

Organ and tissue donation in a public hospital of Pernambuco

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Abstract

The goal of this study was to carry out a survey of the frequency of organ or tissue donation in Hospital Regional do Agreste, Caruaru, Pernambuco, Brazil. This is a descriptive, retrospective study, based on data from 439 medical records which documented donations made in the hospital between January 2011 and December 2014. Donations varied over the period in question and decreased in the last year of the series, remaining always well below the number of potential donors. In addition, tissue donation was far superior to organ donation. The results show that it is essential to create permanent public measures to raise awareness of the importance of this subject among the population.

Keywords: Brain death. Tissue and organ procurement. Public health policy. Public awareness. Craniocerebral trauma.

Resumo

Doação de órgãos e tecidos em hospital público de Pernambuco

O objetivo desta pesquisa foi realizar levantamento sobre a frequência das doações de órgãos ou tecidos no Hospital Regional do Agreste, Caruaru/PE. Trata-se de estudo descritivo, retrospectivo, com base nos dados de 439 prontuários que registraram as doações realizadas no hospital entre janeiro de 2011 e dezembro de 2014. As doações oscilaram no período considerado e diminuíram no último ano da série, ficando sempre muito abaixo do número de potenciais doadores. Além disso, a doação de tecido foi muito superior à de órgãos. Os resultados demonstram que é imprescindível criar medidas públicas permanentes para conscientizar a população sobre a importância do tema.

Palavras-chave: Morte encefálica. Obtenção de tecidos e órgãos. Políticas públicas de saúde. Sensibilização pública. Traumatismos craniocerebrais.

Resumen

Donación de órganos y tejidos realizados en un hospital público de Pernambuco

El objetivo de esta investigación fue realizar una recolección de datos sobre la frecuencia de las donaciones de órganos o tejidos en el Hospital Regional do Agreste, Caruaru, Pernambuco, Brasil. Este es un estudio descriptivo, retrospectivo, basado en datos de 439 registros médicos que registraron las donaciones realizadas en el hospital entre enero de 2011 y diciembre de 2014. Las donaciones oscilaron en el período considerado y disminuyeron en el último año de la serie, siempre manteniéndose muy por debajo del número de donantes potenciales. Además, la donación de tejidos fue muy superior a la donación de órganos. Los resultados demuestran que es imprescindible crear medidas públicas permanentes para concienciar a la población sobre la importancia del tema.

Palabras clave: Muerte encefálica. Obtención de tejidos y órganos. Políticas públicas de salud. Sensibilización pública. Traumatismos craneocerebrales.

Approval CEP-Unifavip CAAE 42440515.3.0000.5666

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The authors declare no conflict of interest.

The first law to regulate organ and tissue donation in Brazil was Law 5,479, enacted in 1968 and amended in 1997 by Law 9,434^{1,2}, which provided that every Brazilian citizen was a potential donor and refusal to donate should be recorded and identified in a legally valid document. However, in 2001, Law 10,211 changed this and other items², providing that donation depended on the consent of a spouse or relative of legal age³.

Regulation was only possible thanks to massive support of the media, which gave widespread coverage to the subject, prompting its debate among Brazilian families in order to encourage donation⁴. Currently, organ transplantation is the last therapeutic alternative for patients with severe, acute or chronic illnesses, enabling the reversal of the condition and the improvement of their quality of life⁵.

Organ and tissue donation are possible when brain death is confirmed, and the patient's other organs still have adequate blood supply. Brain death is defined as the complete and irreversible destruction of the brainstem, verified by an electroencephalogram and physical examination (both mandatory, according to Brazilian legislation). In cases of death from cardiorespiratory arrest – characterized by lack of cardiac and respiratory activity – donation must be performed within six hours due to the degeneration of body cells⁶.

Whatever the circumstances, the organ and tissue information, harvesting and distribution department must be notified. This department is responsible for informing the local organ procurement organization of the brain death or cardiorespiratory arrest, thus initiating the donation process. Following these procedures, an interview can be conducted with the deceased person's next of kin to verify whether they wish to authorize the donation⁶⁻¹⁰.

