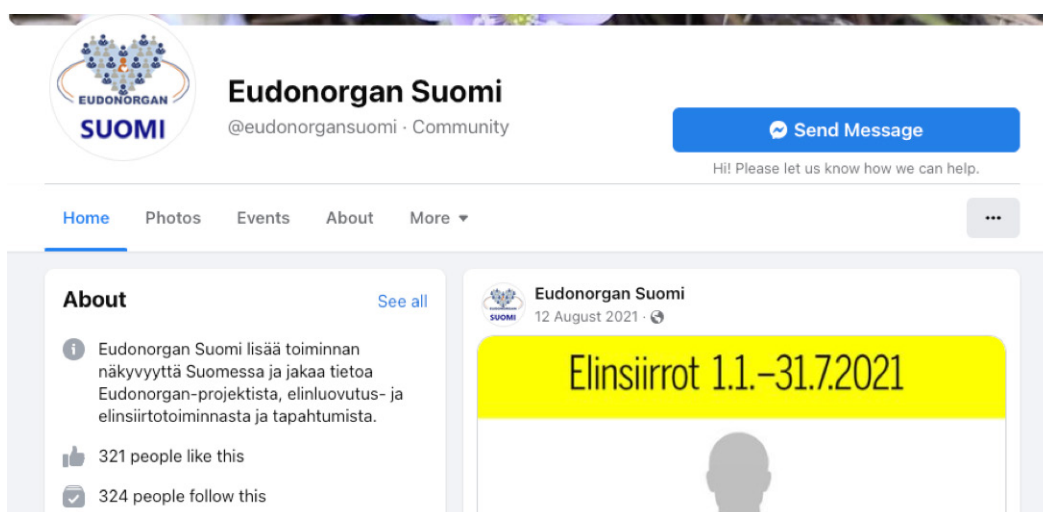


Figure 27. EUDONORGAN Suomi. Facebook page.

- From the six social awareness events, content about organ donation was generated. Local speakers discussed event-specific topics, leading to an information hub tailored to EUDONORGAN's audience. This repository contained details about country-specific donation systems, communication practices, patient experiences, medical insights, and more.

DISCUSSION

6. DISCUSSION

The EUDONORGAN project was an educational initiative proposed within the framework of the AP on Organ donation and the legislation established in Directive 2010/53/EU. The project had a significant impact, which was achieved through two consecutive phases. Firstly, a successful train the trainers' program was implemented, which resulted in increased knowledge and transformed attitudes and perceptions of HCPs and OKPs, leading to a positive change. Secondly, social awareness events were organized in six different European countries with the support of the trained experts and were useful to promote organ donation.

The train the trainers' program yielded positive results as evidenced by assessments conducted across the various levels of Kirkpatrick evaluation (73). Particularly notable were the outcomes observed at the learning level, indicating the successful implementation of the training program. It is worth highlighting that this program encompassed a diverse group of 96 participants from 24 different countries, marking a significant milestone as it included the participation of non-health professionals for the first time in a European project. This expansion of participants further enriched the program and contributed to its overall success.

At the knowledge level, participants successfully completed the program with a mark of 95%, demonstrating a substantial acquisition of knowledge. These outcomes were particularly noteworthy in the group of nurses who were part of the HCPs. The evaluation also revealed positive results into the attitudes and perspectives of both groups of participants regarding organ donation. The findings demonstrated a strong positive inclination towards organ donation, with a growing acceptance of donating the organs of relatives after death. According to the Eurobarometer (80) while the majority of European citizens support organ donation, with 55% expressing their willingness to donate their own organs after death and 53% willing to consent to donate organs of deceased close family members, the level of support had not increased at a EU level in the Eurobarometer (data collected in 2009), which was a matter of concern since the demand for donors is rapidly accelerating. Education level was also noted as a key factor influencing support for organ donation (80).

The results also indicated that there was unanimous agreement among participants that organ and tissue donation should be integrated into end-of-life care, highlighting its importance in improving lives. Additionally, most participants supported admitting patients with devastating injuries to the ICU for the purpose of facilitating organ and tissue donation, recognizing the potential impact on saving lives through transplantation. Furthermore, participants widely agreed that equal resources should be allocated to maintain potential brain-dead donors and other critically ill patients.

The train the trainers' program also demonstrated positive outcomes, as indicated by the noticeable increase in positive terms observed in the post-test. Both groups could also benefit from further education on various aspects of organ donation and transplantation (2) and on communication skills to support the implementation of public awareness actions and how to communicate with the families of patients, education in schools, generating overall public awareness, and the use of social media (2). This result on perception is also comparable to a similar study that evaluated whether the implementation of educational programmes about deceased donation and critical care setting, end-of-life care clarify misperceptions and promote a positive attitude towards considering donation at the end of life (84). It also considered positive and negative terms and observed how training helped improve the positive perception of both DBD and DCD as reflected by an increased number of positive terms selected by participants to describe such procedures post course (84).

Following McGlade and Pierscionek (85), it has been acknowledged that formal training about organ donation can successfully influence student nurses' attitudes, encourage communication and registration behaviours, and help improve knowledge about donor eligibility and brain death. Moreover, according to the research conducted by Bastami et al. (86), the review of 20 studies showed that education of HCPs and the public is needed and can make a difference in attitudes toward donation and donation rates. At the same time, critical perceptions and arguments are important feedback on a matter as sensitive as organ procurement and can help identify the narrow path of aiming to maximize the number of available organs while maintaining respect for the dying person and his or her loved ones. If concerns of HCPs and the public are taken seriously, trust in the transplantation system may be maintained or fostered (86).

The post-training results were positive, as HCPs and OKPs continued their engagement in training actions after their participation in the EUDONORGAN Project. This ongoing involvement allowed them to apply their acquired knowledge and skills, implementing practical initiatives that promote organ donation. Through their active participation in post-training actions, both groups played a crucial role in driving positive changes at the local level. This included organizing training sessions and awareness-raising events, thereby contributing to the overall success of the EUDONORGAN program.

Innovative methodology

The innovation that the project promoted in relation to the implementation of the methodology and evaluation is also remarkable as well as how the project effectively trained a diversity of participants.

The EUDONORGAN project emerged as a pioneering initiative, introducing a unique dimension to educational delivery methods. The methodology employed followed the adult learning principles (29) and incorporated experiential learning, recognized as a valuable

framework for learner-centred educational innovation (87), tailored to the specific training context. The project adopted a blended learning approach, which involved a strategic combination of online and face-to-face instructional methods, along with diverse learning technologies, to facilitate planned learning and promote desired learning outcomes (88).

The integration of a computer-based training system or WebApp into online training programs marked a significant innovation breakthrough in the field. This cutting-edge methodology revolutionized the way participants engaged with the training material and ensured their active involvement throughout the learning process. By incorporating adult learning principles, the training program successfully catered to the specific needs and preferences of adult learners, leading to enhanced knowledge retention and skill development.

Furthermore, the incorporation of the WebApp facilitated a dynamic and interactive learning experience.

Both groups were provided with convenient access to the online modules through a user-friendly interface, allowing them to follow distinct learning routes, tailored to their specific needs and roles. The content was skillfully presented in a highly understandable manner, enabling participants to easily follow along with the sequential storytelling approach. This thoughtful presentation of information facilitated effective comprehension and engagement, ensuring that participants could understand the main concepts on organ donation and with the support of the educational tips, apply them confidently in their respective contexts.

The WebApp not only improved accessibility, but also facilitated the learning process, allowing participants to access the modules from different devices. This provided flexibility in terms of time and place (33, 89), granting access to the best educational elements (89) and promoting autonomy through gradual development of independent learning (89).

As adult learners demonstrate different characteristics and learning preferences (29, 30, 31), the training was customized to align with their educational needs. The content was carefully designed to be relevant, practical, and applicable to real-life situations, thereby instilling a sense of immediate relevance and value. The educational materials developed in accordance with EU legislation (1,2). Adhering to the high-quality standards stipulated (83), these materials aimed to ensure that the group of participants involved in the donation-to-transplantation process, were suitably qualified, trained, and competent.

To maintain engagement, various instructional techniques were employed in the WebApp. The training incorporated a mix of multimedia elements through the integration of game elements, animated characters, and interactive scenarios within the seven consecutive modules on organ donation, as learning is the process whereby knowledge is created through the transformation of experience (88).

Furthermore, the train the trainers' program employed collaborative learning methods, encouraging learners to actively participate and interact with their peers. This collaborative approach fostered a sense of community and created a supportive environment for continuous learning and growth as it is shown the results of the reaction level of the online component were all the online educational modules related to medical aspects, educational tips, and practical activities of the seven modules were scored with high values by both groups, HCPs and OKPs.

The face-to-face training sessions offered an invaluable opportunity for participants to engage in hands-on learning, foster meaningful networking connections, exchange best practices, and promote a remarkable level of interactivity between HCPs and OKPs. The participants acknowledged the training as highly beneficial, as it significantly enhanced their teaching and communication skills while equipping them with the necessary tools to effectively organize trainings and raise awareness events within their respective work environments, be it hospitals, national transplant organizations, or patients' associations.

The training served as a transformative experience, empowering the attendees to excel in their roles and make a positive impact within their professional contexts. This positive outcome was also observed in the previous project, ETPOD training program (9), which focused on creating high-quality educational materials and successfully identifying the educational needs of healthcare professionals involved in the organ and tissue donation process. As a result, effective training programs were implemented, leading to a positive impact on donation parameters (9). Similarly, the EMPODaT program played a significant role by proposing innovative materials, contents, and methodologies (19).

Previous EU-funded training projects, leading up to EUDONORGAN, have played a crucial role in advancing organ transplantation and donation practices throughout Europe. Collectively, their efforts have contributed to the goals of the AP. They have facilitated the acquisition of knowledge necessary for the implementation of the PAs, developed tools such as guidelines, trainings, and manuals to facilitate this implementation, facilitated the exchange of knowledge and best practices among countries, and directly implemented initiatives to achieve tangible changes (2). Some of these projects have focused on improving outcomes from deceased organ donation, including enhancing collaboration with ICUs (ACCORD) (15), comparing and improving deceased organ donation programs (MODE) (17), assessing protocols and critical steps (COORENOR) (16), developing quality system indicators (ODEQUS) (14), and training transplant coordinators (ETPOD) (9) and EMPODaT (19).

However, EUDONORGAN program's innovation was further exemplified through the incorporation of an innovative educational methodology that integrated cutting-edge techniques and pedagogical approaches with the promotion of active learning, critical thinking, and practical application of knowledge and skills.

Innovative evaluation

Kirkpatrick's model, the CIPP (Context, Input, Process, Product) model (76), Realist Evaluation (78), Theory-Driven Evaluation (79), and the RE-AIM framework (79) are all evaluation models that can be utilized to assess the effectiveness and impact of the EUDONORGAN project. While these models share the common objective of evaluating intervention outcomes and effects, they differ in terms of their focus and approach, and Kirkpatrick's model was particularly considered due to its emphasis on evaluating training-induced change.

The adaptation of this four-step model (73) was considered suitable for evaluating the implementation of the EUDONORGAN, considering the project's characteristics. It provided a clear and practical approach to training evaluation, offering a framework for assessing training effectiveness and guiding improvement efforts. Kirkpatrick's model also underscored the importance of evaluating the impact of training-induced change, a key aspect that aligned with the project's goals.

By examining how both groups of participants applied somehow their newly acquired knowledge and skills in hospitals, patients' associations, workplaces, or organizations, after their participation in the project, it becomes possible to determine whether the training has resulted in noticeable performance improvements. The post-training actions taken by HCPs and OKPs following their participation in the EUDONORGAN program revealed their commitment to train other experts within their organizations on organ donation. Both groups demonstrated a proactive approach in disseminating their knowledge with the implementation of some training actions, contributing to the wider goal of promoting organ donation awareness.

Diversity of participants

In a pioneering move for an EU project, the training was not only directed towards HCPs, but also to OKPs, enabling them to advocate for organ donation and train their colleagues in their respective countries, regions, and hospitals. This expansion of capacity-building efforts aimed to include a more diverse range of participants. Within the HCPs group, the participants primarily consisted of anesthesiologists, intensivists, registered nurses, and transplant coordinators from 25 different European countries. The OKPs group comprised patient group representatives, patients themselves, journalists, and communication experts from 11 different countries, all actively engaged in the training. Thus, the training brought together a diverse group of experts with different backgrounds aiming to foster collective responsibility among stakeholders to collaboratively enhance organ donation and transplantation rates. This is a relevant factor as stated in the FACTOR Study that emphasized the importance of considering a joint involvement of HCPs and OKPs as it would impact on other aspects, such as standardization of training programs, and collaboration between countries and sharing of best experiences (2).

