

# ORGAN DONATION SCENARIO IN A TRANSPLANTATION CENTER OF PERNAMBUCO

## CENÁRIO DA DOAÇÃO DE ÓRGÃOS EM UMA MACRORREGIONAL DE PERNAMBUCO

## ESCENARIO DE LA DONACIÓN DE ÓRGANOS EN UNA CENTRAL DE PERNAMBUCO

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**Objective:** to know the scenario of organ and tissue donation of a transplantation center located in Pernambuco. **Method:** quantitative, descriptive, retrospective and exploratory study. **Results:** suspected brain death identified in 524 medical records of patients hospitalized between January 2013 and December 2017. Most potential donors were male (63.6%), age group between 21 and 60 years old (55.9%); main causes of brain death were stroke (27.9%) and head trauma (19.5%). Most of hospitalizations (96.2%) in public institutions. Total of brain death protocols 86.8%. Family acceptance (53.5%) for donation predominated. **Conclusion:** mostly male individuals, young adults, treated in public hospitals and having traumatic brain injury as the main cause of death, were organ and tissue donors in a transplant center. As for donation acceptance, family interviews were positive and, in large part, in favor of donation.

**Descriptors:** Tissue Donors. Obtaining Tissues and Organs Health Assessment. Brain Death.

*Objetivo: conhecer o cenário da doação de órgãos e tecidos de uma macrorregional de transplantes situada em Pernambuco. Método: estudo quantitativo, descritivo, retrospectivo e exploratório. Resultados: suspeita de morte encefálica identificada em 524 prontuários de pacientes internados entre janeiro de 2013 e dezembro de 2017. A maioria dos potenciais doadores era do sexo masculino (63,6%), faixa etária entre 21 e 60 anos (55,9%); principais causas de morte encefálica foram acidente vascular encefálico (27,9%) e trauma cranioencefálico (19,5%). Maioria de internamentos (96,2%) em instituições públicas. Protocolos de morte encefálica totalizaram 86,8%. Predominou aceitação familiar (53,5%) para doação. Conclusão: doação de órgãos e tecidos em uma macrorregional de transplantes era feita majoritariamente por indivíduos do sexo masculino, adultos jovens, atendidos em hospitais públicos e tendo como principal causa de morte o traumatismo crânio encefálico. Quanto ao aceite para doação, as entrevistas familiares foram positivas e, em grande parte, favoráveis à doação.*

*Descritores: Doadores de Tecidos. Obtenção de Tecidos e Órgãos Avaliação em Saúde. Morte Encefálica.*

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*Objetivo: conocer el escenario de donación de órganos y tejidos de un centro de trasplantes ubicado en Pernambuco. Método: estudio cuantitativo, descriptivo, retrospectivo y exploratorio. Resultados: sospecha de muerte cerebral identificada en 524 registros médicos de pacientes hospitalizados entre enero de 2013 y diciembre de 2017. La mayoría de los donantes potenciales eran varones (63,6%), de edad entre 21 y 60 años (55,9%); las principales causas de muerte cerebral fueron accidente cerebrovascular (27,9%) y traumatismo craneoencefálico (19,5%). La mayoría de las hospitalizaciones (96,2%) en instituciones públicas. Los protocolos de muerte cerebral totalizaron el 86,8%. Predominó la aceptación familiar (53,5%) para la donación. Conclusión: la donación de órganos y tejidos en un centro de trasplante fue realizada principalmente por individuos masculinos, adultos jóvenes, tratados en hospitales públicos y con traumatismo craneoencefálico como la principal causa de muerte. En cuanto a la aceptación de la donación, las entrevistas familiares fueron positivas y, en gran parte, favorables a la donación.*

*Descriptores: Donantes de tejidos. Obtención de Tejidos y Órganos Evaluación en salud. Muerte Cerebral.*

## Introduction

Brazil ranks second in absolute numbers in the conduct of transplantations in the world, with the largest public program of organ and tissue transplantations. In recent years, the donation rate has been growing and in 2017, it reached the proposed target of 16.5 per million people (pmp), with an increase of 14.6% compared to 2016. In 2018, the rate of effective donations increased by 2.4% (17.0 pmp), not reaching the expected rate (18.0 pmp)<sup>(1)</sup>.