In the interview it is common for family members to refuse authorization for lack of basic information on the subject. They are often unaware of the procedures and potential benefits of the donation to other people. This leads to an increase in waiting lists in Brazil¹¹⁻¹³, where organ and tissue transplantation falls far short of demand. By the most optimistic estimates, waiting time for a procedure in Brazil exceeds one year, while the least optimistic predictions are up to nine years for liver transplantation and 11 for kidney transplantation. Such prolonged waiting times lead

to the death of a significant number of candidates for transplantation¹⁴.

Given the above, this study asks: "What is the status of organ and tissue donation?" To answer this question, the investigation focuses on the specific case of a public hospital in an inland city in the state of Pernambuco, observing the frequency of donations in that institution and analyzing the profile of donors.

Method

This is a descriptive, retrospective study carried out at Hospital Regional do Agreste, which serves trauma patients. Situated in the city of Caruaru, Pernambuco, Brazil, the institution has an organ harvesting team that notifies deaths due to brain death or cardiorespiratory arrest. It is the only local hospital to harvest organs and tissues from donors.

The inclusion criteria of this study are date of donation records (between January 2011 and December 2014), notification of the organ harvesting team and place of death (only deaths in the actual hospital were considered). Incomplete and illegible medical records were excluded from the study. During the period in question, 1,316 deaths were reported to the organ and tissue harvesting team. However, only 439 met the established eligibility criteria.

Medical record data were used by the researchers to fill out the evaluation forms. These forms contained background information – age, gender, date of donation, place of residence and marital status – information on the patient's health – systemic hypertension or diabetes mellitus, alcoholism, use of tobacco, cardiorespiratory arrest and use of vasoactive drugs. Also added was the degree of kinship of the person who authorized the organ or tissue donation.

The information was recorded by one of the researchers in the evaluation forms and subsequently checked by another for possible inaccuracies. The data was entered in Microsoft Excel 2007 by two evaluators, independently (double data entry), to avoid typing errors and ensure reliability. Descriptive statistics were used, with results expressed in frequency and percentage for dichotomous qualitative variables and means and standard deviation for quantitative

variables. The data were analyzed using Statistical Package for the Social Sciences (SPSS) software, version 18.0.

Results

This study analyzed organ and tissue donations and donor profiles in Hospital Regional do Agreste (Caruaru, Pernambuco, Brazil) between January

2011 and December 2014. Over this period, 5,230 deaths were reported, of which 1,316 were considered to be of potential donors; however, only 439 of them donated organs or tissues, for a total of 457 donations (436 tissues and 21 organs). The number of donations varied over the years observed in this study (2011: 16.6%; 2012: 34.3%; 2013: 32%; 2014: 17.1%), and tissue donations (95.4% of total donations) were more frequent than organ donations (4.6%), as shown in Table 1.

Table 1. Deaths, potential donors and organ and tissue donations in Hospital Regional do Agreste (Caruaru/PE)

	2011		2012		2013		2014		Total	
	n	%	n	%	n	%	n	%	n	%
Death notifications	870	16.6	1,463	28.0	1,625	31.1	1,272	24.3	5,230	100
Potential organ or tissue donors	251	19.1	460	35.0	377	28.6	228	17.3	1,316	100
Organ or tissue donations	76	16.6	157	34	146	31.9	78	17.1	457	100
Tissue donations	74	17.0	154	35.3	134	30.7	74	17.0	436	100
Organ donations	2	9.5	3	14.3	12	57.1	4	19.1	21	100

Table 2 shows the mean age of donors (50.5±16.9), with a predominance of men (63.8%). Regarding marital status, most were married (44.2%), followed by single donors (36%). In most cases donation was authorized by offspring (33.5%) or spouse (29.4%). Regarding place of residence, most donors lived in Caruaru (47.2%), but patients from neighboring towns and cities such as Bezerros (5.5%) and Belo Jardim (3.2%) also appear in the sample. As for chronic diseases, 45.3% of the sample had some kind of disease, 36.2% had high blood pressure and 25.1% had diabetes mellitus. Alcoholism affected 25.7% of donors and only 6.2% made use of tobacco.

