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ORIGINAL PAPER

Factors Related to the Low Organ Donation Rate - A Transplant Management Approach

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ABSTRACT

Objectives: To assess the capacity to identify potential organ donors in a university hospital in Maranhão (MA). **Methods:** The study is a retrospective, quantitative cohort based on the documentary analysis of medical records of deceased patients in the adult intensive care units (ICUs) of a university hospital in MA from 2018 to 2019. Screening Instrument I from the Organización Nacional de Trasplantes (ONT) of Spain, based on Avedis Donabedian and validated in Brazil, was used to identify potential donors with clinical signs of brain death (BD). The analysis involved reviewing medical records and applying BD diagnostic criteria, according to Conselho Federal de Medicina Resolution nº 2,173 of 2017. A total of 312 records were analyzed, resulting in 38 with signs of BD, classified as escapes due to identification and maintenance failures of potential donors. **Results:** Of the 312 evaluated records, 21 from 2018 and 17 from 2019 (totaling 38) presented clinical signs of BD and were selected for detailed auditing.Additionally, it was identified that 31.1% of the escapes or losses of potential donors resulted from deaths not identified as BD, generating previously unknown indicators. The tool revealed that patients undergoing surgical treatment for brain tumors and cerebrovascular diseases have a higher likelihood of evolving to BD. These patients, usually admitted to the general ICU, should receive special attention in daily assessments due to their high potential to become organ donors. **Conclusion:** The audit highlighted the need for improvements in the identification and maintenance of potential donors, as well as in reducing family refusals, to increase the number of effective donations.

Descriptors: Transplant Management; Potential Donor; Brain Death; Transplant Quality.

Fatores Relacionados à Baixa Taxa de Doação de Órgãos - Abordagem de Gestão de Transplantes

RESUMO

Objetivos: Avaliar a capacidade de identificar possíveis doadores de órgãos em um hospital universitário no estado do Maranhão (MA). **Métodos:** O estudo é uma coorte retrospectiva, quantitativa, baseada na análise documental de prontuários de pacientes falecidos nas unidades de terapia intensiva (UTIs) de adultos de um hospital universitário no MA, no período de 2018 a 2019. Utilizou-se o Instrumento de Triagem I da Organización Nacional de Trasplantes (ONT) da Espanha, fundamentado por Avedis Donabedian e validado no Brasil, para identificar possíveis doadores com indícios clínicos de morte encefálica (ME). A análise envolveu a revisão dos prontuários e a aplicação de critérios de diagnóstico de ME, conforme a Resolução nº 2.173 de 2017 do Conselho Federal de Medicina. Foram analisados 312 prontuários, resultando em 38 com sinais de ME, classificados como escapes por falhas na identificação e manutenção dos doadores. **Resultados:** Dos 312 prontuários avaliados, 21 de 2018 e 17 de 2019 (totalizando 38) apresentaram indícios clínicos de ME e foram selecionados para auditoria detalhada. Além disso, foi identificado que 31,1% dos escapes ou perdas de possíveis doadores ocorreram devido a óbitos não identificados como ME, gerando indicadores antes desconhecidos. A ferramenta revelou que pacientes submetidos a tratamento cirúrgico para tumores encefálicos e doenças cerebrovasculares têm maior probabilidade de evoluir para ME. Esses pacientes, geralmente internados na UTI geral, devem receber

atenção especial nas avaliações diárias, pois têm alto potencial para se tornarem doadores de órgãos. **Conclusão:** A auditoria evidenciou a necessidade de melhorias na identificação e manutenção de possíveis doadores, bem como na redução de recusas familiares para aumentar o número de doações efetivas.

Descritores: Gestão de Transplantes; Possível Doador; Morte Encefálica; Qualidade em Transplantes.

INTRODUCTION

Brazil has the most extensive public transplant program in the world, but it still needs to meet the needs of its population[1]. There was a drop in donations from 2019 onwards, intensified by the coronavirus disease 2019 (COVID-19) pandemic. In 2020, the donor rate fell to 15.8 per million population (pmp)[2]. This trend has continued into 2021, severely impacting cornea, liver, kidney, and lung transplants[3].