Although the numbers are growing, transplantations performed are still not enough to reduce the waiting line. Among the total notifications of Potential Donors (PD), in 67% of the cases the donation is not carried out, and family refusal is the main cause (43%)<sup>(1)</sup>.

For the process of organ donation for transplantation purposes, it is necessary to make the diagnosis of Brain Death (BD), with criteria established by the *Conselho Federal de Medicina* (CFM), in accordance with Resolution No. 2.173/2017<sup>(2)</sup>. BD is described as absence of supraspinal activity, non-perceptual coma and persistent apnea. After opening the BD protocol, the compulsory notification of the potential donor to the *Central de Notificação, Captação e Distribuição de Órgãos* (CNCDO) occurs.

Only after BD confirmation, the donation can be offered to the family that, in accordance with Law No. 10.211/2001, authorizes or not the donation of organs and tissues<sup>(3)</sup>. The person who may authorize the donation is the spouse or relative to the second degree, according to line

of inheritance, of legal age. Moreover, in order for the transplantation to occur, the recipient has to be enrolled in a single waiting list, agree to perform the procedure, being advised on the possible risks and benefits of the procedure<sup>(3)</sup>.

The potential organ donor (PD) is the patient who presents suspected clinical conditions of BD, including the protocol, according to the criteria pre-established by CFM<sup>(2)</sup>. Sequentially the PD will undergo two clinical evaluations and at least one complementary examination, according to age, to confirm or rule out diagnosis of BD. In this sense, measures to maintain the PD will be introduced, aiming at closing the protocol and the survival of these organs, so that, if death is confirmed, organ donation can be offered<sup>(4)</sup>.

Transplantation is characterized as a safe therapeutic modality for various chronic and disabling diseases, besides promoting rehabilitation and increased life expectancy of individuals<sup>(1-5)</sup>. However, to offer better quality organs to receptors, it is necessary to intensify care with the PD, due to the hemodynamic/physiological instability caused by BD, which represents a risk of impairing the functionality of the organs<sup>(6-7)</sup>.

Health professionals linked to the organ donation process, whether in the maintenance of the PD, whether in the transplant team, need to know the PD clinically and be in contact with their families, to offer them quality care. The efficacy of transplantation depends on the donation implementation with quality organs.

The study aims to know the scenario of organ and tissue donation of a transplantation center located in Pernambuco.

## Method

This is a descriptive, exploratory, quantitative study conducted in a transplantation center in Pernambuco, from October 2017 to January 2018.

The center covers about 30 municipalities in the state of Pernambuco and has its headquarters in a hospital in the city of Petrolina (PE), but receives notifications BD from all notifying hospitals of the macro region.

Data from all medical records of patients hospitalized with suspected BD, with ongoing protocol, from January 2013 to December 2017, who met the research criteria, were collected.

As inclusion criteria, we adopted: potential organ donor patients, with protocol in progress or complete. The medical records in which the notes were incomplete were excluded. After applying the inclusion and exclusion criteria, we had 524 medical records.

Data collection instruments used were family interviews and a structured form with closed questions, elaborated by the authors for this study, based on the notification form of the potential donor, containing information related

to the sociodemographic profile, diagnosis of admission, comorbidities, clinical diagnosis of brain death, length of hospitalization, confirmation of BD and length of the BD protocol.

The data were transcribed to the Excel for Windows/2013 program and then transposed to the Data Analysis and Statistical version 12.0 software in order to perform descriptive analyses, with absolute and relative frequency tables.

The study respected the formal requirements contained in national and international regulatory standards for research involving human beings, according to Resolution No. 466/2012. Since it is a research with secondary data, we requested institutional authorization, ensuring the non-use of the information to the detriment of persons and/or communities. The project was approved by the Research Ethics Committee of the State University of Bahia, under Opinion no. 1.984.075 and CAAE n. 65496017.3.0000.0057.