Most donors suffered cardiorespiratory arrest (95%), 4.8% were declared brain dead and 0.2% were dead (Table 3) on arrival. Causes of death included: acute respiratory failure (8.7%), hypovolemic shock (7%), polytrauma (6.2%) and ischemic stroke (2.3%). The other causes (75.8%) were split into a total of 84 identified diseases.

The main cause of brain death was craniocerebral trauma (33.3%) followed by hypoxic encephalopathy and hemorrhagic stroke, both with 14.3%. Tissue donations were much more numerous than organ donations and the most donated tissue was the cornea. There were also multiple-organ donations: heart, liver, pancreas and kidneys (85.7%); liver and kidneys (9.5%); and liver, pancreas and kidneys (4.8%).

Table 2. Profile of organ and tissue donors in Hospital Regional do Agreste (Caruaru, Pernambuco, Brazil)

	Mean±SD	n	%
Age	50.5±16.9		
Gender			
Men	-	280	63.8
Women	-	159	36.2
Marital status			
Married	-	194	44.2
Single	-	158	36.0
Widowed	-	40	9.1
Stable union	-	26	5.9
Divorced	-	21	4.8
Degree of kinship of person who authorized the donation			
Offspring	-	147	33.5
Spouse	-	129	29.4
Parent	-	75	17.1
Sibling	-	74	16.9
Nephew/niece	-	9	2.0
Grandparent, grandchild and uncle/aunt	-	5	1.1
Place of residence			
Caruaru	-	207	47.2
Bezerros	-	24	5.5
Belo Jardim	-	14	3.2
Agrestina	-	12	2.7
Toritama	-	11	2.5
Other	-	171	38.9

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Table 2. Continuation

	Mean±SD	n	%
Chronic diseases			
Yes	-	199	45.3
No	-	240	54.7
Systemic hypertension			
Yes	-	159	36.2
No	-	280	63.8
Diabetes mellitus			
Yes	-	110	25.1
No	-	329	74.9
Alcoholism			
Yes	-	113	25.7
No	-	326	74.3
Tobacco use			
Yes	-	27	6.2
No	-	412	93.8

Table 3. Characteristics of organ and tissue donations in Hospital Regional do Agreste (Caruaru, Pernambuco, Brazil)

	n	%
Cause of death		
Acute respiratory failure	38	8.7
Hypovolemic shock	31	7.0
Polytrauma	27	6.2
Ischemic stroke	10	2.3
Other	333	75.8
Cardiorespiratory arrest		
Yes	417	95.0
No	22	5.0
Brain death		
Yes	21	4.8
No	418	95.2
Main cause of brain death		
Craniocerebral trauma	7	33.3
Hypoxic encephalopathy	3	14.3
Hemorrhagic stroke	3	14.3
Other	8	38.1
Use of vasoactive drugs		
Yes	21	4.8
No	418	95.2
Tissue donor only		
Yes	436	99.3
No	3	0.7
Organ donor only		
Yes	21	4.8
No	418	95.2
Multiple-organ donations		
Heart, liver, pancreas and kidneys	18	85.7
Liver and kidneys	2	9.5
Liver pancreas and kidneys	1	4.8

Discussion

A review of the literature on the subject revealed a shortage of data on organ and tissue donation in Brazil in this decade, which makes comparisons difficult. Nevertheless, this study found a much higher number of potential donors (n=1,316) compared to actual donors (n=439). Moreover, donations varied over the years in question and decreased in the last year analyzed (2014) compared to the second year of the series (2012).

Data from the Brazilian Organ Transplantation Association (ABTO)¹⁵ show the Northeast region as the second region with the fewest donations, behind only the North region. In addition, northeastern states have a high number of refusals of organ and tissue donation – Paraíba (61%), Bahia (62%), Maranhão (64%) and Sergipe (74%). Pernambuco has the lowest rate (44%), but still quite high.