This initiative offered specific training to OKPs and during its implementation, a mutual understanding was fostered to promote organ donation and transplantation. This was achieved by facilitating role interchange among HCPs and OKPs enabling them to gain perspective from different viewpoints. The interaction fostered among both groups was focused on improving communication skills, promoting empathy, raising awareness, and collaborating for a better understanding of organ donation and transplantation, with the common goal of increasing organ donation activity. However, it is worth emphasizing that the involvement of non-medical key players played a significant role in the training, highlighting diverse perspectives on organ donation. Through the sharing of their personal stories, this group of participants contributed to the comprehension of organ donation and followed the recommendations indicated in the FACTOR Study on implementing journalists' workshops centrally to make them aware of their key role in this issue, the complexity of the issue, and the added value. This, in turn, indirectly increased public awareness, at least (2). Additionally, it emphasized that the organization of this type of activity is in line with the objective of the AP to increase public awareness of organ donation (2), and the input of patients' associations can also be highly valuable (2).

According to the quality report of the EUDONORGAN (81), various professional profiles stepped out of their comfort zones. The “confrontation” of these professionals, who were connected by the common topics of organ donation, but had diverse professional backgrounds, enabled most of them to venture beyond their comfort zones. This was primarily due to the face-to-face training, which required active collaboration and allowed participants to gain insights into each other's daily work reality. The team of international experts from six European Union (EU) countries—Croatia, France, Italy, Slovenia, Spain, and the Netherlands—provided support and fostered a culture of learning by dedicating in-class time with the used of innovative methods. The learning environment created allowed participants to explore the topics on organ donation from different points of view, thus enabling them to explore deeper and creating enriching experiences for them.

Widening EUDONORGAN's message through social awareness events

The social Awareness events greatly amplified the dissemination of the EUDONORGAN message. These events not only provided extensive insights into programming and logistics, but also produced numerous ideas and expressions of interest from the audience. Organizers also expressed a positive outlook on the outcomes. Although the events' implementation presented challenges, the preparation and execution of each event were successfully carried out.

According to the quality report (81), the social awareness events sought to introduce innovative elements by adopting various approaches. Firstly, it aimed to engage a wide range of participants to organize the events, including non-healthcare professionals such as patients, patients' associations, communication specialists, and journalists. By involving these individuals, the organizers ensured that the event catered to the needs and perspectives of those directly impacted by organ donation and transplantation.

Secondly, the events went beyond the traditional boundaries of healthcare by bringing together both health and non-healthcare speakers and participants. The focus was on communication strategies related to organ donation and their role in expanding the pool of organ donors in the European Union. By incorporating diverse expertise, the events fostered multidisciplinary discussions and encouraged collaboration between professionals from different backgrounds.

The use of the WebApp and Facebook played a pivotal role in enhancing the dissemination of the events aimed at promoting organ donation. These digital platforms effectively facilitated widespread outreach, allowing the EUDONORGAN initiative to connect with a broader audience, thereby fostering greater awareness and engagement in the cause of organ donation.

Sustainability of EUDONORGAN

After completing the EUDONORGAN project, it is crucial to look at the impact of its two main parts: the ‘train the trainers’ program and the social awareness events. During the project, the healthcare professionals (HCPs) and the other key players (OKPs) were effectively trained, not only in gaining knowledge and skills, but in changing their attitudes and perceptions towards a positive perspective on organ donation.

The project prepared them with the necessary skills and knowledge to serve as advocates for organ donation at both local and national levels. Additionally, the success of organizing six different social events for professionals and the society suggests the potential for ongoing awareness initiatives to inform and raise awareness about the importance of organ donation in the future.

Hence, it is advisable to contemplate the potential future actions listed below to ensure the project’s ongoing sustainability. These initiatives could be disseminated through competent authorities’ websites, essential stakeholders’ platforms, and social media networks, with a primary focus on active involvement from the HCPs, OKPs, competent authorities and the EUDONORGAN international consortium:

- **Educational workshops:** Organizing workshops and seminars in educational institutions and community centres to educate medical students and the public about organ donation’s importance, inviting experts and patients to share their insights and testimonials.
- **Engaging webinars for organ donation awareness:** By offering web-based presentations with medical experts, patients, and specialists to provide non-health professionals with information on organ donation. The webinar series could aim to raise awareness, inspire individuals to become organ donors, and offer support to those undergoing the transplant process.
- **Storytelling platforms:** Creating dedicated online platforms for individuals to share their personal experiences as patients, donors, or donors’ family members as it could be a powerful way to educate the society. These stories could offer first-hand insights, fostering understanding, breaking down misconceptions, and promoting a culture of support.
- **Social media campaigns:** Launching targeted campaigns on platforms like Facebook, Instagram, Twitter, and LinkedIn, among others, could enable the sharing of informative posts, real-life stories, video testimonials, and explanatory graphics that highlight the positive impact of organ donation. Partnering with influencers can amplify the reach and credibility of the message, using their established platforms to inspire advocacy and heighten awareness. This approach could use the power of social media and influential personalities for effective promotion.

- **Extending training to other influential stakeholders:** To foster greater inclusivity and engagement, it could be proposed extending the project's promotional activities to other influential key stakeholders. This includes educators, minority leaders, religious figures, and scientists. By involving these key figures, with the aim to create more inclusive and impactful training and awareness initiatives.
- **Translating educational content in other languages:** The seven educational modules were initially created in English for healthcare professionals and other experts. An initiative to enhance accessibility and reach a broader audience could involve translating these modules into multiple languages. Additionally, for the video recordings, considering voice-over options would further improve accessibility.

Continuity of the research

It is proposed that this research can be extended by conducting a new analysis of the impact based on the training results and the events that have been implemented. The results of the study are primarily focused on short-term outcomes. However, it would be more relevant to conduct a follow-up study evaluating the long-term results of EUDONORGAN in the EU member states that participated. Such a study would measure the project's influence not only on these participating countries, but also on other nations where the training could be implemented.

The goal of the follow-up study would be to implement data tracking and monitoring systems that consistently could collect relevant data over an extended period. This would enable a thorough analysis of the sustainability of the project's achievements and improvements.

Additionally, the Kirkpatrick model could be employed to assess the intervention's effectiveness five years after the project implementation. This assessment would include measuring Level 1 (reaction) and Level 2 (learning: knowledge, attitudes, and perceptions) using the same surveys as during the train the trainers' program and facilitating a direct comparison of results. Furthermore, the implementation of the model could also incorporate Level 3 (behaviour) and Level 4 (impact), which were not initially considered in the evaluation of EUDONORGAN, providing data related to training effectiveness according to this evaluation model.

The Level 3 evaluation would focus more on assessing the effectiveness of the "train the trainers" program. Specifically, it would not just evaluate the mere acquisition of knowledge related to organ donation by the HCPs and OKPs, but also their ability to apply and integrate this knowledge into their daily roles in their hospitals, universities, or patients' associations. For instance, they should be able to clarify misconceptions about organ donation at their hospitals, guide potential donors through the process effectively, and communicate the importance of organ donation to families. In this scenario, the primary goal of the assessment would be to determine whether this pool of professionals, having received a training on organ donation during the project, could effectively be proactive educators or facilitators within their respective workplaces, thus promoting and enhancing awareness and best practices related to organ donation. The evaluation tools that could help gather information and obtain results could be a combination of observational assessments and feedback surveys. Trainers could be observed in their workplaces. Furthermore, feedback collected with interview to colleagues, superiors, and other stakeholders could also provide information. This combined approach could provide results from real-world application.

Determining Level 4 would be more challenging as it would involve measuring the long-term impact in the society. In the context of organ donation, this might involve assessing factors such as potential changes in organ donation rates in countries where the project was implemented or if there is an increase in donor registrations, directly related to

the actions implemented in EUDONORGAN. The assessment tools that could support gathering this information might include consulting databases on organ donation rates pre and post intervention, establishing key performance indicators or comparing donor registrations from before the project's implementation. The assessment could incorporate both quantitative and qualitative data, using methods like surveys and focus groups.

The inclusion of both levels would complete the evaluation cycle, which aims to enhance the program, maximize the transfer of learning into behaviour, and demonstrate the value of the project's training (73).

Limitations of the study

Some limitations of the study should be acknowledged and addressed.

Firstly, the analysis focused solely on the "satisfaction" and "learning" levels of the train-the-trainers' program implementation. The EU tender requirements did not account for the implementation of trainings at the local or regional levels, which were directly linked to the evaluation of "behaviour" and "results." Therefore, these levels were not assessed, resulting in a lack of results to gauge the overall impact of the project. Furthermore, although a post-survey was conducted to measure the implementation of post training actions, the results obtained were general in nature and did not specifically measure the effectiveness of the post-training activities carried out by both groups of participants.

Secondly, although efforts were made to facilitate networking and mutual learning among HCPs and OKPs, there was a challenge in effectively promoting a deeper understanding of organ donation. One strategy proposed was to provide both groups with diverse educational content to disseminate to the population, to continue spreading the message of EUDONORGAN. However, the extent to which this strategy enhanced knowledge exchange and achieved the desired impact on public understanding was not fully assessed.

Thirdly, despite having implemented social awareness initiatives, not all EUDONORGAN participants were able to actively participate, and the collection of all survey results was not feasible. Moreover, while the actions developed during the project were successful, there was a lack of continuity, and no further events were proposed among the participating countries. As a result, the long-term sustainability and impact of the project, including the momentum generated by the initial actions, might not have been sustained without ongoing engagement and follow-up activities among the participating countries.

CONCLUSIONS

7. CONCLUSIONS

1. The evaluation of the EUDONORGAN project, an European Union funded initiative aimed at training and raising awareness among a diverse group of professionals, has demonstrated its positive impact and positioned it as a benchmark for future training actions.
2. The results indicated a significant **improvement in knowledge and a positive change in attitudes and perceptions regarding organ donation**. This emphasizes the ongoing necessity for continuous education at various levels.
3. The successful **achievement of the educational objectives** within the project not only demonstrated the effectiveness of this approach, but also emphasized the significance of collaborative efforts in enhancing professional knowledge and skills.
4. The implementation of a **computer-based training system** or WebApp, combined with the application of **adult learning principles**, brought about a significant innovation breakthrough in the project. The use of webinars and interactive features within the training program captivated participants' attention and fostered their active involvement in the learning process.
5. **Social awareness** on organ donation is imperative for policymakers, healthcare institutions, and stakeholders involved in organ and tissue donation to recognize the significance of ongoing education initiatives. By investing in enhanced awareness, improving attitudes, and increasing participation in organ donation, we can ultimately promote organ donation.
6. This research highlights that organ donation remains a complex process that influences not only healthcare professionals, but also the society. **Training emerges as a crucial facilitator within the healthcare sector to expand knowledge and improve skills.**

By employing a cross-sectorial, multi-level training approach, as exemplified by the EUDONORGAN project, valuable resources and expertise gathered from previous initiatives and studies can be effectively connected. The comprehensive training provided by EUDONORGAN highlights the potential for sustainable education programs that bridge the gap between medical professionals and the wider community, fostering a better understanding of the importance of organ donation.

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LIST OF ARTICLES

TRAIN THE TRAINERS EUDONORGAN PROJECT



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“Train the Trainers” Program to Improve Knowledge, Attitudes and Perceptions About Organ Donation in the European Union and Neighbouring Countries: Pre- and Post- Data Analysis of the EUDONORGAN Project

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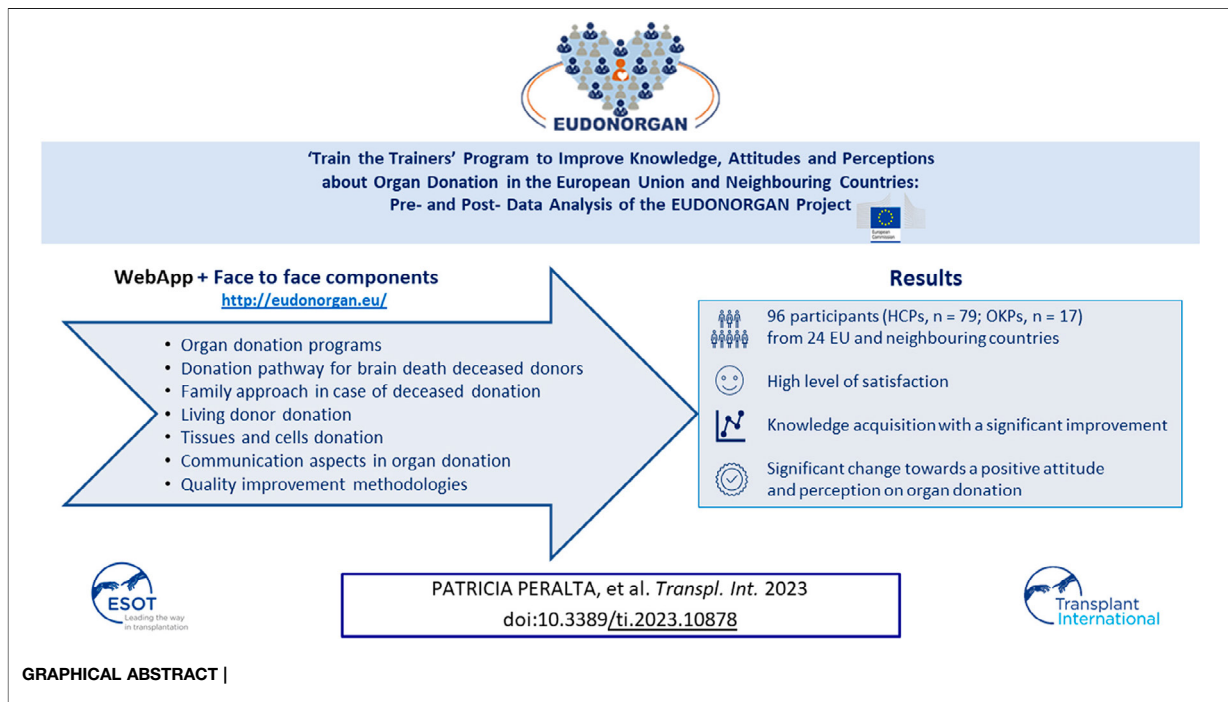
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EUDONORGAN, a European Union-funded project to improve organ and tissue donation, included a blended-based “Train the Trainers” program, which was implemented with the support of an international consortium from Croatia, Italy, Slovenia, and Spain. The web-based training included seven modules for which medical aspects, educational tips, and practical activities were scored using a 5-point Likert scale. The overall mean scores of satisfaction were higher than 4 for each module, without significant differences between HCPs and OKPs. In the face-to-face training survey similar scores above 4 were obtained for most items. Knowledge acquisition improved significantly in both HCPs and OKPs, as well as in transplant/donor coordinators, medical doctors, registered nurses, anesthesiologists/intensivists, and intensive care nurses. Improvements in attitudes and perceptions regarding organ donation were also observed, particularly among HCPs. In the accomplishment of the learning process, a successful pass mark of 95% was obtained. The “Train the Trainers” program was associated with an improvement in learning and attitudes of healthcare and non-healthcare professionals for the benefit of organ and tissue donation.