## Results

We could observe that, of the total number of medical records analyzed, 326 (63.6%) were male patients; the prevalent age group was from 41 to 60 years old with 177 patients (33.8%), followed by the age group from 21 to 40 years old, with 168 (32.1%) (Table 1).

**Table 1** – Identification of potential organ and tissue donors for transplants. Petrolina Center. Petrolina, Pernambuco, Brazil – 2013-2017 (N=524)

Variables	n	%
<b>Age group (n=524)</b>		
Up to 20	102	19.5
21 – 40	168	32.1
41 – 60	177	33.8
Acima de 61	77	14.7
<b>Gender (n=513)</b>		
Male	326	63.6
Female	187	36.5

Source: Created by the authors.

We observed that the main causes of brain death were traumatic brain injury, with 33.9% of the cases, followed by stroke, with 27.9% of the cases. Other diagnoses, such as meningitis,

hypoxia, arteriovenous malformation, among other causes corresponded to 16% of the notifications. The length of stay until the definitive diagnosis of BD ranged from less than

24 hours to 48 hours. Considering the hospital in which the patients were admitted, 96.2% were in public hospitals of the Network. After

hospitalization, 33.1% of the protocols started within 24 h (Table 2).

**Table 2** – Clinical profile and hospitalization of potential donor. Petrolina Center. Petrolina, Pernambuco, Brazil – 2013-2017 (N=524)

Variables	n	%
<b>Cause of Brain Death (n=524)</b>		
Traumatic brain injury	177	33.9
Stroke	146	27.9
Subarachnoid Hemorrhage	92	17.6
Firearm injuries	11	2.1
Tumor in central nervous system	10	1.9
Other causes	88	16.6
<b>Hospital (n=524)</b>		
Public	504	96.2
Private	20	3.8
<b>Length of hospital stay until diagnosis of Brain Death (n=513)</b>		
Up to 24 hours	170	33.1
25 – 48 hours	138	26.9
49 – 72 hours	74	14.4
73 – 96 hours	39	7.6
> than 96 hours	92	17.9

Source: Created by the authors.

For the conclusion of the protocol, it is necessary to perform two clinical examinations and complementary examination, according to age, in accordance with current legislation. According to the medical records analyzed, 86.8% of the protocols were complete. An amount of 69 protocols was not complete. Of these, 98.5% was due to cardiorespiratory arrest between the evaluations.

Cardiorespiratory arrest does not indicate the protocol should be interrupted or non-opened. Sometimes it can be the cause of BD, happening before the process begins. Thus, we identified the occurrence of 13 (2.5%) cardiorespiratory arrests before the beginning of the protocol. However, these cases went through cardiopulmonary resuscitation (CPR) process successfully and it was possible to start the protocol, because the

parameters were feasible for their conduction. CRP was recorded after an open protocol in 81 (15.6%) cases, however, the diagnosis of BD was complete, since the patient was revived and there was no organ failure.

Forty-five protocols were complete, all with conclusive results for BD. Of this quantitative, 379 interviews were conducted with family members, because the other cases were contraindicated for organ donation, and the interview was not necessary. The most prevalent reason for contraindication of donation relate to the clinical conditions of patients (69.4%). Only 6.6% of patients had positive serology for HIV or hepatitis, and were also contraindicated to organ donation. Of the interviews conducted, more than half (53.5%) of family members accepted the donation of organs and tissues (Table 3).