The high rate of refusals to authorize tissue and organ donations in Hospital Regional do Agreste, which serves 32 neighboring cities of Caruaru, confirms ABTO data. This issue must be faced with permanent public policies, especially in towns and cities furthest from large urban centers and capital cities, as it is likely that residents of these regions have more doubts and less information on the subject.

Refusal generates a shortage of available organs, significantly affecting the likelihood of cure for patients on the waiting list. The situation is even worse when waiting time for transplants is not only high but unpredictable. Such uncertainty creates life planning difficulties for patients and families, reduces the efficiency of health services and affects production, since it prevents individuals from performing adequately at work¹⁶.

In view of all the difficulties in harvesting transplants, it is important to ask: “Why does the population still oppose organ and tissue donation?” There are many reasons, especially social and religious issues given the multi-ethnic, multicultural and multireligious nature of Brazilian society¹⁷.

For Moraes and Massarollo¹⁸, inadequate emotional support, religious beliefs, fears and taboos are the main factors that prevent family members from authorizing this type of donation when grieving. Freire and collaborators¹⁹ also emphasize that the hospital structure and the death process influence the refusal to donate. All these causes jointly contribute to the increase in waiting lists for an organ.

Another important factor is fear that the body of the deceased will be deformed by organ removal

procedures, the result of lack of information about the process and poor support to the family who have just lost a loved one and are grieving²⁰. However, it is important to note that Brazilian legislation obliges transplant teams to adequately reconstruct the donor's body to hand it over to relatives or legal guardians²¹.

In this study, given the low frequency of donation among patients residing outside Caruaru, one should also consider concern with body transportation. Last but not least are bureaucratic procedures, which involve referring to the deceased as a "body," making decisions and signing papers, situations that may cause even more suffering²⁰.

Refusal is influenced by a negative view of the procedure, which reveals the need to provide the population with better guidance. Thus, it is essential to create permanent donation encouragement campaigns that inform society²², an educational process in which healthcare professionals play a key role.

The media can help spread information on the subject alongside educational and religious institutions, paving the way for healthcare professionals to raise awareness among society. Given the reach of the media and those entities, the discussion initiated in such spaces could quickly spread to households, reaching a larger number of people.

A study found that Brazilian adolescents feel the need to help others and view themselves as potential organ or tissue donors but feel poorly informed about the procedure²³. The result confirms that the subject is still not adequately addressed in schools in Brazil.

For Victorino and Ventura²⁴, the existence of laws on organ donation and transplantation is not enough. Healthcare professionals and the population must be aware of the legislation for it to be effective and increase the number of organs available for transplantation. Healthcare professionals should also be better trained in related subjects, such as brain death²⁵.

This study also analyzed the profile of organ or tissue donors. Most of the sample was male, married and with a mean age of 50.5 years. In most cases their offspring were responsible for authorizing the donation. Regarding their death, craniocerebral trauma was the most frequent cause of brain death. Other than brain death, the most common cause was acute respiratory failure.

The data corroborate the studies by Freire and collaborators²⁶ and Aguiar and collaborators²⁷, who also found a predominance of male donors who had

suffered fatal craniocerebral trauma. This might be explained by the fact that men are more involved in accidents with serious trauma and violence, such as car crashes. Regarding this study, it should also be noted that Hospital Regional do Agreste is a large center specialized in orthopedics and traumatology.

A relevant result for the formulation of public policies is the fact that most donations were authorized by the donor's offspring. Therefore, the younger population can be targeted by awareness initiatives that draw on their openness to this subject. Schools and universities are the ideal places for these policies to reduce family refusal, the main obstacle to donation²⁸.

Another important fact is the higher frequency of tissue donation compared to organ donation, which is justified by the fact that brain death accounts for only 4.8% of the sample. Among such donations, the most common is the cornea, whose transplantation has been one of the most required in recent years, to the point of being currently one of the most performed, boasting the highest success rate among tissue transplants in humans^{29,30}. According to Lucilius and Kruckenfellner, the cornea *was the first human tissue to be transplanted and is the only tissue free of blood vessels, which makes it possible to remove it from the body up to six hours after death and preserve it for use in transplantation up to 14 days. The resistance of the tissue is decisive for the success of the procedures*³¹.