Keywords: transplantation, organ donation, training, blended-learning, knowledge

Abbreviations: EC, European Commission; EU, European Union; HCPs, healthcare professionals; ICU, intensive care unit; MD, medical doctor; OKPs, other key players; RN, registered nurse; SD, standard deviation.



INTRODUCTION

Over the past 50 years, organ transplantation has become an established practice worldwide, bringing immense benefits to hundreds of thousands of patients with end-stage failure of organs for most of whom organ transplantation is the only available treatment (1). The shortage of organs, listed as a major priority, and the supply-demand gap are two limiting factors for organ procurement. In response to these major challenges, the European Commission (EC) issued a communication on organ donation and transplantation (2) that proposed the Action Plan on Organ Donation and Transplantation that complemented the organ specific legislation (3). After a first half-period of completion of the Action Plan, the EC undertook the ACTOR Study, which emphasized the importance of implementing educational activities and improving as there were many opportunities for countries to share experiences and to learn from each other (3). As the study indicated, several EU-funded projects were proposed with the aim of providing training, sharing of knowledge, implementation of programs, development of tools, and to identify the best organizational models (3). In a final assessment of the impact of the Action Plan, a final report (4) provided an overview of the efforts made showing the benefits of the EU-funded resulting in guidelines, trainings, and manuals to exchange knowledge and best practices among countries.

The EU-funded pilot project EUDONORGAN was a pioneer EU-funded project that contributed to the Action Plan as an initiative for increasing organ and tissue donation in the EU and

neighbouring countries. To this purpose, two types of core activities focused on training and social awareness were developed and implemented at EU level. The “Train the Trainers” program was based on active learning and adult learning principles and employed a blended learning methodology by means of e-learning (via WebApp) and face-to-face training. The course was addressed to healthcare professionals (HCPs) and other relevant key players (OKPs). The objective of this study was to present the results of pre- and post-data analysis of the “Train the Trainers” activities.

MATERIALS AND METHODS

EUDONORGAN Project

EUDONORGAN project was a service contract awarded by the EC from the EU budget, on the initiative of the European Parliament. It was developed by an international consortium, made up of institutions from four European countries, --Croatia, Italy, Slovenia and Spain--, that provided similar organ donation models and successful transplantation rates. The consortium partners were the Institute for Transplantation and Biomedicine-Ministry of Health of Republic of Croatia (Croatia); the Italian National Transplant Centre-Italian National Institute of Health (Italy); the Institute of the Republic of Slovenia for the Transplantation of Organs and Tissues (Slovenia); and the University of Barcelona, Fundació Bosch i Gimpera, the Donation and Transplantation Institute (DTI), and

Dinamia, with the support of the Spanish National Transplant Organization (Spain).

The aim of the project was to contribute actively to increase organ donation rates in Europe focusing on two main actions: the implementation of a “Train the Trainers” program on organ and tissue donation, and organizing six social awareness events on organ donation with the support of the trained professionals. Both activities were oriented to HCPs and relevant OKPs, such as patients and patient support groups, representatives of public and governmental agencies, representatives of health institutions, opinion leaders, and the media. EUDONORGAN was launched in September 2016 and lasted 36 months, with the implementation of the “Train the Trainers” program in 2017, and the social awareness events between 2018 and 2019.

The whole timeframe of the project was proposed to be implemented considering the policies established for EU Member States in the field of transplantation and it required to consult and involve the Competent Authorities to establish a European network, following the indications of the Directive 2010/53/EU (1).

Educational Methodology

Training Design, Contents and Participants

The objective of the “Train the Trainers” program was to assist and provided HCPs and relevant OKPs with knowledge, educational strategies and communication techniques to monitor and improve overall performance in the management of donated and transplanted organs. The training included the implementation of a curriculum to support capacity-building efforts and train professionals who will, in turn, be able to conduct future training actions. The design of the program started by establishing a training methodology, the educational contents, and the selection of participants according to the criteria agreed upon by the consortium partners.

The methodology followed analysis of trends in education and literature research to ensure effective educational strategies to engage participants through the “Train the Trainers” program. Based on blended-learning methods that share the common element of engaging participants in doing things and thinking about what they are doing (5), the training offered the advantages of both online (WebApp) and face-to-face components in terms of flexibility of time and place (6,7), accessibility to the best of the educational elements (6), and autonomy with a gradual development of independent learning (7). From a competence-based perspective, blended-learning methods allowed participants to further fine-tune their skills and capabilities, which optimize direct application of experience and knowledge in their own professional environment (8) and promote efficiency, motivation, cognitive effectiveness, and flexibility of learning style (9).

The WebApp (<http://eudonorgan.eu>) provided a learner-centered platform. Educational modules on organ donation, educational tips and quizzes were delivered through microcapsules of curated content (microlearning) with fine-grained and inter-connected learning activity (10). The storytelling was the narrative learning method used to create a link between lived experience and curricular content (11).

Specifically, it showed a family of characters and scenarios through a wide range of game elements in a gradual, entertaining and easy to understand way to keep participants interested and motivated (12).

The face-to-face component employed learning strategies: process mapping exercises, case studies, buzz sessions, collaborative activities and on-ground simulations, that boosted hands-on learning, networking and promoted great interactivity. The methodology followed six adult learning principles (13–16) adapted to the training. This included self-directed experiences; performance-based training to establish a relation between participants’ previous knowledge and their training expectations; experiential learning; critical thinking; learning based on real-world situations; and value learning to further apply the acquired competencies when organizing future training actions on organ donation.

The educational contents were proposed in compliance with the EU legislation (1,17). According to the high-quality standards required (18), these contents should ensure that healthcare personnel directly involved in the chain from donation to transplantation or disposal are suitably qualified or trained and competent, and shall develop specific training programs for such personnel (1) and, consequently, needed to cover the most relevant information on organ and tissue donation. Seven educational modules were designed and adapted to each group of HCPs and OKPs, with the support of international experts, and finally agreed by the members of the consortium. The which included the following content: organ donation programs, donation pathway for brain death deceased donors, family approach in case of deceased donation, living donor donation, tissues and cells donation, communication aspects in organ donation, and quality improvement methodologies. The topics and learning objectives of these modules are described in the **Supplementary Table S1**.

International experts and participants selection was performed in parallel with the design of the training methodology. Participants from EU Member States and neighbouring countries were invited to join in the training program. The selection of participants followed the recommended criteria agreed by the competent authorities described in the **Supplementary Table S2**. The objective was to create a heterogeneous pool of trained and dedicated professionals on organ donation that will continue improving in the working environment. Participants were trained on how to best identify donors, how to best organize donation activities (taken into account national specificities) and how to pass on the main positive aspects of donation within the hospitals and to the rest of society (18). The criteria for the selection of HCPs included professionals that were able to demonstrate medical expertise in the field of organ/tissue and cell donation and transplantation. Eligible candidates could be medical doctors (MD) and registered nurses (RN) with different specialties, such as transplant/donor coordinators, anesthesiologists, intensivists, nephrologists, internal medicine physicians, general nurses, or intensive care nurses. The selection of OKPs was focused on actors with proven capacity and motivation to learn and to transfer the knowledge acquired in organ and tissue donation and transplantation *via* the

training course, such as active members of patient support groups, communication officers of national and regional authorities, journalists in the field of care, healthcare establishments, and key opinion leaders.

Training Implementation

The “Train the Trainers” program started in June 2017 with a series of informative webinars to get all participants familiar with the main topics of the program, the training objectives, and the characteristics of the methodology. Before beginning the training, participants were requested to complete an 18-item test of knowledge and a survey on attitudes and perceptions towards organ and tissue donation. The content of knowledge questionnaires was based on information included in the educational modules. Knowledge questionnaires were different for HCPs and OKPs, whereas the survey on attitudes and perceptions remained the same. Once completed the questionnaires, participants were ready to access to the training program. They were direct responsible for pacing their own self-learning.

The program continued with face-to-face sessions. A total of 9 guests and 11 international experts from six EU countries (Croatia, France, Italy, Slovenia, Spain, and Netherlands) joined the on-site training. The on-site sessions were designed to put into practice the knowledge acquired previously during the online part and to facilitate the switch from the theoretical knowledge to hands-on practice. A learning culture was created with in-class time dedicated to exploring organ and tissue donation topics in greater depth and creating enriching experiences. Apart from the educational contents, an educational kit was provided to participants with essential knowledge on adult learning in medical education and tips on teaching methodologies and strategies.

The training course finished in September 2017. Certificates of achievement were issued and delivered to participants who had completed the program successfully.

Evaluation

Continuous evaluation of the participant’s performance was carried out to allow assessing the extent to which the objectives were achieved. The Kirkpatrick impact evaluation model (19) was proposed to measure the educational intervention. The evaluation framework outlined by this author defined four levels of evaluation based on outcomes of satisfaction, learning, change in learner behaviors (20), and organizational change/patient outcome (9). In EUDONORGAN project, this evaluation model was partially used adapted to the design the tailored “Train the Trainers” program and only satisfaction and learning levels based on knowledge, attitudes and perceptions were considered.

The satisfaction level referred to the degree to which learners find the training favorable, engaging, and scientifically relevant (19). After completion of the training, the overall satisfaction of the program was evaluated. For the web-based training, three categories for each educational model, including medical aspects, educational tips, and practical activities were assessed using a 5-point Likert scale

(1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent), with a final score as the sum of the scores corresponding to the three categories. For the face-to-face training, 18 items related to different aspects of training methodology and experience, quality of workshops and presentation, specific debates, practical exercises, etc., were defined, and three categories --contents, presentation, and questions and answers--, were assessed for 15 items, whereas other categories were defined for the remaining three items (organization, course information provided, and global evaluation). All items, however, were evaluated using a 5-point Likert scale (1 = poor, 5 = excellent).

The learning level contained three components (knowledge, attitudes and perception (10, 20).

In relation to knowledge acquisition, pre- and post-test tailored-made questions by HCPs and OKPs were designed by three experts. The pre-test multiple-choice questionnaire included 18 items related to the topics given in the seven educational modules, with four possible options, one of which was correct. Only one attempt was allowed. Each item was scored “1” if the answer was correct or “0” if it was incorrect. The post-test multiple-choice questionnaire included 39 items (18 of which were the same questions as those provided in the pre-test). Again, each item was scored “1” if the answer was correct or “0” if it was incorrect. The 18 items that were same in the pre- and post-test were used to assess differences in knowledge acquisition, whereas results of the post-test questionnaires of 39 items were used to establish the accomplishment of training, with a pass mark of 70% of correct responses. The pre-test and post-test multiple-choice questionnaires are reported in the **Supplementary Tables S3, S4**.

To measure participants’ attitudes pre- and post-surveys were also designed regarding organ and tissue donation. These surveys included a total of seven questions, five of which with three different answer choices and the remaining 2, with different close-ended answers.

Finally, pre- and post-surveys measuring participants’ perceptions of the process of donation after brain death consisted of a set of 20 terms (solidarity, stressful, organized, complicated, positive, painful, opportunity, awkward, correct, strange, dignified, mistrustful, respectful, barbaric, encouraging, dubious, clear, chaotic, easy and discreditable) that from their perspective best describe the process of donation after brain death), five of which should be chosen.