**Table 3** – Organ donation process. Petrolina Center. Petrolina, Pernambuco, Brazil – 2013-2017 (N=524)

Variables	n	%
<b>Complete Brain Death Protocol (n=524)</b>		
Yes	455	86.8
No	69	13.2
<b>Reason for incomplete protocol (n=69)</b>		
Cardiorespiratory arrest between evaluations	68	98.5
Absence of further examinations	1	1.5
<b>Cardiorespiratory arrest (n=524)</b>		
No	430	81.9
Yes, after the opening of the protocol	81	15.6
Yes, before the opening of the protocol	13	2.5
<b>Family interview (n=455)</b>		
Yes	379	83.3
No	76	16.7
Patient without clinical conditions	54	71
Patient comorbidities	7	9.2
Positive Serology	5	6.6
Neoplasms	4	5.3
Multiple organ dysfunction	4	5.3
Sepsis	2	2.6
<b>Result of family interviews (n=379)</b>		
Positive	203	53.5
Negative	176	46.4

Source: Created by the authors.

## Discussion

In this study, the most prevalent age groups were from 21 to 40 and 41 to 60 years old, evidencing a population of adults of economically active age. Recent studies show similar results with a prevalent age group between 20 and 60 years old<sup>(6-8)</sup>. Patients over 60 years old often have a higher prevalence of comorbidities and, because of this, a lower tendency to be donors, which underlies the predominance of younger PD. However, studies indicate an increase in the age of PD, which can be justified by the aging of the population, in the case of Brazil, and more flexible clinical parameters for possible donors<sup>(9-10)</sup>.

Regarding gender, male was predominant, corroborating other studies with the same population<sup>(6-11)</sup>. According to the Ministry of Health, men die earlier, mainly due to external

causes, are more susceptible to chronic diseases and seek less health services<sup>(12)</sup>. The literature confirms the results of this study, which identifies a higher incidence of mortality and consequently higher existence of men for PD<sup>(6-11)</sup>.

In the USA, according to data from the Organ Procurement and Transplantation Network, in 2018, the most prevalent age groups were from 18 to 34 years old, from 35 to 49 years old and from 50 to 63 years old<sup>(13)</sup>. In addition, the gender prevalent among potential donors was male, showing similarity between the profiles of PD in that and this study.

Among the main causes of BD are Traumatic Brain Injury (TBI) followed by stroke. These data differ from some findings<sup>(9,14-15)</sup>, which show stroke as the main cause of BD. These studies emphasize a change in the donor profile, which can be justified by the aging process of the population linked to the increase of chronic

non-communicable diseases, which are the main causes for stroke<sup>(9)</sup>.

Traumatic brain injury (TBI) and cerebrovascular causes also gain prominence in other countries, such as the U.S. and Spain, being the second and third causes of death, respectively. However, the main cause of death among potential donors in 2018 in the USA was anoxia, demonstrating a difference in mortality profile among countries<sup>(13)</sup>.

According to a study conducted in the USA, between 2000 and 2015, cerebrovascular causes predominated in the mortality profile. However, a possible change in the management of risk factors that lead to chronic non-communicable diseases has justified the changes that have occurred in this profile<sup>(16)</sup>.

An important data from this study, also present in another study, was the prevalence of TBI in men, which can be justified by the greater involvement of men in violence and traffic accidents<sup>(6)</sup>. This same association was present in the above-mentioned international data<sup>(13)</sup>.

Most PD in this study were admitted to public hospitals, reinforcing that most of the Brazilian population depends on the *Sistema Único de Saúde* and, due to the severity of the condition, requires high complexity care, offered in these institutions<sup>(17)</sup>.

In this study, the length of hospitalization until the completing the diagnosis of BD recorded variation between 24 hours and more than 96 hours. This is due to the care process for maintaining the life of critically ill patients, as well as the clinical and complementary examinations recommended by the *Conselho Federal de Medicina* to confirm the BD<sup>(2)</sup>. However, the length of the donation process may interfere in the quality of the organs and tissues offered, hampering their survival. The shorter the duration of the process, the better the survival of these organs<sup>(18)</sup>.

The *Conselho Federal de Medicina* establishes that, for finishing the BD protocol, two clinical examinations are required, performed by different physicians, and at least one complementary examination<sup>(2)</sup>. In this study, there were a high

number of protocols concluded, which confirmed the diagnosis of brain death, compliance with legislation and seriousness in conducting these cases.