The reduction in donations directly affected the number of transplants performed. In 2020, there was a 44.3% reduction in cornea transplants and a 7% reduction in liver transplants[3]. The rate of kidney transplants decreased by 18.4% in 2020 and remained low in 2021. In 2021, there was a slight recovery in the rate of kidney transplants, but other organs, such as lungs, showed a sharp drop[2,3].

Studies identify several factors associated with the loss of potential donors. These factors include the population's distrust of the donation process, lack of preparation and/or insufficient involvement of health professionals, and religious and cultural issues[4].

The pandemic was not the only factor responsible for low donation rates. The scarcity of notifications of potential donors and diagnosis of brain death (BD) are persistent challenges. In 2021, 5,857 brain deaths were recorded, but only 1,451 resulted in effective donors[5]. The family refusal rate to donate, 37.8% in 2021, also contributes to the problem[3].

Transplantation is the definitive treatment for some diseases, leading to the growing need to improve work processes in the area. Therefore, the use of quality tools becomes essential for the transplant segment[6].

The situation is particularly critical in the state of Maranhão (MA). In 2022, only 12 multiple organ donations were made, an insufficient number to meet demand[3]. Despite the difficulties, the state can potentially improve its donation rate, given its territorial extension and population.

To address these issues, the present study evaluated the causes of the reduced numbers of organ and tissue donors by applying the Instrument adapted from the Quality Management Model of the Organización Nacional de Trasplantes (ONT) of Spain in a university hospital in MA.

METHODS

The present is a retrospective, quantitative cohort study carried out through documentary analysis of medical records of patients who died in the adult intensive care units (ICUs) of a university hospital in MA from 2018 to 2019.

For data collection, the instruments of the Quality Assurance Program in Transplant Processes, developed by professionals from the ONT in Spain[7], were used. The Instrument was theoretically based on Avedis Donabedian and, in Brazil, went through all validation stages until the final version was applied in this research.

To apply the Instrument, the fields dealing with diagnostic criteria referenced in current legislation for BD and Resolution No. 2,173 of 2017 of the Federal Council of Medicine (Conselho Federal de Medicina-CFM)[8] were used. The standard provides guidelines for determining BD and regulates the diagnosis at a national level, taking into account the presence of non-perceptual coma, absence of supraspinal activity, persistent apnea and known cause of coma[9].

Thus, BD represents an irreversible nerve injury compatible with clinical death. Although the terms are already known worldwide, in Brazil, it was in 1997 that the law brought explicit reasons for the diagnosis, as well as starting to deal with organ donation (art. 3 of Law nº 9,434 of 1997), when considering the removal of organs, tissues and parts of the human body for transplantation purposes after the definitive diagnosis of BD.

Data collection instruments are composed of questions arranged in a flow format, in which one answer leads to another or stops when it is impossible to answer a question. These questions aim to define the hospital's organ donation capacity and detect potential organ donors' losses by analyzing the causes of these losses[10,11].

A specialist nurse and a nursing technician assisted with internal and external assessments. Everyone involved has experience in the area and was previously instructed on the criteria to be observed in the medical records and the availability of the guidance guide.

Patients were listed in a spreadsheet according to initials, medical record number, diagnosis and place of hospitalization, and deaths were classified by age, from 18 to 80, from 2018 to 2019. Thus, applying Instrument I, they selected and evaluated 312 death records in ICUs at this stage.

Instrument I is used in the first stage of medical record analysis, the internal assessment stage, which presents eight items with yes and no answers. The evaluator analyzes the dying patient's first and last medical and multidisciplinary developments to obtain the answer.

By reviewing the medical records, it was identified how many deaths probably occurred due to BD in the ICUs and, of these, which were adequately identified, as well as each possible BD that was not identified during hospitalization. Furthermore, we sought to identify whether the Intra-Hospital Commission for Organ and Tissue Donation for Transplants (Comissão Intra-Hospitalar de Doação de Órgãos e Tecidos para Transplantes-CIHDOTT) was aware of the case. If the CIHDOTT professional was not notified, an attempt was made to identify the reasons, if possible. Then, we tried to understand the reasons why the diagnosis of BD was not made in cases where this was clinically indicated and what led to the death not being reported to CIHDOTT.

