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EPIDEMIOLOGICAL CHARACTERISTICS OF ORGAN DONORS OF A PUBLIC HOSPITAL IN SOUTHERN BRAZIL

*Características epidemiológicas dos doadores de órgãos de um hospital público do sul de Brasil**Características epidemiológicas de los donantes de órganos de un hospital público del sur de Brasil***Nicásio Urinque Mendes¹** **Daniele Delacanal Lazzari²** **Caroline D’Azevedo Sica³** **Naira Helena Ebert⁴** **Lucio de Quadros Galvão⁵** **Roberta Guzzon⁶** 

ABSTRACT

Objective: to determine the epidemiological characteristics of organ donors of a public hospital in southern Brazil. **Method:** documentary research, described and quantitative, conducted in the year 2022 in a public hospital in a municipality in southern Brazil, with data for the period from 2016 to 2021, grouped in Microsoft Office Excel spreadsheets and analyzed by the Epi Info™ program. **Results:** 76.47% of donors were male, 55.88% of donors had brain death due to vascular causes, 44.12% were carriers of arterial hypertension and there were higher donors of kidneys (91.18%) and liver (64.71%). **Conclusion:** the profile of organ donors in the region studied is characterized by the majority of males, aged over 40 years old with prevalence of comorbidities such as hypertension, psychiatric and cardiovascular diseases.

KEYWORDS: Health Profile; Tissue and Organ Procurement; Unified Health System.

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RESUMO

Objetivo: determinar as características epidemiológicas dos doadores de órgãos de um hospital público do Sul do Brasil. **Método:** pesquisa documental, descrita e quantitativa, realizada no ano 2022 em um hospital público de um município no sul do Brasil, com dados referentes ao período de 2016 à 2021, agrupados em planilhas do Microsoft Office Excel e analisados pelo programa Epi InfoTM. **Resultados:** 76,47% dos doadores eram do sexo masculino, 55,88% dos doadores teve Morte Encefálica por causas vasculares, 44,12% eram portadores de hipertensão arterial e houve maior doadores de rins (91,18%) e fígado (64,71%). **Conclusão:** o perfil dos doadores de órgãos da região estudada é caracterizado pela maioria do sexo masculino, faixa etária superior a 40 anos de idade com prevalência das comorbidades como hipertensão arterial, doenças psiquiátricas e cardiovasculares.

DESCRITORES: Perfil de Saúde; Obtenção de Tecidos e Órgãos; Sistema Único de Saúde.

RESUMEN

Objetivo: Determinar las características epidemiológicas de los donantes de órganos de un hospital público del Sur de Brasil. **Método:** investigación documental, descrita y cuantitativa, realizada en el año 2022 en un hospital público de un municipio en el sur de Brasil, con datos referentes al período 2016 a 2021, agrupados en hojas de cálculo de Microsoft Office Excel y analizados por el programa Epi InfoTM. **Resultados:** 76,47% de los donantes eran de sexo masculino, 55,88% de los donantes tuvo Muerte Encefálica por causas vasculares, 44,12% eran portadores de hipertensión arterial y hubo mayor donantes de riñones (91,18%) e hígado (64,71%). **Conclusión:** el perfil de los donantes de órganos de la región estudiada es caracterizado por la mayoría del sexo masculino, grupo de edad superior a 40 años de edad con prevalencia de las comorbidades como hipertensión arterial, enfermedades psiquiátricas y cardiovasculares.

DESCRIPTORES: Perfil de Salud; Obtención de Tejidos y Órganos; Sistema Único de Salud.

INTRODUCTION

Brain death (BD) is defined as the irreversible loss of brain activity, with a known cause, in which there is a definitive extinction of any motor reaction.¹ Some classifications treat BD as synonymous with death, which provides ethical and moral support for organ donation.² BD is compulsorily notifiable, but for every eight potential donors, only one is notified to the transplant center. This is partly due to professionals' lack of knowledge about the importance of notification.³

The diagnosis of BD is compulsory and its notification is mandatory, thus constituting the starting point for organ donation and is carried out following the BD protocol, which is a legal guideline that standardizes both the diagnosis of BD and the process of organ donation and transplantation at a national level.¹