This study found that organ and tissue donations varied over the period in question and decreased in the last year, which may have increased the waiting time for transplants, resulting in greater costs to the health system and suffering to patients. Unavailability is often resolved with the use of organs of inferior quality, which reduces graft durability. This leads to the need for new procedures, increased post-transplant mortality rates and reduced actuarial survival of the transplanted population³².

In this scenario, healthcare professionals must act as educators to modify misconceptions spread among the population, who should be encouraged to take part in debates about organ transplantation. Changing reality also implies developing ongoing education programs supported by theoretical frameworks and scientifically recognized models, aimed at all segments of the community³³.

Therefore, it is necessary to convince the public authorities to address the lack of incentive to donate organs as a serious issue and include educational activities in their healthcare policies¹⁰. It is important that the government take on this

responsibility, which is related to the right to live and die with dignity. After all, it is the role of the Brazilian Unified Health System to ensure patients receive the necessary healthcare to enjoy quality of life throughout their finite and provisional journey³³.

Final considerations

Organ and tissue donation in Hospital Regional do Agreste varied over the observed period, eventually decreasing in the last year of the series. Overall, the number of effective donors was always well below the number of potential donors.

Moreover, tissue donation was far higher than organ donation. Therefore, it is essential to create permanent social and health programs to raise awareness of this issue among the population.

In addition, such sensitization and awareness may culminate in a review of current legislation to recognize the will of donors as overriding, thus ensuring their autonomy. That way the donation, without being compulsory, as provided by Law 9,434/1997^{1,2}, would respect the person's desire without causing more suffering and discomfort to the family, allowing us to make progress in increasing the number of organ donations and reducing waiting lists for transplants in Brazil.