The following steps must be observed to begin CIHDOTT's internal assessment activities. The first step consists of analyzing the death reports that were filled out when the patient died in the ICU, using the discharge summary in which information about the death was included. Through the Management Application for University Hospitals (Aplicativo de Gestão para Hospitais Universitários-AGHUX) [electronic medical record of the federal hospital network – Empresa Brasileira de Serviços Hospitalares (EBSERH)] they accessed the medical records. This tool makes it possible to consult the medical records of patients admitted to the institution based on their name or medical record number. Thus, for the first searches, they entered the patients' initials or the numbers from their medical records, and the 312 deaths that occurred from 2018 to 2019 were analyzed. After analyzing the deaths, the medical records that showed signs of BD were included, starting the second stage of the process.

Once eligible medical records are identified, a second, careful reading of each one begins, taking into account the developments of all professionals who cared for the patient and paying attention to the details contained in the developments, as this information may indicate the possibility of donation. An individual self-assessment instrument was filled out for each possible BD or clue. During this analysis, we sought to answer the following questions: does this case represent BD? What are the clinical signs of BD in this patient? Was the patient advised to open a BD protocol? Was the cause of the coma known? Have metabolic and exogenous causes been excluded?

Then, we proceeded to the third stage. To this end, clinical signs of BD should be recorded in the medical record, as mentioned in the legislation. To be considered a BD, the protocol with diagnostic tests must have been initiated, and the tests performed must be described in the evolutions.

After analyzing 312 records, the number of records was 38. These patients met the compatibility criteria with a neurological condition, apperceptive coma and Glasgow 3. In these records, we applied the flowchart using Instrument I, with the following variables: (a) the cause of death; (b) whether CIHDOTT detected BD; (c) if a correct medical contraindication was observed or an incorrect contraindication was observed, specify); (d) if there was a correct medical contraindication, what was its cause, or, if it was an incorrect contraindication, specify the cause; (e) whether surgery was initiated to remove the organs; (f) if it has not been initiated, what is the reason for not removing the organs; finally, (g) whether a family interview was carried out.

Next, verification was carried out by other professionals using Instrument III, observing the following variables: (a) Did the medical record correspond to the BD identified by CIHDOTT?; (b) Was it actually a BD?; (c) What was the cause of the loss of the potential donor?; d) Was it possible to determine the cause of the loss?; e) Is it an adequate, inevitable or non-correctable loss? Is this an inadequate, avoidable and correctable loss, or can it not be assessed?; (f) Was a family interview carried out?; (g) Was there an unfavorable result to the donation? What's the reason?

The medical records were classified into possible and potential donors based on the responses. Potential donors are those who present clinical signs of BD, such as clinical signs of BD, coma without response to external stimuli, lack of brain stem reflexes and apnea. In turn, the potential donor comprises those who present clinical signs of BD and have already started the diagnostic protocol.[13]

Patients who presented clinical signs compatible with BD or presented an exam that had confirmed the indication for opening a BD protocol but did not have their protocol started are considered to have escaped or lost a possible donor. In turn, a potential donor is deemed to have escaped if the BD protocol was started but, for some reason, not completed. Thus, the reasons for a potential donor's loss and escape were defined. The analyses are demonstrated through graphs and tables presented by absolute n and relative frequencies by contingency table.

Descriptive and inferential statistical methods were applied to analyze the data from the 38 patients. The distribution of absolute and relative frequencies presented qualitative variables. Quantitative variables were presented by central tendency and variation measures, and normality was assessed using the Shapiro-Wilk test. In the inferential part, the following methods were applied: (a) to compare the distribution of qualitative variables in the period from 2018 to 2019; (b) to evaluate the difference between two quantitative variables, the Student's t test was applied; (c) to evaluate the trend of qualitative variables, the chi-square adherence test was applied[12]. An alpha error of 5% was previously set to reject the null hypothesis, and statistical processing was carried out in the BioEstat version 5.3 and STATA release[17] programs.

Textual and qualitative data analysis was mainly used to identify patterns of similarities between text units according to the frequency of keywords. Similarity analysis in the Iramuteq program allows for specifying the proximity or similarity between text units according to the occurrence of common keywords. This helps reveal patterns and relationships between different documents or categories, which can help understand relationships between themes, concepts, or text groups in a textual dataset.

To perform similarity analysis, the program calculates the frequencies of keywords in each text unit (a text unit represents each patient). It uses this information to calculate the proximity between these units.