In Brazil, organ and tissue donation for transplantation was initially regulated by Federal Law No. 9,434 of February 4, 1997. It states that organ donation for transplantation can be carried out in two ways, one by a living donor and the other by a post-mortem donor. For living donors, the law only allows donations from people over 18 years of age and the recipient must be a spouse or related by blood up to the fourth degree; in other cases, judicial authorization is required. This requirement no longer exists when it refers to the donation of bone marrow, blood and its derivatives, in which case the donor's consent is sufficient. For post-mortem donation, this is allowed when, after death by NP, authorization is obtained from the family.⁴

Despite this and the general recognition of organ donation as a global priority, the demand for organs exceeds the supply in several countries around the world. One possible solution to

reduce this gap would be post-mortem organ donation. Several factors are involved in this process, including cultural, ethical and religious issues. The interaction of socio-cultural factors, beliefs and superstitions, lack of communication and organizational support and negative media views also play important roles.⁵

The opportunity to identify and refer patients who are potential organ donors usually arises in intensive care units (ICUs) after the neurological determination of death. Referrals for donation, however, can also occur in the Emergency Department if the team knows how to recognize a patient who is likely to die in a way that allows organ donation. As such, ICU and ER nursing staff play a vital role in organ donation management, including identifying and assessing potential donors, supporting families and assisting with logistics.⁶

Brazil ranked 24th out of 45 countries with the most effective donors in 2021, with 13.8 effective donors per million population (pmp). Germany tops this ranking with 11.1 pmp, followed by Ireland with 13.0 pmp. Brazil's position may be due to the stricter rules governing the complex donation and transplantation of organs and tissues.⁷

This position leads us to believe that there is an increase in the number of people who need one or more organs and/or tissues, which makes it important for public health to identify the public considered potential organ and tissue donors. The aim of this study was therefore to determine the profile of organ donors at a public hospital in southern Brazil.

METHOD

This is a documentary, descriptive study with a quantitative approach. The research was carried out in a public hospital in a municipality in the southern region of Brazil, which has various medical specialties and is a reference in some specialties such as traumatology and neurology.

The study included the medical records of potential donors from the institution described above from 2016 to 2021. Medical records that could not be accessed electronically and those whose essential information for the study was missing from the records were excluded from the study.

Data was collected in two stages using a pre-prepared form. At first, data was extracted from the Organ Procurement Organization (OPO 1) database in the state of Rio Grande do Sul. Secondly, based on the identification data collected in the initial stage, the other patient data was extracted by accessing the electronic medical records.

The data was grouped in Microsoft Excel 2016 spreadsheets and processed using the statistical program Epi Info™, Version 7.2.5. Descriptive analysis was carried out using relative and absolute frequencies, as well as measures of central tendency (arithmetic mean and median) and dispersion (standard deviation) for quantitative variables.

The ethical principles of scientific research were respected. The research project was submitted to the Municipal Center for Collective Health Education (NUMESC) for approval and then submitted to the Research Ethics Committee (CEP) of Feevale University for evaluation of ethical issues, obtaining CAAE: 60772522.9.0000.5348, and approval by means of opinion no. 5.575.193.

RESULTS

The sample consisted of 34 actual donors from the last 6 years, from 2016 to 2021. The average age was 49.88 ± 17.12 years. As for the distribution of donors over the years of the study, 2016 and 2019 stood out as having the highest and lowest number of donors, 9 (26.47%) and 3 (8.82%) respectively (Table 1).

Table 1. Characterization of public hospital organ donors between 2016-2021, according to year, gender, hospitalization sector and reason for SCI. Novo Hamburgo, RS, Brazil, 2022

VARIABLES	N	%
YEAR	-	-
2016	9	26,47
2017	5	14,71
2018	6	17,65
2019	3	8,82
2020	7	20,59
2021	4	11,76

Gender	-	-
Male	26	76,47
Female	8	23,53
Cause of BD	-	-
AVE	19	55,88
TCE	12	35,29
Meningitis	1	2,94
Other	2	5,88
Hospitalization Sector	-	-
ICU	31	91,18
Emergency	3	8,82

Systemic Arterial Hypertension (SAH), Diabetes Mellitus (DM) and positive serologies were not considered underlying diseases. In this regard, of the 8 cases with underlying diseases, psychiatric conditions were the most prevalent with 3 (37.50%) cases, followed by cardiovascular diseases with 2 (25.00%) cases (Table 2).