Statistical Analysis

Categorical data are expressed as frequencies and percentages, and continuous data as mean and standard deviation (SD). In the bivariate analysis, the chi-square test or the Fisher’s exact test were used for the comparison of categorical variables, and the Student’s t-test, the Wilcoxon signed-rank test or the Kruskal-Wallis test for the comparison of pre- and post-test quantitative data according to conditions of application. Data for HCPs and OKPs were also stratified by gender, age decades, profession, specialty, and position. Statistical significance was set at $p \leq 0.05$. All data was analyzed by using the Statistical Package for Social Sciences (SPSS), version 10.0 for Windows.

TABLE 1 | Demographic data and characteristics of healthcare professionals.

Variables	N (%)
Total participants	79 (100)
Gender	
Men	32 (40.5)
Women	47 (59.5)
Age, years, mean (SD)	40.1 (8.4)
Profession	
Medical doctor	49 (62.0)
Registered nurse	27 (34.2)
Medical student	2 (2.5)
Healthcare manager	1 (1.3)
Specialty	
Anesthesiology/intensive care	41 (51.1)
General nurse	20 (25.3)
Intensive care nurse	5 (6.3)
Transplant/donor coordinator	3 (3.8)
Nephrology	2 (2.5)
Internal medicine	2 (2.5)
Other	6 (3.8)
Position	
Transplant/donor coordinator	37 (46.8)
Anesthesiologist/intensive care	26 (32.9)
Medical doctor	3 (3.8)
Other	13 (16.5)
Participants per country	
6, France, Italy	12
5, Belgium, Poland	10
4, Estonia, Greece, Lithuania, Spain	16
3, Bosnia & Herzegovina, Bulgaria, Croatia, Cyprus, Hungary, Ireland, Latvia, Malta, Sweden	27
2, Finland, Netherlands, Portugal, Romania, Serbia, Slovenia	12
1, Turkey, Germany	2

Data expressed as frequencies and percentages in parenthesis unless otherwise stated.

RESULTS

Participants

A total of 96 participants (HCPs, $n = 79$; OKPs, $n = 17$) from 24 EU and neighbouring countries completed the training program. In the group of HCPs, there were 32 men and 47 women, with a mean (SD) age of 40.1 (8.4) years, whereas in the group of OKPs, there were 4 men and 13 women, with a mean age of 40.8 (11.4) years. In the group of HCPs, 51.1% of participants were anesthesiologists or intensivists and 25.3% were RN. Thirty-seven (46.8%) were transplant/donor coordinators. In the group of OKPs, patients' group representatives accounted for 41.2% of participants followed by communication experts (29.4%). Profession-related characteristics and countries of origin of participants are shown in **Tables 1, 2**.

Satisfaction With the Program

For the web-based training considering medical aspects, educational tips, and practical activities of the seven modules, the overall mean (SD) scores of satisfaction were higher than 4 for each module, with 4.4 (0.6) for module 1, 4.5 (0.5) for module 2, 4.5 (0.5) for module 3, 4.5 (0.6) for module 4, 4.4 (0.6) for module 5, 4.4 (0.6) for module 6, and 4.3 (0.7) for module 7, without significant differences between HCPs and OKPs. In the group of HCPs (**Table 3**), women scored significantly higher than men in

TABLE 2 | Demographic data and characteristics of other relevant key players (non-healthcare professionals).

Variables	N (%)
Total participants	17 (100)
Gender	
Men	4 (23.5)
Women	13 (76.5)
Age, years, mean (SD)	40.8 (11.4)
Profession	
Patients' group representative	7 (41.1)
Communication expert	5 (29.4)
Journalist	3 (17.6)
Documentalist	1 (5.9)
Other	1 (5.9)
Participants per country	
2, Bulgaria, Ireland, Spain	6
1, Croatia, Cyprus, France, Hungary, Lithuania, Portugal, Romania, Serbia, Slovenia, Slovakia, Sweden	11

Data expressed as frequencies and percentages in parenthesis unless otherwise stated.

modules 3, 5, and 7, but significant differences by age, profession, specialty or position were not found. In the group of OKPs (**Table 4**), mean scores were also higher than 4 for all modules, but significant differences by gender, age, and profession were not observed.

Regarding the face-to-face training survey, data from HCPs and OKPs were gathered, with more than 80 participants who completed the survey in most of the items, and a highest response rate at 85 participants (88.5%). Results of the face-to-face training also showed high scores (above 4) for all items evaluated, except for communication workshop with scores above 3. In the global evaluation, mean (SD) scores of 4.4 (0.8) were obtained for both categories of "applicability to my job" and "overall course assessment" (**Table 5**).

Knowledge Acquisition

Knowledge acquisition after training showed a statistically significant improvement in both HCPs and OKPs, with mean (SD) percentages of correct responses increasing from 72% (13.4) to 96.2% (5.6) and from 64% (18.3) to 92.8% (7.3), respectively (**Table 6**). In the group of HCPs, improvement in knowledge acquisition was significant in all age categories, professions, and specialties. Pre- and post-test comparisons were particularly significant for RN vs. MD and intensive care unit nurses vs. general nurses and other specialties (**Table 6**). Transplant/donor coordinators showed a meaningful improvement (pre-test 71.5% [13.8] vs. post-test 96.7% [5.6], $p < 0.0001$) as well as anesthesiologists and intensivists. In the group of OKPs, statistically significant improvements in knowledge acquisition were observed in women, age segments 25–34 and 45–54 years, patients' group representatives and communication experts (**Table 6**). However, between-group differences either in pre-test or post-test results in HCPs or OKPs were not observed.

Finally, in the 39-item questionnaire to assess the accomplishment of the learning process, a successful pass mark of 95% was obtained.

TABLE 3 | Satisfaction with the web-based training program among 79 healthcare professionals.

Categories	Participants	Module 1	Module 2	Module 3	Module 4	Module 5	Module 6	Module 7
Gender								
Men	32	4.2 (0.6)	4.3 (0.6)	4.3 (0.6)	4.3 (0.6)	4.0 (0.7)	4.0 (0.7)	4.0 (0.7)
Women	47	4.5 (0.6)	4.6 (0.5)	4.6 (0.5)	4.6 (0.5)	4.6 (0.6)	4.4 (0.6)	4.5 (0.7)
<i>p</i> -value		0.098	0.102	0.017	0.071	0.003	0.221	0.007
Age, years								
25–34	16	4.4 (0.5)	4.6 (0.4)	4.5 (0.5)	4.6 (0.4)	4.5 (0.5)	4.4 (0.6)	4.4 (0.6)
35–44	37	4.3 (0.7)	4.5 (0.6)	4.5 (0.5)	4.5 (0.7)	4.4 (0.7)	4.4 (0.7)	4.3 (0.8)
45–54	20	4.5 (0.7)	4.5 (0.6)	4.6 (0.6)	4.5 (0.6)	4.5 (0.7)	4.3 (0.7)	4.4 (0.6)
55–64	6	4.3 (0.6)	4.5 (0.5)	4.6 (0.4)	4.6 (0.3)	4.3 (0.5)	4.4 (0.7)	4.2 (0.7)
<i>p</i> -value		0.882	0.258	1.083	0.668	1.324	0.177	0.464
Profession								
Medical doctor	49	4.4 (0.6)	4.5 (0.6)	4.6 (0.5)	4.5 (0.6)	4.5 (0.6)	4.3 (0.7)	4.4 (0.7)
Registered nurse	27	4.3 (0.3)	4.6 (0.6)	4.5 (0.6)	4.5 (0.6)	4.4 (0.7)	4.4 (0.6)	4.3 (0.7)
Medical student	2	4.3 (0.0)	4.7 (0.5)	4.3 (0.0)	4.5 (0.2)	4.3 (0.0)	4.0 (0.5)	4.3 (0.9)
Healthcare manager	1	5.0	5.0	5.0	5.0	5.0	5.0	5.0
<i>p</i> -value		0.846	0.644	0.887	0.97	0.672	0.561	0.726
Specialty								
Anesthesiology/intensive care	41	4.4 (0.6)	4.4 (0.6)	4.5 (0.5)	4.5 (0.6)	0.5 (0.7)	4.3 (0.7)	4.4 (0.7)
General nurse	20	4.2 (0.7)	4.5 (0.6)	4.5 (0.5)	4.4 (0.6)	4.3 (0.7)	4.4 (0.6)	4.2 (0.7)
Intensive care nurse	5	4.3 (0.8)	4.5 (0.7)	4.3 (0.7)	4.5 (0.7)	4.7 (0.5)	4.3 (0.9)	3.9 (1.6)
Transplant/donor coordinator	3	4.4 (0.7)	4.7 (0.6)	5.0 (0.0)	4.7 (0.6)	4.9 (0.2)	4.7 (0.6)	4.9 (0.2)
Nephrology	2	4.7 (0.5)	4.7 (0.5)	5.0	5.0	5.0	4.5 (0.7)	4.5 (0.7)
Internal Medicine	2	4.3 (0.9)	4.2 (1.2)	4.7 (0.5)	4.5 (0.7)	4.7 (0.5)	4.3 (0.9)	3.9 (1.6)
Other	6	4.3 (0.5)	4.5 (0.5)	4.5 (0.4)	4.5 (0.4)	4.5 (0.5)	4.3 (0.5)	4.3 (0.5)
<i>p</i> -value		0.898	0.937	0.483	0.885	0.498	0.989	0.726
Position								
Transplant/donor coordinator	37	4.5 (0.5)	4.6 (0.5)	4.6 (0.5)	4.6 (0.4)	4.5 (0.6)	4.4 (0.6)	4.4 (0.7)
Anesthesiologist/intensive care	26	4.2 (0.7)	4.4 (0.7)	4.0 (0.6)	4.4 (0.7)	4.4 (0.7)	4.2 (0.7)	4.2 (0.7)
Medical doctor	3	4.5 (0.7)	4.6 (0.6)	4.6 (0.5)	4.5 (0.7)	4.5 (0.7)	4.5 (0.7)	4.4 (0.7)
Other	13	4.2 (0.9)	4.6 (0.4)	4.3 (0.7)	4.6 (0.5)	4.4 (0.5)	4.1 (1.02)	4.8 (0.4)
<i>p</i> -value		0.49	0.401	0.447	0.651	0.97	0.756	0.491
Total	79	4.4 (0.6)	4.5 (0.6)	4.5 (0.5)	4.5 (0.5)	4.4 (0.6)	4.3 (0.6)	4.3 (0.7)

Data as mean and standard deviation in parenthesis. Values in bold mean statistical significance.

TABLE 4 | Satisfaction with the web-based training program among 17 other key players (non-healthcare professionals).

Categories	Participants	Module 1	Module 2	Module 3	Module 4	Module 5	Module 6	Module 7
Gender								
Men	4	4.3 (1.0)	4.6 (1.0)	4.3 (1.0)	4.3 (1.0)	4.3 (1.0)	4.3 (1.0)	4.3 (1.0)
Women	13	4.6 (0.4)	4.8 (0.3)	4.6 (1.0)	4.6 (0.5)	4.7 (0.3)	4.5 (1.0)	4.3 (0.6)
<i>p</i> -value		0.589	0.469	0.631	0.589	0.469	0.221	0.772
Age, years								
25–34	6	4.6 (0.3)	4.7 (0.3)	4.7 (0.7)	4.7 (0.4)	4.7 (0.3)	4.4 (0.7)	4.4 (0.7)
35–44	3	4.7 (0.6)	4.8 (0.4)	4.6 (0.5)	4.8 (0.4)	4.8 (0.4)	4.7 (0.3)	4.6 (0.5)
45–54	7	4.3 (0.7)	4.5 (0.8)	4.3 (0.7)	4.1 (0.8)	4.4 (0.7)	4.3 (0.7)	4.1 (0.8)
55–64	1	5.0	5.0	5.0	5.0	5.0	5.0	4.0
<i>p</i> -value		0.585	0.742	0.491	0.351	0.723	0.592	0.582
Profession								
Patients' group representative	7	4.6 (0.5)	4.6 (0.4)	4.4 (0.6)	4.6 (0.5)	4.6 (0.4)	4.5 (0.5)	4.3 (0.5)
Communication expert	5	4.3 (0.8)	4.5 (0.9)	4.4 (0.9)	4.2 (1.0)	4.5 (0.8)	4.3 (0.8)	3.9 (0.9)
Journalist	3	4.8 (0.4)	4.9 (0.2)	4.7 (0.6)	4.8 (0.4)	4.8 (0.4)	4.8 (0.4)	4.9 (0.2)
Documentalist	1	4.3	4.3	5.0	4.7	4.3	3.3	3.3
Other	1	5.0	5.0	4.7	5.0	5.0	4.6	4.7
<i>p</i> -value		0.609	0.55	0.847	0.765	0.7	0.486	0.207
Total	17	4.5 (0.5)	4.6 (0.5)	4.5 (0.6)	4.5 (0.6)	4.6 (0.5)	4.4 (0.6)	4.3 (0.7)

Data as mean and standard deviation in parenthesis.