The non-completion of the other protocols was the main reason for the occurrence of CPR among the evaluations. CPR and hemodynamic instability are common complications in patients who are evolving into brain death. In order to complete the protocol and the implementation of organ donation, it is essential to maintain organs and tissues to ensure survival. Otherwise, there may be graft failure, making the transplant unfeasible<sup>(6)</sup>.

A study conducted in Italy observed organ eligibility in post-CPR patients. It was found that of 112 patients, 56% had their organs donated with good functional recovery<sup>(19)</sup>. This study demonstrates how important is quality care to the critical patient, as well as the effective maintenance of organs, because, even after CPR, the potential for an individual to become a donor remains high<sup>(19)</sup>.

Among family interviews, 84% were carried out. The lack of clinical conditions of the patient and altered blood indices or examinations of images indicating impaired organs were the main reasons that prevented the interviews. In addition, positive serology for HIV and Hepatitis, multiple organ dysfunction, infections and neoplasms also caused the impediment. According to the Guidelines prepared by the *Associação de Medicina Intensiva Brasileira* (AMIB) and the recommendations of the *Associação Brasileira de Transplante de Órgãos* (ABTO), absolute contraindications for organ donation are: presence of sepsis not clinically controlled, infections and neoplasms in which the risk of transmission outweighs the possibility of potential receptors benefits<sup>(4)</sup>.

Of the interviews conducted, 53.5% resulted in authorization for organ donation and 46.4% had a negative answer. This number is higher than the national average of family negatives in 2018<sup>(1)</sup>.

These data allowed identifying that clinical contraindications and family refusal are factors

that cause an unfavorable attitude towards donation, being the latter the main cause of non-effectiveness, characterized as a modifiable cause<sup>(20)</sup>. This reinforces the importance of a qualified team to act at the time of the interview, even being something difficult and involving an important emotional burden of the interviewers<sup>(21)</sup>. These data regarding family refusal corroborate that found in a study conducted in the southern region of the country in 2017<sup>(20)</sup>.

It is important to remember that recent changes in Brazilian legislation brought new guidelines for the diagnosis of BD<sup>(2)</sup>, such as regulation of time between evaluations and the mandatory prior and adequate communication of bad news to the family, in order to complete the protocols faster and the family is aware of all stages of diagnosis.

The research showed limitations in reporting some variables, due to the absence of information in the analyzed medical records.

## Conclusion

It was possible to identify that the potential organ donors of the center studied are mostly male individuals, between 21 and 40 years old and 41 and 60 years old, with traumatic brain injury as the main cause of brain death. These patients were hospitalized predominantly in public hospitals, remaining in the institutions around 24 hours until the definitive diagnosis of BD. Most of the BD protocols were complete, and the family interview was positive for organ donation in most cases.

The population does not completely understand organ donation process, which generates doubts and insecurities about decision-making. The study provided better situational understanding and signaled the need to discuss the theme of donation. Therefore, the importance of policies for permanent education on the subject, involving health professionals and the general population, to encourage the donation of organs and tissues, considering that the implementation depends, in large part, on the donation process and the family authorization.

Thus, knowing the scenario of the organ donation process is of fundamental importance for health service professionals, since it offers subsidies for quality care, aiming at maintaining the quality of the organs offered, as well as the increase in the number of donations made.

New studies are suggested to know the scenario after the proposed changes in the law, which analyze in deepening its impacts, especially the causes for non-implementation of organ donation.

## Collaborations:

1 – conception, design, analysis and interpretation of data: Christielle Lidiane Alencar Marinho, Ana Isabel Cezário de Carvalho Conceição and Flávia Emília Cavalcanti Valença Fernandes;

2 – writing of the article and relevant critical review of the intellectual content: Christielle Lidiane Alencar Marinho, Ana Isabel Cezário de Carvalho Conceição, Alana Mirelle Coelho Leite and Joice Requião Costa de Santana;

3 – final approval of the version to be published: Christielle Lidiane Alencar Marinho, Alana Mirelle Coelho Leite and Joice Requião Costa de Santana.

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