Table 2. Characterization of health conditions and use of chemical substances by organ donors at a public hospital between 2016-2021. Novo Hamburgo, RS, Brazil, 2022

VARIABLE	N	%
Baseline disease (n=8)		
Respiratory	1	12,50
Cardiovascular	2	25,00
Psychiatric	3	37,50
Others	2	25,00
Types of serology (n=10)		
Hepatitis B	3	30,00
Hepatitis C	5	50,00
Syphilis	2	20,00
Systemic hypertension		
Carrier	15	44,12
Non-carrier	19	55,88
Diabetes Mellitus		
Carrier	2	5,88
Non-carrier	29	85,29
Alcoholism		
Practitioner	8	23,53
Non-practitioner	26	76,47
Drug addiction		
Practitioner	5	14,71
Non-practitioner	29	85,29
Smoking		
Practitioner	15	44,12

Non-practitioner	19	55,88
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Among the number of organs/tissues donated, 18 (52.94%) patients donated three organs/tissues; kidneys and liver were the most donated organs with 31 (91.18%) and 22 (64.71%) donors respectively. There were no heart donors and only one lung donor, who donated only his right lung. There were 4 (11.76%) cornea donors and no skin donors. The number of family members who expressed their wish not to donate these tissues specifically is noteworthy.

Table 3 - Characterization of donated organs at a public hospital in the Bells Valley 2016-2021. Novo Hamburgo, RS, Brazil, 2022

VARIÁVEIS	N	%
No. of organs/tissues donated	-	-
One	3	8,82
Two	10	29,41
Three	18	52,94
Four	3	8,82
Kidney Donation	-	-
Donated	31	91,18
Não Doaram	3	8,82
Liver	-	-
Donated	22	64,71
Did not donate	12	35,29
Lungs	-	-
Donated	1*	2,94
Did not donate	33	97,06
Heart	-	-
Donated	0	0,00
Did not donate	34	100,00
Cornea	-	-
Donated	4	11,76
Did not donate	27	79,41
Not authorized by the family	3	8,82
Skin	-	-
Donated	0	0,00
Did not donate	30	88,24
Not authorized by the family	4	11,76

* Donated only his right lung

DISCUSSION

The primary purpose of organ donation is to increase people's life expectancy; however, this act can also be carried out to improve the quality of life of other individuals. An understanding of the obstacles involved in this process on the part of public health management and the population could improve the number of organ and tissue donations in the region and, inferably, in the country.

With regard to the mean age and standard deviation observed in the study, they are similar to those obtained in a 2019 study on the profile of potential organ donors, which obtained a mean of 42.55 ± 18.19 years.⁸ This may have been due to the fact that a greater number of BD were caused by stroke, a condition that affects the elderly and middle-aged populations more, respectively.

In general terms, there was a decrease in effective donors in the last three years of the study, which corresponds to the years during the Covid-19 pandemic. A literature review carried out in 2023 showed a considerable reduction in the number of organ and tissue donations and transplants globally, especially in Brazil, which has been badly affected by the disease. This drop is due to the tightening of the rules that guide the organ donation and transplant process.⁹

This study corroborates the literature which shows a higher prevalence of male organ and tissue donors, as revealed by two studies with 76.00% and 70.94% of effective male donors.⁸⁻⁹

This higher proportion of male donors stems from the higher occurrence of BD in this group, justified by the greater exposure of the male population to risk situations⁸. Coupled with a culture of denial on the part of the male population towards basic health services, seeking health care only in serious or even fatal cases, the situation is exacerbated by the fact that this population group is not prioritized by the health system.¹⁰

In relation to the causes of metabolic encephalopathy (BD), both traumatic brain injury (TBI) and stroke are identified in this study as the main causes, with a particular emphasis on stroke. Scientific research has shown a significant numerical prevalence for both conditions. However, in some analyses, TBI is more frequently identified as the main cause.^{8,11}

This scenario suggests strong evidence of a change in the etiological profile of BD in some Brazilian states due to population aging and an increase in chronic diseases. This is already the case in developed countries such as Poland.¹¹