The similarity analysis diagram is a graphical representation of the proximity relationships between the words used for a given patient. In the diagram, each text unit is represented by a point (or node), and the lines that connect these points 1 represent the proximity between them. The interpretation of the similarity diagram involves the distance between the points: the closer the points are in the diagram, the greater the similarity between the corresponding text units. Thus, units that share more keywords will be closer to each other. Identifying patterns is carried out by observing the relationships in the diagram; for example, closer words suggest a solid thematic relationship between them.

RESULTS

From 2018 to 2019, 312 records were evaluated, and Instrument I was applied to each. After using this Instrument, 21 records with signs of BD in 2018 and 17 with signs of BD in 2019 were selected, totaling 38 records with signs of BD in the two years.

The 38 patients with BD had ages with a normal distribution (p = 0.0896) that ranged from 20 to 78 years, with a mean of 53.5 years and standard deviation (SD) of 13.9 years (coefficient of variation = 26.8%). The comparison between patients from 2018 (mean of 53.3 years and SD of 16.4 years) and those from 2019 (mean of 55.1 years and SD of 10.3 years) presented p = 0.5411, indicating no real difference between the two years. Table 1 presents the age distribution of the 38 patients identified with BD.

Table 1. Age distribution (years) of 38 patients with probable BD.

Description	2018	2019	General
n sample	21	17	38
Minimum	20.0	35.0	20.0
Maximum	78.0	72.0	78.0
Median	55.0	53.0	55.0
First quartile	45.0	49.0	47.0
Third quartile	65.0	64.0	64.7
Arithmetic mean	53.3	55.1	53.5
SD	16.4	10.3	13.9
Coefficient of variation (%)	31.9	18.0	26.8
p value (normality)	0.1341	0.5267	0.0896

Source: Elaborated by the authors
p-value (2018 × 2019) = 0.5411, Student's t-test.

Table 2 presents two types of analysis: analysis 1, a comparison of proportions between 2018 and 2019, and analysis 2, an evaluation of the trend in 38 patients. The location of BD diagnosis tended to be general ICU (71.1%, $p < 0.0001$*) (asterisks in p-values indicate statistical significance). The comparison between 2018 and 2019 resulted in p = 0.2960 (not significant); therefore, there is no real difference.

The patient's age range was 60 to 69 years (34.2%, $p = 0.0193$*, statistically significant). The comparison between 2018 and 2019 resulted in $p = 0.4443$ (not significant); therefore, there is no real difference. The patient's gender did not show a significant trend, although there is a higher proportion of females (60.5%, $p = 0.2561$ is not significant). The comparison between 2018 and 2019 resulted in $p = 0.7923$ (not significant); therefore, there is no real difference.

The cause of death did not show a significant trend, although there was a higher proportion of hemorrhagic stroke (18.4%, $p = 0.4223$ is not substantial). The comparison between 2018 and 2019 resulted in $p = 0.3348$ (not significant); therefore, there is no real difference.

Confirmation of death tended to be "no" (78.9%, $p = 0.0007$*). Comparing 2018 and 2019 resulted in $p = 0.0962$ (not significant); therefore, there is no real difference.

Table 2. Characterization of the 38 patients with probable BD.

Evaluated condition	2018 (n = 21)		2019 (n = 17)		General (n = 38)		2018 × 2019	Trend
	n	%	n	%	n	%	*p*-value	
Location of diagnosis							0.2069	< 0.0001*
cardiological ICU	5	23.8	3	17.6	8	21.1		
general ICU	13	61.9	14	82.4	27	71.1		
Others	3	14.3	0	0.0	3	7.9		
Age range (years)							0.4443	0.0193*
20 to 29	3	14.3	0	0.0	3	7.9		
30 to 39	2	9.5	1	5.9	3	7.9		
40 to 49	2	9.5	5	29.4	7	18.4		
50 to 59	5	23.8	4	23.5	9	23.7		
60 to 69	7	33.3	6	35.3	13	34.2		
over 70	2	9.5	1	5.9	3	7.9		
Gender							0.7923	0.2561
Female	12	57.1	11	64.7	23	60.5		
Male	9	42.9	6	35.3	15	39.5		
Death							0.0962	0.0007*
Yes	7	33.3	1	5.9	8	21.1		
No	14	66.7	16	94.1	30	78.9		
Cause of death							0.3346	0.4223
Anoxia/CRA	5	23.8	0	0.0	5	13.2		
Hemorrhagic stroke	3	14.3	4	23.5	7	18.4		
Ischemic stroke	2	9.5	1	5.9	3	7.9		
Post-surgery bleeding	3	14.3	2	11.8	5	13.2		
Other	4	19.0	6	35.3	10	26.3		
Tumor	4	19.0	4	23.5	8	21.1		

Source: Elaborated by the authors
Trend chi-square. CRA= cardiorespiratory arrest. * Statistical relevance.