TABLE 5 | Satisfaction with the face-to-face training program in all participants.

Items	Participants	Mean (SD)
1. Welcome session		
Contents	81	4.2 (0.9)
Presentation	81	4.2 (0.9)
Questions and answers	81	4.3 (0.9)
2. Project overview and training methodology		
Contents	82	4.4 (0.9)
Presentation	82	4.4 (0.9)
Questions and answers	82	4.4 (0.9)
3. Online training experience		
Contents	82	4.5 (0.8)
Presentation	82	4.6 (0.9)
Questions and answers	81	4.5 (0.9)
4. Living donation		
Contents	84	4.4 (0.9)
Presentation	83	4.4 (0.8)
Questions and answers	84	4.5 (0.8)
5. Deceased donation		
Contents	84	4.6 (0.8)
Presentation	83	4.7 (0.7)
Questions and answers	84	4.7 (0.7)
6. Quality management presentation		
Contents	82	4.3 (0.9)
Presentation	81	4.4 (0.8)
Questions and answers	83	4.3 (0.9)
7. Quality management workshop		
Contents	84	4.2 (0.9)
Presentation	82	4.2 (0.9)
Questions and answers	83	4.3 (0.9)
8. Teaching and learning strategies		
Contents	83	4.1 (0.9)
Presentation	83	4.1 (0.8)
Questions and answers	83	4.3 (0.9)
9. Communication workshop		
Contents	83	3.7 (1.2)
Presentation	84	3.7 (1.1)
Questions and answers	83	3.9 (1.2)
10. Subject specific debates		
Contents	74	4.2 (0.9)
Presentation	74	4.2 (0.9)
Questions and answers	75	4.2 (1.0)
11. Megacase practical exercise		
Contents	84	4.7 (0.8)
Presentation	84	4.7 (0.8)
Questions and answers	84	4.7 (0.8)
12. Communication exercise		
Contents	83	4.0 (1.1)
Presentation	83	4.1 (1.1)
Questions and answers	83	4.1 (1.0)
13. Group work		
Contents	77	4.5 (0.7)
Presentation	75	4.6 (0.7)
Questions and answers	76	4.5 (0.7)
14. Group work presentation		
Contents	59	4.4 (0.7)
Presentation	58	4.5 (0.7)
Questions and answers	59	4.5 (0.7)
15. Wrap up and next steps		
Contents	52	4.6 (0.7)
Presentation	52	4.5 (0.9)
Questions and answers	52	4.6 (0.7)
16. Organization		
Level of organization	85	4.4 (0.9)
Level of teaching	85	4.4 (0.8)
Technical direction	84	4.8 (4.4)

(Continued in next column)

TABLE 5 | (Continued) Satisfaction with the face-to-face training program in all participants.

Items	Participants	Mean (SD)
Secretariat	85	4.5 (0.8)
Educational material	85	4.5 (0.7)
Audiovisual support	85	4.3 (0.7)
17. Course information provided		
Before registration	85	4.2 (1-0)
Alter registration	85	4.4 (0.8)
During the course	85	4.5 (0.8)
18. Global evaluation		
Applicability to my job	85	4.4 (0.8)
Overall course assessment	84	4.4 (0.8)

Attitudes and Perceptions

Attitudes regarding organ and tissue donation in HCPs and OKPs are shown in **Table 7**.

Answers recorded in the post-test survey showed a statistically significant change towards a positive attitude when referring to the willing to donate organs of their relatives both in HCPs and OKPs. Also, 100% of HCPs and OKPs answered “yes” regarding donation of their own organs after death. An improvement in the percentage of participants that considered that organ and tissue donation should be part of the end of life care, both in HCPs and OKPs was also found.

Results of the perception survey showed that both HCPs and OKPs selected more positive than negative terms that better described the process of donation after brain death as compared with pre-test assessment (**Figure 1**). HCPs significantly improved the selection of solidarity, opportunity, and dignified concepts, and significantly reduced the selection of negative items such as stressful and painful ($p < 0.05$). Positive perceptions were also recorded among OKPs, but differences between pre- and post-test analysis were not statistically significant.

DISCUSSION

The EUDONORGAN project (21) was proposed within the framework of EU Action Plan on Organ donation and the legislation established in the Directive 2010/53/EU, as one of the initiatives aimed to increase organ availability, to enhance efficiency and accessibility of transplant systems, and to improve quality and safety. The Action Plan advocated appointing of transplant donor coordinators and promoting quality improvement programs in hospitals hence optimizing deceased organ donation, exchanging best practice on donation from living donors, and strengthening communication skills of professionals and patient support groups. Other EU-funded projects focused on improving outcomes from deceased organ donation included to improve collaboration with ICUs (ACCORD) (22), to compare and improve deceased organ donation programs (MODE) (4), to assess protocols and critical steps (COORENOR) (23), and to develop quality system indicators (ODEQUS) (24).

TABLE 6 | Learning (knowledge acquisition) scores in all participants.

Variables	Healthcare professionals (HCPs) (n = 79)				Other relevant key players (OKPs) (n = 17)			
	Participants	Correct answers, %		p-value ^a	Participants	Correct answers, %		p-value ^a
		Pre-test	Post-test			Pre-test	Post-test	
Gender								
Men	32	71.4 (12)	94.8 (6.9)	<0.001	4	54.1 (32.5)	87.5 (8.3)	0.109
Women	47	72 (14.3)	97 (4.5)	<0.001	13	67 (11.8)	94.4 (6.4)	0.002
p-value ^b		0.693	0.67			0.281	0.096	
Age, years								
25–34	16	72.2 (14.8)	95.8 (6.6)	0.001	6	70.4 (5.7)	96.3 (2.9)	0.026
35–44	37	70.7 (14.1)	97.3 (4.6)	<0.001	3	57.4 (12.8)	88.8 (11.1)	0.102
45–54	20	75.4 (12.9)	96.8 (5.6)	<0.001	7	75 (19.5)	95.8 (5.3)	0.042
55–64	6	70.4 (8.5)	92.6 (6.4)	0.027	1	55.5	94.4	
p-value ^b		0.688	0.479			0.281		
Profession (HCPs)								
Medical doctor	49	74.1 (12.4)	95.4 (6.5)	<0.0001				
Registered nurse	27	69.8 (14.7)	97.3 (4.2)	<0.0001				
Medical student	2	55.5 (7.9)	100					
Healthcare manager	1	66.6	100					
p-value ^b		0.93	0.173					
Profession (OKPs)								
Patients' group representative					7	69 (15)	94.4 (3.2)	0.027
Communication expert					5	67.7 (17.7)	92.2 (6.3)	0.068
Journalist					3	42.6 (23.1)	85.1 (12.8)	0.109
Documentalist					1	66.6	100	
Other					1	72.2	100	
p-value ^b						0.297	0.232	
Specialty								
Anesthesiology/intensive care	41	75 (12.5)	94.8 (6.6)	<0.0001				
General nurse	20	70.8 (15.8)	97.2 (4.2)	<0.0001				
Intensive care nurse	5	62.2 (10.7)	94.4 (5.5)	0.042				
Transplant/donor coordinator	3	77.7	100					
Nephrology	2	55.5	100					
Internal medicine	2	75.0 (11.8)	97.2 (3.9)					
Other	6	65.3 (13.8)	100	0.043				
p-value ^b		0.243						
Position								
Transplant/donor coordinator	37	71.5 (13.8)	96.7 (5.6)	<0.0001				
Anesthesiologist/intensive care	26	75 (12.5)	95.3 (6.1)	<0.0001				
Medical doctor	3	72.2 (11.)	96.3 (6.4)					
Other	13	69.4 (13.9)	96.3 (5.5)	0.001				
p-value ^b		0.349	0.852					
Total	79	72 (13.4)	96.2 (5.6)	<0.0001	17	64 (18.3)	92.8 (7.3)	<0.0001

^aWithin-group comparison.

^bBetween-group comparison.

EUDONORGAN was an educational project addressed to HCPs. However, and for the first time in an EU project, OKPs who turned be able to advocate for organ donation and train colleagues in their countries, regions and/or hospitals were also considered to extend the capacity-building efforts to a more heterogeneous group of participants (e.g., patient support groups, journalists, communication experts). Joint involvement of HCPs and OKPs would impact on other aspects, such as standardization of training programmes, and collaboration between countries and sharing of best experiences (4).

As in previous EU-funded training projects, such as ETPOD (25) and EMPODaT (26), the methodology used was blended learning defined in this project as the appropriate mix and use of

face-to-face instructional methods and various learning technologies to support planned learning and foster subsequent learning outcomes (27). EUDONORGAN provided an innovative dimension with the use of an instructional delivery method consisting of computer-based training or WebApp with the application of the main adult learning principles in that consider the learner's role is not only to receive knowledge but also to search, challenge, construct knowledge and change their own perception, views, and beliefs (28). Innovation came by offering game elements, animated characters and scenarios in each of the seven modules on organ and tissue donation following an interactive, enjoyable, and easy to understand manner.

TABLE 7 | Attitudes regarding organ and tissue donation in all participants.

Questions	Healthcare professionals			Other relevant key players		
	Pre-test (n = 79)	Post-test (n = 64)	p-value	Pre-test (n = 17)	Post-test (n = 13)	p-value
Would you donate your organs after death?						
Yes	78 (98.7)	64 (100)	0.321	13 (76.5)	13 (100)	NA
No	0	0		1 (5.9)		
I do not know	1 (1.3)	0		3 (17.6)		
Would you donate the organs of your relatives after death?						
Yes	69 (87.3)	60 (93.7)	<0.0001	16 (94.1)	13 (100)	NA
No	1 (1.3)	0		1 (5.9)		
I do not know	10 (12.7)	4 (6.2)		0		
If you choose "No" or "I do not know" in the previous question, why? (more than one answer is accepted)						
Religious reasons	0	1 (1.6)	NA	0	13 (100)	NA
Lack of trust in the health system	2 (2.5)	1 (1.6)		0		
Not knowing the wish of the deceased	14 (17.8)	4 (6.3)		3 (17.6)		
Ethical reasons	1 (1.3)	0		0		
Fear of body disfigurement	0	0		1 (5.9)		
Other reasons	25 (31.6)	0		4 (23.5)		
Organ and tissue donation should be part of the end of life care						
Yes	75 (94.9)	64 (100)	0.182	13 (76.4)	12 (92.3)	0.689
No	3 (3.8)	0		1 (5.9)	0	
I do not know	1 (1.3)	0		3 (17.6)	1 (7.7)	
When do you consider that it is the most appropriate moment to talk about organ and tissue donation?						
Anytime	29 (36.7)	24 (37.5)	<0.0001	15 (88.2)	7 (53.8)	0.246
When the death of the patient is predictable	28 (35.4)	22 (34.3)		2 (11.8)	2 (15.4)	
After the patient's death	22 (27.9)	18 (28.1)		0	4 (30.8)	
Do you agree with the admission to the intensive care unit (ICU) of patients with devastating injuries in whom the treatment has deemed futile, for the sole reason of facilitating organ and tissue donation?						
Yes	70 (88.6)	60 (93.7)	0.810	13 (76.5)	12 (92.3)	0.494
No	4 (5.1)	0		2 (11.8)	1 (7.7)	
I do not know	5 (6.3)	4 (6.2)		2 (11.8)	0	
Do you consider appropriate to employ the same resources to maintain a potential brain dead donor as in any other critical patient?						
Yes	75 (94.9)	61 (95.3)	<0.0001	10 (58.9)	12 (92.3)	0.559
No	0	0		3 (17.6)	1 (7.7)	
I do not know	4 (5.1)	3 (4.7)		4 (23.5)	0	

As shown in the satisfaction results, the online educational modules were scored with high values and so it was the methodology used during the face-to-face sessions that boosted hands-on learning, networking, best practice exchange and promoted great interactivity between both groups of participants. They found the training very useful to improve their teaching and communication skills and to organize both trainings and raising awareness events in their daily work context: hospitals, national transplant organizations and/or patients' associations. Learning results indicated that the training was successfully implemented involving a total of 96 participants from 24 different countries that passed the program with a pass mark of 95%, which is a relevant indicator of a significant increase of knowledge acquisition. These outcomes are even more remarkable in the group of RN as part of the HCPs as professionals active in the field of organ donation and transplantation that resulted as a major factor in maximizing deceased donor potential and eventually increase donation rates (25) and an asset to replicate the training at a national level (28).

Results were also positive in the group of OKPs that become a pool of professionals trained that are part of the entire donation and transplantation chain. In both groups of participants, a change of attitude on their willingness to donate their organs or their relatives was observed. Training also helped improvement towards a positive perception that was noticeable by the increase of positive terms in the post-test. Moreover, both groups could also benefit from further education on various aspects of organ donation and transplantation (4) and on communication skills to support the implementation of public awareness actions and how to communicate with the families of patients, education in schools, generating overall public awareness, and the use of social media (4).