Regarding the sector in which patients were hospitalized at the time of BD diagnosis, the ICU's prominence was not unexpected as it is a place with specialized staff and appropriate technologies for the care and treatment of these patients.¹² However, it was noted that a considerable number of BD diagnoses were made in the hospital emergency room as it is the gateway to the health system and due to the unavailability of ICU beds.¹³ The permanence of potential donors in this sector may be related to the high rates of cardiopulmonary arrests that occur during the process, as it is a sector intended for brief

care and referral of patients after stabilization or with suspected BD.¹³

As for the health conditions of the participants, the greater presence of mental or psychiatric disorders among organ donors as the underlying disease is in line with the literature, which has pointed to mental disorders as the main cause of disability and one of the main causes of morbidity in contemporary society.¹⁴ In fact, in the Americas, they are responsible for more than a third of disabilities and have been exacerbated during the COVID-19 pandemic.¹⁵

As for serologies, the prominence of hepatitis C and B, respectively, was predicted in the literature, which states that in the years around 2010, hepatitis C became more evident in Brazil and is the leading cause of death among all viral hepatitis, followed by hepatitis B.¹⁶

The presence of the chronic conditions SAH and DM may be linked to the reshaping of the Brazilian age pyramid, especially in the last decade, when the elderly population grew by 4% a year, and it is estimated that this population will reach 41.5 million by 2030.¹⁷ The presence of these two chronic conditions may explain the higher number of BD due to vascular causes, since SAH is the main risk factor for cardiovascular disease, and this risk increases twofold when associated with DM.¹⁷

With regard to the use of psychoactive substances, it was noted that the proportion of drinkers was little different from the proportion of users of other drugs, reinforcing the idea that the use of illicit drugs goes hand in hand with the use of alcoholic beverages. The use of these substances has been associated with risky behavior in traffic as well as interpersonal violence.¹⁸ For this reason, it is wise to assume that these behaviors may be related to the head injuries discussed above, as the second cause of BD.

Smoking may also have played an important role in BD caused by strokes, since smoking can increase the chances of stroke by up to four times.¹⁹

With regard to donated organs, the prevalence of multiple organ donation is already a reality in developed countries and is being consolidated in Brazil. This once again reaffirms the need for qualified intensive care teams to maintain potential donors until the donation takes place.¹¹

Multiple donation also demonstrates the systematization of the donation process, characterized by its decentralization to the states, triggering coordination between the different teams involved in the process.²⁰ However, there are still criticisms regarding the slowness of this process, especially the delay in handing the body over to the family, which has been one of the main reasons for family refusal,²¹ which calls for the reformulation of organ donation and transplant laws in order to optimize the time between diagnosis and the release of the body to the family.

The countries that occupy the best positions in the ranking of effective donors have high multiple donation rates of over 80% for simultaneous kidney, liver, heart, lung, pancreas and

cornea donation,¹¹ but in this study kidney donation was the only one with a similar proportion, followed by liver donation with less than three quarters of all donations. It should be emphasized that low organ donation increases the disproportion between donation and the waiting list for organs.

The higher uptake rate for both groups of organs seems to be a national reality, as demonstrated in a study whose kidney and liver uptake rates were 84.5% and 66.7% respectively, surpassing other organs²² and in another study whose total organ uptake exceeded half of all donations.²³

The high uptake of kidneys and livers compared to other organs may be related to their greater viability, which is estimated at 48 hours for kidneys and 24 hours for livers,²⁴ a fact which raises concerns about optimizing the time between organ donation and transplantation.

Still on the subject of uptake, there was little or no uptake of cornea tissue and skin organs respectively, which is unexpected given that these can be removed up to 6 hours after cardiac arrest.²⁵ Therefore, the literature highlights a high rate of cornea uptake, which sometimes exceeds that of kidneys.²²

Another important finding in relation to skin and corneas is the number of families who refused to donate them even though they had authorized the donation of other organs, which is related to the idea of family members to prevent deformities in the bodies of their loved ones.²⁶

This study had some of the limitations of a documentary study, which depends on others filling in the information correctly, and there may be divergent information; for example, it was not possible to determine the skin color of the donors, nor their religious beliefs, factors that may have an impact on organ donation, nor was it possible to determine the municipality of residence of the donors since the study hospital serves several municipalities in different medical specialties including neurology and traumatology.

CONCLUSION

The increase in population ageing that is beginning to emerge in some Brazilian states has influenced the prevalence of chronic diseases, which in turn is related to the prominence of cerebral vascular conditions as the main causes of brain death. The profile of organ donors in the region studied is characterized by the majority being male, aged over 40, with a prevalence of comorbidities such as hypertension, psychiatric and cardiovascular diseases.

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