Table 3 presents the predominant characteristics of the 35 patients in whom escape occurred: possible donor (31, 88.6%, $p < 0.0001$*), Glasgow ≥ 3 (35, 100%, $p < 0.0001$*), apperceptive coma (35, 100%, $p < 0.0001$*), absence of cough reflex (34, 97.1%, $p < 0.0001$*) and unidentified cause (11, 31.4%, $p = 0.0199$*). The characteristics of potential donors ($p = 0.9999$) and medical records identified by CIHDOTT ($p = 0.4991$) did not show a significant trend.

Similarity analysis was applied to identify patterns in the data of 38 patients based on the occurrence of common keywords. The interpretation of diagrams must consider the distance between the points: the closer the points in the diagram, the greater the similarity between the corresponding words. The diagram identifies patterns and relationships between patients according to the frequency of keywords and data from textual records referring to the 38 patients.

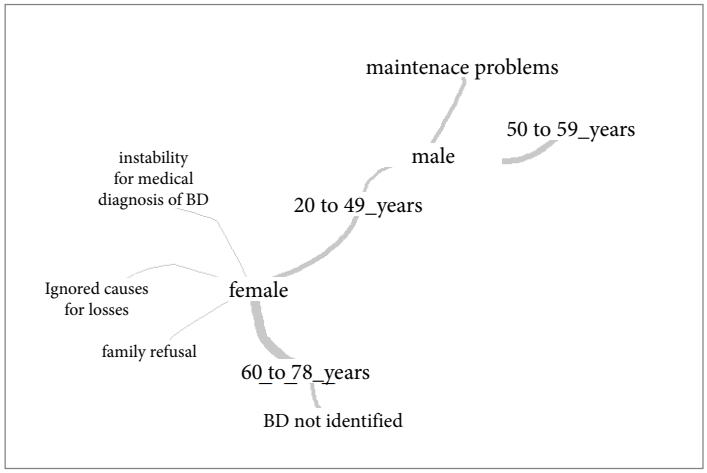
Table 3. Characterization of escape from the sample of 38 patients, including escape (n = 35) and transplantation (n = 3).

Evaluated condition	Escape (n = 35)		*p*-value	Transplant (n = 3)		General (n = 38)	
	n	%		n	%	n	%
Possible donor			< 0.0001*				
Yes	31	88.6		3	100.0	34	89.5
No	4	11.4		0	0.0	4	10.5
Gasgow ≥ 3			< 0.0001*				
Yes	35	100.0		3	100.0	38	100.0
No	0	0.0		0	0.0	0	0.0
Apperceptive coma			< 0.0001*				
Yes	35	100.0		3	100.0	38	100.0
No	0	0.0		1	33.3	1	2.6
Absence of cough reflex			< 0.0001*				
Yes	34	97.1		3	100.0	37	97.4
No	1	2.9		0	0.0	1	2.6
Potential donor			0.9999				
Yes	17	48.6		2	66.7	19	50.0
No	18	51.4		1	33.3	19	50.0
Medical record identified by CIHDOTT			0.4991				
Yes	15	42.9		2	66.7	17	44.7
No	20	57.1		1	33.3	21	55.3
Cause of escape			0.0199*				
Causes ignored	3	8.6		0	0.0	3	7.9
Incorrect medical contraindication	2	5.7		0	0.0	2	5.3
Instability to start BD diagnosis	4	11.4		0	0.0	4	10.5
Unidentified BD	11	31.4		0	0.0	11	28.9
Logistical problems	2	5.7		0	0.0	2	5.3
Maintenance issues	7	20.0		0	0.0	7	18.4
Family refusal	4	11.4		0	0.0	4	10.5
No criteria for BD	1	2.9		0	0.0	1	2.6
The donor (tumor)	1	2.9		0	0.0	1	2.6
Does not apply	0	0.0		3	100.0	3	7.9

Source: Elaborated by the authors

Trend chi-square applied to the escape group. * Statistical relevance.