Some limitations of the study should be mentioned. The implementation of "Train the Trainers" program was analyzed, but only at satisfaction and learning levels. The requirements of the EU tender did not foresee the implementation of trainings at local level or regional level, directly related to behavior and result evaluation levels. A post-survey was proposed to optimize the

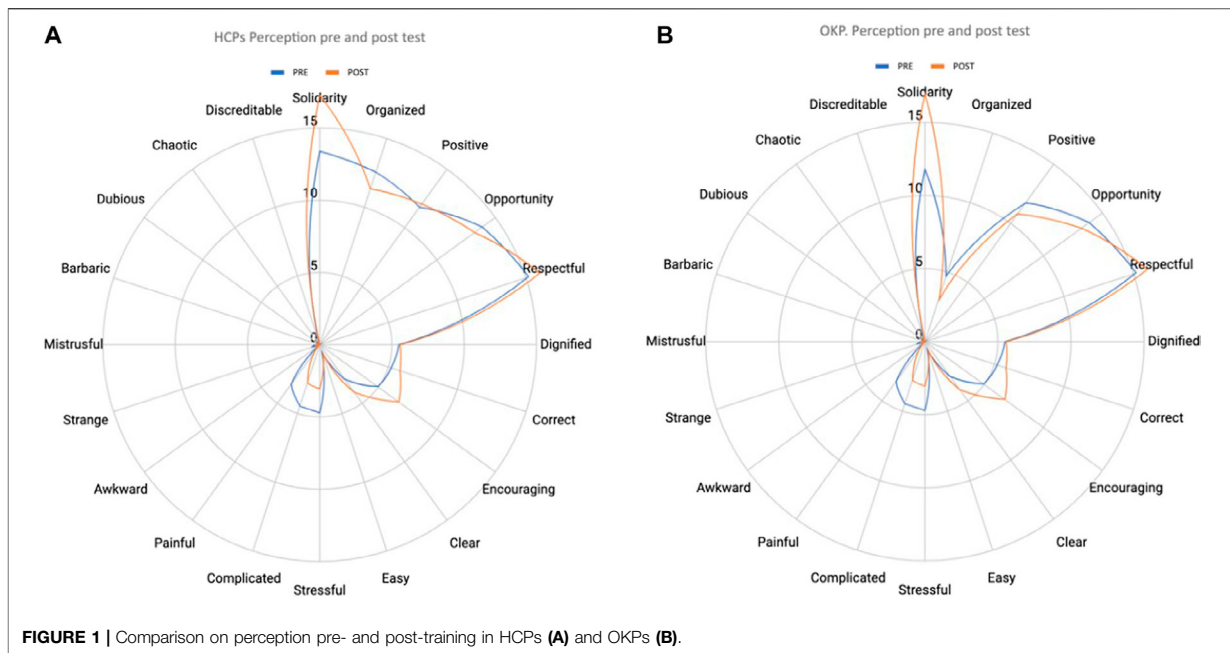


FIGURE 1 | Comparison on perception pre- and post-training in HCPs (A) and OKPs (B).

impact of training provided but, the study did not measure the effectiveness of the post-training activities performed by both groups of participants. Assessment of the direct impact of the training program on donation rates was not feasible. However, EUDONORGAN responded very positively to the Action Plan and contributed to promote awareness rising among population with the ultimately improve organ donation rates in the EU and neighbouring countries.

The “Train the Trainers” program was a source of learning and motivation for the professionals. It provided a whole educational framework that allowed a multiplying impact at different levels and types of entities and human supports. The professionals who participated in the study were prepared to organize training actions and events at the local level (university, hospital and/or patient organizations, etc.) and aimed at the target audience. Some of them reported that they had started to implement training actions and a Facebook group was set up in which they continued to interact (<https://www.facebook.com/groups/340412829742498/>). An evaluation at the clinical and social level could be performed through a follow-up study conducted in European hospitals 2–3 years after the implementation of the training. It would allow to measure whether changes in donation and transplantation occurred in that period.

In summary, organ donation remains a multicomplex process that affects both healthcare professionals and the entire society. Training is a key enabler in healthcare to increase knowledge and skills. This study proves that the methodology used classically in HCPs also applies in OKPs. We identified a significant increase in knowledge and change of attitude and perception that underline the need of permanent education at different levels in relation to organ and tissue donation.

EUDONORGAN CONSORTIUM

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DATA AVAILABILITY STATEMENT

The raw data supporting the conclusion of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

All participants were informed of the content. They also signed their consent to fulfil voluntarily the surveys that guaranteed the protection of their data, the anonymity and the confidentiality according to the information collected.

AUTHOR CONTRIBUTIONS

PP: Design, analysis and writing of the manuscript; MI: Collecting data and intellectual review; CB: Methodological

advice and intellectual review; MM: Supervision, methodological advice, and intellectual review; RV: Design, data analysis, writing the manuscript and intellectual review. All authors have seen and approved the final draft.

CONFLICT OF INTEREST

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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ANNEXES

ANNEX 1. LEVEL 1 REACTION. ONLINE TRAINING SURVEY

Assessment questionnaire

Please assess the content, accuracy and the interest raised by the course modules. Use the following scoring scale: **5** =Excellent; **4** =Very Good; **3** = Good; **2** = Average; **1** = Poor

COURSE MODULES

Module 1:

Medical aspects

Educational tips

Practical activity

Module 2:

Medical aspects

Educational tips

Practical activity

Module 3

Medical aspects

Educational tips

Practical activity

Module 4:

Medical aspects

Educational tips

Practical activity

Module 5:

Medical aspects

Educational tips

Practical activity

Module 6:

Communication aspects

Educational tips

Practical activity

Module 7:

Quality improvement methodologies

Educational tips

Practical activity

RESOURCES

Please assess the content, accuracy and the interest raised by the course resources. Use the following scoring scale: **5** =Excellent; **4** =Very Good; **3** = Good; **2** = Average; **1** = Poor

Syllabus

Texts

Graphics

Audiovisual

Bibliography

Efficiency of the online technical assistance

COMMENTS AND SUGGESTIONS

Open section

ANNEX 2. LEVEL 1 REACTION. FACE TO FACE TRAINING SURVEY



EUDONORGAN Train the trainers, Face to Face Program
Barcelona (Spain), September 18th – 22th 2017

COURSE EVALUATION FORM

Please take a few moments and fill out the evaluation form after each session! Your feedback is highly appreciated and essential to maintaining and improving our educational effectiveness! Once filled out, please return the form to any of the EUDONORGAN staff members!

Please follow the criteria:

1 – POOR 2 – AVERAGE 3 – GOOD 4 – VERY GOOD 5 – EXCELLENT

LECTURES	Contents	Presentation	Questions answered
<u>Monday, 18th of September</u>			
Welcome session	1 2 3 4 5	1 2 3 4 5	<u> </u> 1 2 3 4 5
Project overview and training methodology	1 2 3 4 5	1 2 3 4 5	<u> </u> 1 2 3 4 5
Online training experience	1 2 3 4 5	1 2 3 4 5	<u> </u> 1 2 3 4 5
<u>Tuesday, 19th and Wednesday, 20th of September</u>			
Living donation	1 2 3 4 5	1 2 3 4 5	<u> </u> 1 2 3 4 5
Deceased donation	1 2 3 4 5	1 2 3 4 5	<u> </u> 1 2 3 4 5
Quality management presentation	1 2 3 4 5	1 2 3 4 5	<u> </u> 1 2 3 4 5
Quality management workshop	1 2 3 4 5	1 2 3 4 5	<u> </u> 1 2 3 4 5
Teaching and learning strategies	1 2 3 4 5	1 2 3 4 5	<u> </u> 1 2 3 4 5
Communication workshop	1 2 3 4 5	1 2 3 4 5	<u> </u> 1 2 3 4 5
Subject-specific debates	1 2 3 4 5	1 2 3 4 5	<u> </u> 1 2 3 4 5
<u>Thursday 21st of September</u>			
Meagacase practical exercise	1 2 3 4 5	1 2 3 4 5	<u> </u> 1 2 3 4 5
Communication exercise	1 2 3 4 5	1 2 3 4 5	<u> </u> 1 2 3 4 5
<u>Friday 22nd of September</u>			
Group <u>work</u>	1 2 3 4 5	1 2 3 4 5	1 2 3 4 5
Group work presentations	1 2 3 4 5	1 2 3 4 5	<u> </u> 1 2 3 4 5
Wrap up and next steps	1 2 3 4 5	1 2 3 4 5	<u> </u> 1 2 3 4 5

 turn over the page to finish the evaluation form

ANNEX 3. LEVEL 2. LEARNING. KNOWLEDGE (18 QUESTIONS)

Topics	Healthcare Professionals	Other Relevant Key Players (Non-Health-care Professionals)
Module 1 Organ donation programs	<p>Chose the FALSE statement about deceased donation:</p> <p>Deceased donors refer to any donor that previous to donation has been declared dead by established medical criteria</p> <p>Deceased donors can be divided in two different categories: donors after brain death (DBD) or donors after circulatory death (DCD)</p> <p>DBD is the most frequent type of donation in the world</p> <p>DCD is the most frequent type of donation in the world</p>	<p>Which of the following statements about organ donors is TRUE:</p> <p>There are basically two types of donors: living donors and deceased donors</p> <p>There are basically two types of donors: brain death donors and cardiac death donors</p> <p>There are basically two types of donors: brain death donors and living donors</p> <p>There are basically two types of donors: cardiac death donors and living donors</p>
	<p>When referring to DCD, chose the TRUE statement:</p> <p>Uncontrolled donors refer to DCD Maastricht type 3</p> <p>Controlled DCD donors can be type 1 or 2 of Maastricht</p> <p>Maastricht type 3 donors refer to those DCD donors in whom life sustaining treatment limitation has been performed</p> <p>Type 4 Maastricht donors are the most common type of DCD donors</p>	<p>Organs that human can donate are:</p> <p>Heart, lung, intestines, pancreas, liver, kidneys</p> <p>Heart, lung, cornea, pancreas, liver, kidneys</p> <p>Heart valves, lung, cornea, pancreas, stool, kidneys</p> <p>Heart, lung, cornea, osteotendinous tissue, liver, kidneys</p>
Module 2 Donation pathway for brain death deceased donors	<p>A possible DBD donor refers to?</p> <p>A patient with a devastating brain injury or lesion and apparently medically suitable for organ donation</p> <p>A person whose clinical condition is suspected to fulfil brain death criteria</p> <p>A medically suitable potential donor who has been declared dead based on neurologic criteria as stipulated by the law of the relevant jurisdiction</p> <p>A consented eligible donor in whom an operative incision was made with the intent of organ recovery or from whom at least one organ was recovered for the purpose of transplantation</p>	<p>Mark the statement which is NOT part of the donor coordinator or TPM (Transplant Procurement Manager) role in the donation process:</p> <p>To detect and identify as many donors as possible wherever they are</p> <p>To diagnose and certify brain death and make sure all the legal requirements are met</p> <p>To offer the possibility of organ and tissue donation to the relatives of the eligible donors</p> <p>To evaluate the medical suitability of the potential donors in order to avoid the transmission of diseases to the recipient</p>
	<p>These are all absolute contraindications for organ donation, except:</p> <p>Septic shock by methicillin resistant Staphylococcus aureus without antibiotic treatment.</p> <p>HIV Ac +</p> <p>Advanced age</p> <p>Unknown cause of death</p>	<p>Who is responsible to detect donors?</p> <p>TPM (Transplant Procurement Manager)</p> <p>Physician and nurse in charge of the patient</p> <p>Medical director</p> <p>All of them</p>

Topics	Healthcare Professionals	Other Relevant Key Players (Non-Health-care Professionals)
<p>Module 3</p> <p>Family approach in case of deceased donation</p>	<p>Concerning the methodology of breaking bad news</p> <p>There is no training required to break bad news</p> <p>It is the personal style of the individual who delivers the bad news that matters, and it cannot be subject to a certain methodology</p> <p>Health care professionals need to be trained on how to deliver bad news</p> <p>No communication skills are required</p>	<p>Regarding legal consent systems to express individual consent to donation, the definition of “opting-out system” is:</p> <p>Everybody is a prospective donor unless they expressed their objection while still alive</p> <p>Consent to donation has to be obtained explicitly from the donor or an authorised individual (usually the next of kin)</p> <p>All are true</p> <p>All are false</p>
	<p>Regarding legal consent systems to express individual consent to donation, the definition of “opting-in system” is:</p> <p>Consent to donation has to be obtained explicitly from the donor or an authorised individual (usually the next of kin)</p> <p>Everybody is a prospective donor unless they expressed their objection while still alive</p> <p>All are true</p> <p>All are false</p>	<p>Which of the following statements best reflects the best practice regarding the interview with the family to evaluate the biological risk of disease transmission?</p> <p>It should never be omitted, even when we have negative serology results</p> <p>It can be omitted if we have performed a review of the medical record and we have serology</p> <p>It can be omitted if the family is too distressed to answer and we have serology</p> <p>It can be omitted if the patient does not have any tattoos and is married and we have serology</p>
<p>Module 4</p> <p>Living organ donation</p>	<p>Which of the following grafts (or their segments) are more frequently transplanted from living donors:</p> <p>Lung</p> <p>Liver</p> <p>Kidney</p> <p>Pancreas</p>	<p>All except ONE of these grafts (or their segments) can be transplanted through living donation:</p> <p>Lung</p> <p>Liver</p> <p>Kidney</p> <p>Heart</p>
	<p>Living donation with respect to deceased donation (mark the FALSE ONE):</p> <p>Increases the kidney donor pool</p> <p>Increases the number of indications beyond</p> <p>May cause psychological benefits for the donor</p> <p>May have worse outcomes</p>	<p>Choose the right statement about living donors:</p> <p>Living donors can only be genetically related to the recipient</p> <p>Living donors can be genetically and emotionally related to the recipient</p> <p>Living donors can be genetically and/or emotionally related as well as unrelated to the recipient</p> <p>Everybody can be a living donor</p>