References

1. Pruinelli L, Luce Kruse KM. Mídia e doação de órgãos: a produção de sujeitos doadores. *Rev Gaúcha Enferm* [Internet]. 2012 [acesso 19 mar 2018];33(4):86-93. Disponível: <https://bit.ly/2NrgD7h>
2. Silveira PVP, Silva AA, Oliveira ACS, Alves AJ, Quaresimin CR, Dias CM *et al*. Aspectos éticos da legislação de transplante e doação de órgãos no Brasil. *Rev. bioét. (Impr.)* [Internet]. 2009 [acesso 19 mar 2018];17(1):61-75. Disponível: <https://bit.ly/36Un4Y7>
3. Reis DJF, Vieira JDR, Araújo DA, Torres SAS, Teles LLM. Doação e transplante de órgãos no Brasil: lei, filas de espera e famílias. *R Min Educ Fís* [Internet]. 2010 [acesso 20 mar 2018];5 Spec No:96-104. Disponível: <https://bit.ly/35UPQGO>
4. Traiber C, Lopes MHI. Educação para doação de órgãos. *Sci Med* [Internet]. 2006 [acesso 20 mar 2018];16(4):178-82. Disponível: <https://bit.ly/30lpJl3>
5. Araújo MN, Massarollo MCKB. Conflitos éticos vivenciados por enfermeiros no processo de doação de órgãos. *Acta Paul Enferm* [Internet]. 2014 [acesso 20 mar 2018];27(3):215-20. DOI: 10.1590/1982-0194201400037
6. Dalbem GG, Caregnato RCA. Doação de órgãos e tecidos para transplante: recusa das famílias. *Texto Contexto Enferm* [Internet]. 2010 [acesso 20 mar 2018];19(4):728-35. DOI: 10.1590/S0104-07072010000400016
7. Cinque VM, Bianchi ERF. Estressores vivenciados pelos familiares no processo de doação de órgãos e tecidos para transplante. *Rev Esc Enferm USP* [Internet]. 2010 [acesso 20 mar 2018];44(4):996-1002. DOI: 10.1590/S0080-62342010000400020
8. De Mattia AL, Rocha AM, Freitas Filho JPA, Barbosa MH, Rodrigues MB, Oliveira MG. Análise das dificuldades no processo de doação de órgãos: uma revisão integrativa da literatura. *Bioethikos* [Internet]. 2010 [acesso 20 mar 2018];4(1):66-74. Disponível: <https://bit.ly/386CMzO>
9. Morais TR, Morais MR. Doação de órgãos: é preciso educar para avançar. *Saúde em Debate* [Internet]. 2012 [acesso 21 mar 2018];36(95):633-9. DOI: 10.1590/S0103-11042012000400015
10. Rech TH, Rodrigues Filho EM. Entrevista familiar e consentimento. *Rev Bras Ter Intensiva* [Internet]. 2007 [acesso 21 mar 2018];19(1):85-9. DOI: 10.1590/S0103-507X2007000100011
11. Cinque VM, Bianchi ERF. A tomada de decisão das famílias para a doação de órgãos. *Cogitare Enferm* [Internet]. 2010 [acesso 21 mar 2018];15(1):69-73. DOI: 10.5380/ce.v15i1.17174
12. Almeida KC, Tipple AFV, Bachion MM, Leite GR, Medeiros M. Doação de órgãos e bioética: construindo uma interface. *Rev Bras Enferm* [Internet]. 2003 [acesso 21 mar 2018];56(1):18-23. DOI: 10.1590/S0034-71672003000100004
13. Dell Agnolo CM, Belentani LM, Zurita RCM, Coimbra JAH, Marcon SS. A experiência da família frente à abordagem para doação de órgãos na morte encefálica. *Rev Gaúcha Enferm* [Internet]. 2009 [acesso 21 mar 2018];30(3):375-82. Disponível: <https://bit.ly/2TmAEEQ>
14. Marinho A, Cardoso SS, Almeida VV. Disparidades nas filas para transplantados de órgãos nos estados brasileiros. *Cad Saúde Pública* [Internet]. 2010 [acesso 21 mar 2018];26(4):786-96. DOI: 10.1590/S0034-71672003000100004
15. Associação Brasileira de Transplante de Órgãos. Dimensionamento dos transplantes no Brasil e em cada estado (2010-2017). *Registro Brasileiro de Transplantes* [Internet]. 2017 [acesso 20 dez 2019];23(4). Disponível: <https://bit.ly/2FWrocl>
16. Marinho A. Um estudo sobre as filas para transplantes no Sistema Único de Saúde brasileiro. *Cad Saúde Pública* [Internet]. 2006 [acesso 21 mar 2018];22(10):2229-39. DOI: 10.1590/S0102-311X20060001000029
17. Robson NZ, Razack AH, Dublin N. Organ transplants: ethical, social, and religious issues in a multicultural society. *Asia Pac J Public Health* [Internet]. 2010 [acesso 21 mar 2018];22(3):271-8. DOI: 10.1177/1010539509357446