Topics	Healthcare Professionals	Other Relevant Key Players (Non-Health-care Professionals)
Module 5 Tissues and cells donation	<p>Ocular tissue used for transplantation includes (mark the FALSE one):</p> <p>Corneal grafts Anterior and posterior lamellar grafts Scleral tissue Optical nerve</p>	<p>How many types of tissue donors are:</p> <p>Living and deceased donors Only deceased donors Only living donors Only brain dead donors</p>
	<p>In tissue donation, warm ischemia times (time elapsed from circulatory arrest to tissue removal) should be shorter than (MARK THE FALSE ONE)</p> <p>12 hours if body was not kept refrigerated 24 h if body was kept refrigerated within 4 hours after</p> <p>Warm ischemia times for cornea retrieval can be longer All are correct</p>	<p>Mark the tissue that cannot be donated by living donors:</p> <p>Ocular tissue Musculoskeletal tissues Heart valves and vascular segments Human amniotic membrane</p>
Module 6 Communication aspects in organ donation	<p>What is the best approach to the public when communicating about organ donation?</p> <p>To develop a strategic plan and work in multidisciplinary teams</p> <p>Medical doctors are the best experts for the task</p> <p>Communication with the public is not so important in transplant medicine; if people want, they can find information on the organization's website, where everything is explained</p> <p>Organizations/national competent authorities need to develop big, national and expensive media campaigns</p>	<p>What is the best approach to the public when communicating about organ donation?</p> <p>To develop a strategic plan and work in multidisciplinary teams</p> <p>Medical doctors are the best experts for the task</p> <p>Communication with the public is not so important in transplant medicine; if people want, they can find information on the organization's website, where everything is explained</p> <p>Organizations/national competent authorities need to develop big, national and expensive media campaigns</p>
	<p>What does the statement "behavioral change is a process" mean in the organ donation context?</p> <p>One well-organized media/communication campaign will linearly and directly result in behavioral change</p> <p>Over a longer period of time people need several impulses from various contexts to decide to become a donor</p> <p>When one decides to become a donor, our communication goal has been accomplished for good</p> <p>The public always needs more information and louder media campaigns</p>	<p>What does the statement "behavioral change is a process" mean in the organ donation context?</p> <p>One well-organized media/communication campaign will linearly and directly result in behavioral change</p> <p>Over a longer period of time people need several impulses from various contexts to decide to become a donor</p> <p>When one decides to become a donor, our communication goal has been accomplished for good</p> <p>The public always needs more information and louder media campaigns</p>

Topics	Healthcare Professionals	Other Relevant Key Players (Non-Health-care Professionals)
Module 7 Quality improvement methodologies	<p>Which of the following are quality indicator requirements? Measurable, objective, acceptable, relevant, evidence-based Specific, measurable, objective, acceptable, relevant Measurable, objective, acceptable, relevant, time-based Specific, measurable, objective, relevant, time-based</p>	<p>Which of the following is the best definition of quality? Is a high level of value or excellence Is the degree by which the characteristics of a product or service fulfil the objectives for which it was created, where the degree refers to something measurable and fulfillment to the expected outcomes Is something measurable Is an improvement method</p>
	<p>Quality management in organ procurement at national or regional level considers the analysis of: Structure, process and outcomes Structure, quality criteria and indicators Process, outcomes and quality criteria Function, structure, and quality indicators</p>	<p>What is biovigilance NOT useful for? To supervise and assess the risk in order to prevent harm To learn from error To penalize organ procurement teams in case of error To improve quality</p>
Educational	<p>What is the adult learning process recommended nowadays? Teacher centered. Learners are empty vessels that need to be filled with knowledge, skills and experience. Learner centered. Adult learners are completely independent and exclusively intrinsically motivated Mix of appropriate learning strategies (from teacher directed to learner directed)</p>	
	<p>Does teaching and learning styles matter in the learning process? Yes. There needs to be a “match” between the learner and the teaching styles used Maybe, but it is not essential No. Theorists proved that shifting teaching styles according to the progression of the learning stages does not impact positively the learning process</p>	
	<p>Feedback in the learning process ... (chose the FALSE one): Is a difficult part of clinical teaching Is an essential part of medical education Is judgmental, so experts recommend avoiding it When constructively given promotes learning and ensures standards are met</p>	
	<p>What are the three interrelated main domains medical education is based on: Transformative education, appreciative education and instrumental learning Knowledge, skills and attitude Rote learning, meaningful learning and associative learning Theoretical knowledge, experience and values</p>	

Correct answers in bold.

ANNEX 4. LEVEL 2. LEARNING. KNOWLEDGE (QUESTIONS FOR ALL PARTICIPANTS)*

Topics	Healthcare Professionals	Other Relevant Key Players (Non-Healthcare Professionals)
Module 1 Organ donation programs	<p>Which of the following is FALSE: Nowadays kidney is the most frequently donated organ, followed by liver segments, and occasionally lung lobes, pancreas or intestinal segments. Many initiatives have been taken to protect vulnerable people from organ commercialization, such as the Toronto declaration At present, most of the organs removed for transplant come from deceased donors, although in some countries or regions living donors represent a significant number of donation resources The type of relationship allowed for living donation may differ among countries according to their legislation, unrelated donation being the least common one.</p>	<p>When referring to Donor after Cardiac Death (DCD): Maastricht type 2 donors refer to persons who arrive dead at the emergency department, after suffering a cardiac arrest Maastricht type 4 donors include those patients who suffer a witnessed cardiac arrest and in whom cardiac resuscitation is started immediately but it is unsuccessful Maastricht type 3 donors refer to donors in whom the withdrawal of life sustaining treatment is agreed by doctors and family and cardiac arrest is presumed to occur shortly after treatment is withdrawn Type 1 Maastricht applies to patients where cardiac arrest occurs after brain death has already been diagnosed</p>
	<p>Some of the factors that may impact the profile of donors after brain death (DBD) are: Demographics (older population, older donors) The rate of traffic accidents (more traffic and labor accidents, more DBD secondary to head trauma) The technological advances in neurocritical care All of them</p>	<p>Which of the following definitions is TRUE: A living donor is a living human being who donates a certain amount of money to speed up the transplantation process for the ones on the waiting lists A deceased donor is a human being declared, by established medical criteria, to be dead and from whom cells, tissues or organs are recovered for the purpose of transplantation A deceased donor is a human being who was diagnosed and declared dead, and in whom organs and tissues are recovered without any type of consent All are correct</p>
	<p>Which statement is TRUE: Warm ischemia damage is not a concerning issue in DCD so preservation techniques or organ recovery can be delayed if necessary The implementation of DCD programs requires a well-organized structure and excellent coordination of all actors involved in the process DCD classifications have nothing to do with the occurrence of circulatory arrest before or after treatment limitation There is no critical pathway published for DCD. The existing one concerns only DBD</p>	

Topics	Healthcare Professionals	Other Relevant Key Players (Non-Health-care Professionals)
<p>Module 2 Donation pathway for brain death deceased donors</p>	<p>Which of the following definitions for brain death donor is INCOMPLETE? Possible deceased organ donor: a patient with a devastating brain injury or lesion and apparently medically suitable for organ donation Potential donor: A person whose clinical condition is suspected to fulfil brain death criteria Eligible donor: A person who has been declared dead based on neurologic criteria as stipulated by the law of the relevant jurisdiction Actual donor: A consented eligible donor in whom an operative incision was made with the intent of organ recovery or from whom at least one organ was recovered for the purpose of transplantation</p>	<p>Which are the duties of the organ donor coordinator or TPM (Transplant Procurement Manager): To proficiently coordinate all the steps of the donation process To promote, protect and audit the living donation process and their participating actors To provide information and training on donation and transplantation to different sectors and groups of society, especially to the medical community All of them</p>
	<p>Concerning global brain death concept, one of the following statements is TRUE: Postulates that the irreversible loss of the brainstem function is enough for human death The most widespread used definition Definition used in some countries such as the UK Used only in some academic settings</p>	<p>The evaluation process (mark the FALSE one): Has the objective to avoid the transmission of infectious diseases and cancer and to ensure that organs will function properly once transplanted Is the responsibility of the TPM (Transplant Procurement Manager) Should be done only after serology results are known All of them</p>
	<p>During donor maintenance (mark the FALSE one): a. Management must be redirected and focused on the support and protection of the organs to be transplanted. b. Only treatments provided for neurological reasons should be stopped. c. The goal of ICU care in donor management is to maintain homeostasis d. Once the eligible donor is diagnosed brain dead no further treatment is necessary</p>	<p>These are all absolute contraindications for organ donation, except: All tumors with no exceptions HIV Ac + Active acute infections if it was the cause of death or if it affected many organs Unknown cause of death</p> <p>Organ allocation: Is a complex process interfacing organ recovery and transplantation by matching donated organs with transplant candidates Requires a compromise between equity, justice, efficacy, with the goal to save as many lives as possible and provide transplant recipients with the best possible chance of long-term survival Allocation policies shall not be influenced by favoritism or discrimination based on political influence, national origin, race, sex, religion, socio-economic status or personal / behavioral history All of them</p>

Topics	Healthcare Professionals	Other Relevant Key Players (Non-Health-care Professionals)
<p>Module 3 Family approach in case of deceased donation</p>	<p>Which of the following is the best definition of bad news?</p> <p>One that we consider unpleasant or undesirable and would like to avoid delivering</p> <p>One that causes negative emotions on the affected person</p> <p>One that has a serious and adverse effect on the individual's view of the future</p> <p>One that informs about the loss of something important</p>	<p>When is the right time to approach a family for organ donation consent?</p> <p>Before brain death testing in Intensive Care Unit (ICU)</p> <p>After brain death testing in ICU</p> <p>c. When breaking the bad news of death of the relative</p> <p>d. When the family have understood that their relative has died</p>
	<p>Which one is the recommended request pattern strategy to obtain family consent?</p> <p>Family interview only by ICU physician due to their previous close relationship.</p> <p>Request organ donation as soon as a patient is admitted to the hospital in a very critical condition and bad prognosis due to severe brain injury</p> <p>Decoupled request with ICU physician informing the brain death diagnosis and transplant coordinator requesting donation</p> <p>There is not a proper pattern</p>	<p>The recommended way to break bad news is:</p> <p>In a direct manner, right away, so that they can take the news in as soon as possible</p> <p>Only when the person asks for the news through direct questioning</p> <p>After figuring out what they already know, how many details the family wants to know and making them aware that we are the bearers of bad news</p> <p>None of them</p>
	<p>The use of metaphors to explain brain death:</p> <p>Should never be used</p> <p>It is a verbal technique that may facilitate comprehension of such a complicated concept</p> <p>Should always be used</p> <p>It is an example of reflection of emotions</p>	<p>Which of the following statements is false regarding the family interview for organ donation?</p> <p>Only half an hour is enough time to carry out a family interview</p> <p>It is necessary to show empathy and acknowledge their grief</p> <p>Knowledge of verbal and non-verbal communication is necessary</p> <p>The interview time should be adapted to family situation</p>

Topics	Healthcare Professionals	Other Relevant Key Players (Non-Health-care Professionals)
Module 4 Living organ donation	<p>Which is FALSE in reference to the surgical procedure in living kidney donors: The general principle is that the donor should always be left with his/her worst kidney</p> <p>When both kidneys are evaluated as equal, the kidney imposing the lowest surgical risk in the recipient will be the chosen one</p> <p>Open or endoscopic nephrectomies may performed</p> <p>The risk of surgical mortality is very low (0.03%)</p>	<p>All, except ONE of the following are advantages of living donation: Grafts may be of better quality from healthy individuals The moment of transplantation can be planned with time There is no risk for the donor All are correct</p>
	<p>Which is TRUE in reference to the surgical procedure in liver kidney donors: The general principle is that the donated lobe should always be right one. In cases where the left lobe is used there is an increased risk of the “small-for-size” syndrome in the recipient Mortality rate for living donor hepatectomy is higher to that of the kidney donor All the above are true</p>	<p>Informed consent is a necessary step that should be signed (mark the FALSE ONE): After the evaluation takes place and the donor is considered suitable To make sure that the donor understands the risks associated with the process Should be given orally and in written form To make sure that the donors understands the long-term consequences for their health</p>
	<p>Living kidney donation (mark the TRUE one): Has a very low risk of mortality related to donor nephrectomy In health donors is associated with an increased risk of kidney disease in the long term. Donor age does not influence the risk of donor long term renal disease Living kidney donors have a higher incidence of medical disability and sick leave, as well as a lower life expectancy, than age-matched controls</p>	<p>Cross-over donation: A living donor who is incompatible with his/her recipient (A) provides a graft to another recipient (B) whose relative’s graft is suitable for the recipient (A) Is mostly done in lung living donation Is a process in which the living donor gives the graft to the recipient in exchange for the recipient graft that is implanted to the donor It’s a form of related-living donation</p>

Topics	Healthcare Professionals	Other Relevant Key Players (Non-Health-care Professionals)
Module 5 Tissues and cells donation	<p>All of the following are specific characteristics of tissue donation that differentiate it from organ donation</p> <p>Higher potential of tissue donation</p> <p>Longer storage time of the retrieved tissues</p> <p>Higher number of potential recipients</p> <p>All of them</p>	<p>About deceased tissue donors:</p> <p>Only brain dead donors (DBD) can donate tissues</p> <p>Only cardiocirculatory dead (DCD) donors can donate tissues</p> <p>Both types of deceased donors can donate tissues</p> <p>Only DCD donors Maastricht III type can be tissue donors</p>
	<p>Musculoskeletal tissues that can be donated include:</p> <p>Bones</p> <p>Ligaments and tendons</p> <p>Meniscus, cartilage and other soft tissues</p> <p>All of them</p>	<p>Tissue donors may be detected:</p> <p>In the Intensive Care Units (ICUs)</p> <p>In other units of the hospitals</p> <p>At morgues and funeral homes</p> <p>All of them</p>
	<p>Do to its unique structure human amniotic membrane can be used in all these situation, EXCEPT ONE:</p> <p>In birth assistance</p> <p>In arthroplasty</p> <p>In ophthalmology</p> <p>In burns</p>	<p>Medical contraindications for tissue donation:</p> <p>Certain absolute contraindications are similar to those in organ donation</p> <p>Relative contraindications depend of each particular tissue and each particular bank</p> <p>Contraindication of one tissue does not necessarily affect another</p> <p>All of them</p>

Topics	Healthcare Professionals	Other Relevant Key Players (Non-Health-care Professionals)
Module 6 Communication aspects in organ donation	<p>What is the most important goal of crisis communication?</p> <p>To promote your organisation and its activities</p> <p>To maintain trust in and the credibility of your organization and its activities</p> <p>Not to control the flow of information</p> <p>Not to get involved in a crisis or scandal</p>	<p>What is the most important goal of crisis communication?</p> <p>To promote your organisation and its activities</p> <p>To maintain trust in and the credibility of your organization and its activities</p> <p>Not to control the flow of information</p> <p>Not to get involved in a crisis or scandal</p>
	<p>When is European Donation Day celebrated?</p> <p>At annual meetings organised for the media</p> <p>The date is not fixed, the Council of Europe sets the date in case of bad events or scandals</p> <p>It depends when a country celebrates National Organ Donation Day</p> <p>It is recommended to celebrate it every second Saturday in October</p>	<p>When is European Donation Day celebrated?</p> <p>At annual meetings organised for the media</p> <p>The date is not fixed, the Council of Europe sets the date in case of bad events or scandals</p> <p>It depends when a country celebrates National Organ Donation Day</p> <p>It is recommended to celebrate it every second Saturday in October</p>
	<p>All organizations should incorporate new media in their communication strategy and use it in campaigns</p> <p>Yes, because these days everybody is using social media</p> <p>No, because social media are unsuitable for communicating about organ donation</p> <p>It depends, if you like and know social media, then you should use it</p> <p>Yes, but carefully and with great caution; some social media can be used as an additional channel for prompt, direct and ongoing communication with the public</p>	<p>All organizations should incorporate new media in their communication strategy and use it in campaigns</p> <p>Yes, because these days everybody is using social media</p> <p>No, because social media are unsuitable for communicating about organ donation</p> <p>It depends, if you like and know social media, then you should use it</p> <p>Yes, but carefully and with great caution; some social media can be used as an additional channel for prompt, direct and ongoing communication with the public</p>

Topics	Healthcare Professionals	Other Relevant Key Players (Non-Healthcare Professionals)
Module 7 Quality improvement methodologies	<p>The quality assessment and improvement cycle do NOT include:</p> <p>Plan: identify and prioritize the problems, Analyze the causes and solutions proposed</p> <p>Do: implement the solution agreed</p> <p>Check: evaluate the results</p> <p>Adopt: define and implement risk measures</p>	<p>The steps to be considered for quality assessment and improvement are (chose the FALSE one):</p> <p>Problem identification and analysis</p> <p>Risk management measures</p> <p>Solution proposal and implementation</p> <p>Result evaluation</p>
	<p>The hospital's potential of organ donation depends on several factors (chose the FALSE one):</p> <p>Presence of 3rd level trauma services, neurosurgical department, transplant surgery program and ethics committee</p> <p>Number of ICU beds with mechanical ventilation</p> <p>Number of maternity wards</p> <p>Attitude of administrative and medical staff towards donation</p>	<p>Quality criteria:</p> <p>Set out the priority areas for marketing and further growth.</p> <p>Are standards of well-being determine the characteristics of a good or service</p> <p>Are conditions that should be met by the healthcare practice in order to be considered a quality practice</p>
	<p>Which of the following is NOT a dimension of quality in healthcare?</p> <p>Social marketing and promotion</p> <p>Clinical effectiveness</p> <p>Centered on patient</p> <p>Safety</p>	<p>Which of the following statements is FALSE regarding to the definition of indicator?</p> <p>An indicator is a measurement of values</p> <p>An indicator gives an idea of what something is like</p> <p>An indicator is a punitive system for control</p> <p>Indicators are expected to indicate and point</p>

*18 questions are the same as those included in the pre-test (Table S2). Correct answers in bold.

ANNEX 5. LEVEL 2. LEARNING. ATTITUDE AND PERCEPTION



EUDONORGAN Train the trainers, Face to Face Program
Barcelona (Spain), September 18th – 22th 2017

Survey on attitude and perception on organ and tissue donation

PERCEPTION

Choose 5 of these terms that best describe for you the process of donation after brain death

- Solidarity
- Stressful
- Organized
- Complicated
- Positive
- Painful
- Opportunity
- Awkward
- Correct
- Strange
- Dignified
- Mistrustful
- Respectful
- Barbaric
- Encouraging
- Dubious
- Clear
- Chaotic
- Easy
- Discreditable



turn over the page to finish the survey



EUDONORGAN Train the trainers, Face to Face Program
Barcelona (Spain), September 18th – 22th 2017

ATTITUDE

1. Would you donate your organs after death?
 - a. Yes
 - b. No
 - c. I don't know

2. Would you donate the organs of your relatives after death?
 - a. Yes
 - b. No
 - c. I don't know

3. If you chose "No" or "I don't know" in any of the previous two questions, WHY? If you already answered YES in the previous questions, click on the option Not applicable.
 - a. Religious reasons
 - b. Lack of trust in the healthcare system
 - c. Not knowing the wish of the deceased
 - d. Fear of body disfiguration
 - e. Ethical reasons
 - f. Others (please specify)
 - g. Not applicable

4. Organ and tissue donation should be part of the end of life care
 - a. Yes
 - b. No
 - c. I don't know

5. When do you consider that it is the most appropriate moment to talk about organ and tissue donation?
 - a. Any time
 - b. When the death of the patient is predictable
 - c. After the patient's death
 - d. Never

6. Do you agree with the admission to the Intensive Care Unit (ICU) of patients with devastating injuries in whom the treatment has been deemed futile, for the solely reason of facilitating organ and tissue donation?
 - a. Yes
 - b. No
 - c. I don't know

7. Do you consider appropriate to employ the same resources to maintain a potential brain-dead donor as in any other critical patient?
 - a. Yes
 - b. No
 - c. I don't know

ANNEX 6. POST TRAINING

Dear X,

I am writing to you regarding the EUDONORGAN project, the Training and social awareness for increasing organ donation in the European Union and neighbouring countries, where you have participated as trainee during the blended educational programme, held from June to September 2017.

I am currently doing my PhD at the University of Barcelona and my research proposal aims to evaluate the impact of the EUDONORGAN training and the social events. Moreover, this research is focused on analysing changes of knowledge, attitude, and perception towards organ donation.

Considering all the above, this online survey is focused on analysing the third level: **post-training behaviour and performance within the period 2018-2019**. It is structured in close-ended items to be evaluated following the five-point Likert scale, ranging from 1 (poor) to 5 (excellent) and open questions.

I kindly invite you to fill it in.

Many thanks for your kind cooperation,

Patricia Peralta Lasso

PhD student in University of Barcelona

Consent section: By participating in this research, I agree that all data provided will be kept anonymously, without any reference to my identity and confidentially, according to the LOPDP regulation for the protection of personal information.

2. Train the trainers

1. Have you organized and implemented any training action after participating in the blended-learning Eudonorgan Train the Trainers 'course'?

Yes	<input type="checkbox"/>
No, Why?	<input type="checkbox"/>

2. If yes, which year? If no, why?

2018	<input type="checkbox"/>
2019	<input type="checkbox"/>
Both years	<input type="checkbox"/>

3. How many training actions have you implemented after the training?

0	<input type="checkbox"/>
1	<input type="checkbox"/>
2-5	<input type="checkbox"/>
More than 5	<input type="checkbox"/>
If more than 5, how many? _____	

4. Where have you organized and implemented the training action/s? (Choose more than one option, if needed)

In my own workplace	<input type="checkbox"/>
The whole hospital	<input type="checkbox"/>
University	<input type="checkbox"/>
Patients' association	<input type="checkbox"/>
Other:	<input type="checkbox"/>

5. What type of training actions have you organized and implemented? (Choose more than one option, if needed)

Master class (short meeting with experts)	<input type="checkbox"/>
Seminar (1 day training session)	<input type="checkbox"/>
Workshop (specific activity based on a topic)	<input type="checkbox"/>
Other: What type? _____	<input type="checkbox"/>

6. Who was your target audience? (Choose more than one option, if needed)

Professional colleagues	<input type="checkbox"/>
Medical students	<input type="checkbox"/>
Medical staff	<input type="checkbox"/>
Patients	<input type="checkbox"/>
Patients support groups	<input type="checkbox"/>
Other: Which one? _____	<input type="checkbox"/>

7. How many participants have attended the training/s actions? If you have organized more than one training, please specify for each one:

8. What topics have your training actions/s covered? (Choose more than one option, if needed)

Deceased organ donation after brain death	<input type="checkbox"/>
Deceased organ donation after circulatory death	<input type="checkbox"/>
Family approach in case of deceased donation	<input type="checkbox"/>
Living donation	<input type="checkbox"/>
Breaking bad news and family interview	<input type="checkbox"/>
Communication with the media/society	<input type="checkbox"/>

9. What methodological approaches have you proposed during your training (Choose more than one option, if needed):

Workshops	<input type="checkbox"/>
Simulations (except role play)	<input type="checkbox"/>
Role play	<input type="checkbox"/>
Clinical case studies	<input type="checkbox"/>
Mapping exercises	<input type="checkbox"/>
Other (limited characters)	<input type="checkbox"/>

10. What type of evaluation tools have you implemented in your training action/s? (Choose more than one option, if needed)

Pre test (a test given to participants before the training)	<input type="checkbox"/>
Post test (a test given to participants after)	<input type="checkbox"/>

SOCIAL AWARENESS EVENTS

13. Have you participated of the **Social Awareness events** implemented within the project?

Yes	<input type="checkbox"/>
No	<input type="checkbox"/>

14. If you have participated, which one? (Choose more than one option, if needed)

Warsaw, Poland	<input type="checkbox"/>
Budapest, Hungary	<input type="checkbox"/>
Brussels, Belgium	<input type="checkbox"/>
Stockholm, Sweden	<input type="checkbox"/>
Lisbon, Portugal	<input type="checkbox"/>
Athens, Greece	<input type="checkbox"/>

15. What was your role during the event? (Choose more than one option, if needed)

Event coordinator	<input type="checkbox"/>
Event support team	<input type="checkbox"/>
Speaker	<input type="checkbox"/>
Testimony	<input type="checkbox"/>
Other	<input type="checkbox"/>

16. Which tasks have you carried out during the event? (Open question)

17. Do you think the previous **train the trainers' course** you completed was beneficial for your role in the event? If so, how? (Open question)

18. Please add any further comments

the training)	
Observation check list (Assessment tool to monitor participants' behaviour)	<input type="checkbox"/>
Satisfaction surveys (short-term survey resulting from the assessment of participants' educational experience)	<input type="checkbox"/>
Others: Which one?	<input type="checkbox"/>

11. Could you explain what did this/these training actions/s consist of? (Open question)

12. Do you plan to continue?

If yes, ..

If no, ..