18. Moraes EL, Massarollo MCKB. Recusa de doação de órgãos e tecidos para transplante relatados por familiares de potenciais doadores. *Acta Paul Enferm* [Internet]. 2009 [acesso 21 mar 2018];22(2):131-5. DOI: 10.1590/S0103-21002009000200003
19. Freire ILS, Vasconcelos QLDAQ, Torres GV, Araújo EC, Costa IKF, Melo GSM. Estrutura, processo e resultado da doação de órgãos e tecidos para transplante. *Rev Bras Enferm* [Internet]. 2015 [acesso 21 mar 2018];68(5):837-45. DOI: 10.1590/0034-7167.2015680511i
20. Roza BA, Garcia VD, Barbosa SFF, Mendes KS, Schirmer J. Doação de órgãos e tecidos: relação com o corpo em nossa sociedade. *Acta Paul Enferm* [Internet]. 2010 [acesso 21 mar 2018];23(3):417-22. DOI: 10.1590/S0103-21002010000300017
21. Victorino JP, Ventura CAA. Bioética e biodireito: da doação ao transplante de órgãos. *Braz J Forensic Sci Med Law Bioeth* [Internet]. 2016 [acesso 21 mar 2018];6(1):72-83. DOI: 10.17063/bjfs6(1)y201672
22. Cantarovich F. Public opinion and organ donation suggestions for overcoming barriers. *Ann Transplant* [Internet]. 2005 [acesso 21 mar 2018];10(1):22-5. Disponível: <https://bit.ly/2QX8Wbi>
23. Monteiro AMC, Fernandes EC, Araújo EC, Cavalcanti AMTS, Vasconcelos MGL. Doação de órgãos: compreensão na perspectiva de adolescentes. *Rev Bras Saúde Matern Infant* [Internet]. 2011 [acesso 21 mar 2018];11(4):389-96. DOI: 10.1590/S1519-38292011000400005
24. Victorino JP, Ventura CAA. Doação de órgãos: tema bioético à luz da legislação. *Rev. bioét. (Impr.)* [Internet]. 2017 [acesso 22 mar 2018];25(1):138-47. DOI: 10.1590/1983-80422017251175
25. Morato EG. Morte encefálica: conceitos essenciais, diagnóstico e atualização. *Rev Méd Minas Gerais* [Internet]. 2009 [acesso 15 dez 2019];19(3):227-36. Disponível: <https://bit.ly/2R1gvxm>
26. Freire SG, Freire ILS, Pinto JTJM, Vasconcelos QLDAQ, Torres GV. Alterações fisiológicas da morte encefálica em potenciais doadores de órgãos e tecidos para transplantes. *Esc Anna Nery* [Internet]. 2012 [acesso 22 mar 2018];16(4):761-6. DOI: 10.1590/S1414-81452012000400017
27. Aguiar MIF, Araújo TOM, Cavalcante MMS, Chaves ES, Rolim ILTP. Perfil de doadores efetivos de órgãos e tecidos no estado do Ceará. *Rev Min Enferm* [Internet]. 2010 [acesso 22 mar 2018];14(3):353-60. Disponível: <https://bit.ly/36Z4kGZ>
28. Coelho DHF, Bonella AE. Doação de órgãos e tecidos humanos: a transplantação na Espanha e no Brasil. *Rev. bioét. (Impr.)* [Internet]. 2019 [acesso 15 dez 2019];27(3):419-29. DOI: 10.1590/1983-80422019273325
29. Issaho DC, Tenório MB, Moreira H. Principais variáveis envolvidas na não-doação de córneas de potenciais doadores em um hospital universitário em Curitiba. *Arq Bras Oftalmol* [Internet]. 2009 [acesso 22 mar 2018];72(4):509-14. DOI: 10.1590/S0004-27492009000400014
30. Moreno GL, Souza LB, Freitas D, Sato EH, Vieira LA. Transplante de córnea e o conhecimento do procedimento pelos pacientes. *Arq Bras Oftalmol* [Internet]. 2003 [acesso 22 mar 2018];66:797-801. DOI: 10.1590/S0004-27492003000700012
31. Lucilius C, Kruckenfellner J. Campanha promove conscientização sobre doação de córneas e órgãos [Internet]. Campinas: Hospital de Clínicas Unicamp; 2012 [acesso 19 mar 2018]. Disponível: <https://bit.ly/371FOFc>
32. Garcia VD, Abbud FM, Neumann J, Pestana JOM. *Transplante de órgãos e tecidos*. 2ª ed. São Paulo: Segmento Farma; 2006.
33. Minayo MCS. Cuidar do processo de morrer e do luto. *Ciênc Saúde Colet* [Internet]. 2013 [acesso 22 mar 2018];18(9):2484. Disponível: <https://bit.ly/2FSn6EF>

Participation of the authors

Emillena Tabosa Monteiro and Sara Pessoa de Albuquerque designed the study, collected the data and drafted the manuscript. Renato de Souza Melo provided guidance and supervision in all stages of the study.

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Received: 1.15.2018

Revised: 11.12.2019

Approved: 12.20.2019