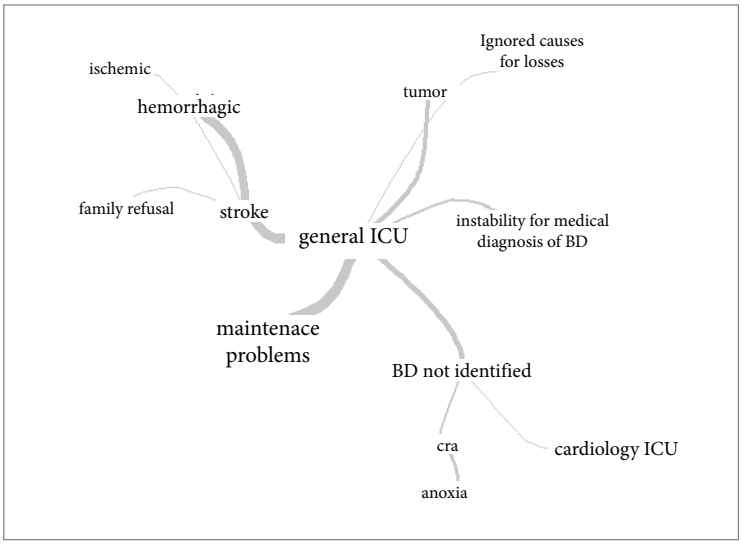
Figure 1 shows that male patients are linked to the age of 50 to 59, and maintenance problems cause escape. On the other hand, in female patients, escape is characterized by patients aged 60 to 78 with unidentified BD. Other causes of escape are instability for medical diagnosis, unknown cause and family refusal.



Source: Elaborated by the authors

Figure 1. Textual similarity diagram considering the gender, age group and cause of escape of 35 patients.

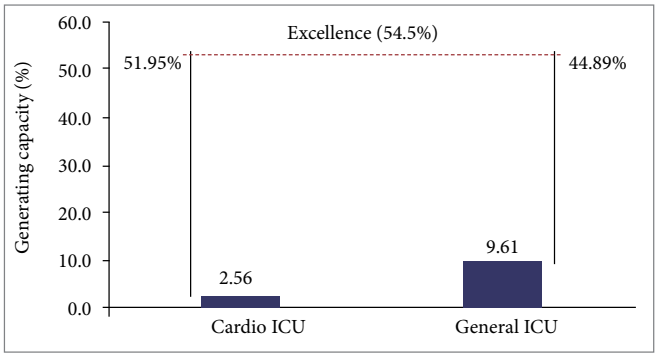
Figure 2 shows that the general ICU is the most typical location for potential donors, and the cause of death is hemorrhagic stroke. Maintenance issues and unidentified BD are present in the related exhausts. In turn, the unidentified BDs were linked to the cardiac ICU, and the cause was anoxia.



Source: Elaborated by the authors

Figure 2. Textual similarity diagram considering the origin and cause of the escape of 35 patients.

The comparison of the cardiac ICU's (2.56%) generating capacity to the general ICU's (9.61%) was evaluated using the binomial test[13]. This evaluation resulted in $p = 0.0002^{\star}$, indicating that the general ICU's generating capacity is significantly closer to the standard of excellence despite still being far from ideal (Fig. 3).



Source: Elaborated by the authors

Figure 3. Comparative Spanish gold standard x obtained data.

DISCUSSION

The data obtained in this study corroborate the indicators published by the Brazilian Association of Organ Transplantation (Associação Brasileira de Transplante de Órgãos-ABTO)[1-3] and other studies that determined the profile of donors in several hospitals in the federation[8]. For example, in 2019, research was published that evaluated, through audits, service reports from the Organ Procurement Organization of the Hospital das Clínicas of the University of Campinas (Unicamp) for the period from January 2013 to April 2018[14].

This study found that male patients who were able to donate represented 57.39% of cases, with an average age of 42.55 years, in contrast to the reality of the university hospital studied, which demonstrated that 60.5% of patients characterized as possible

donors were women with an average of 53.5 years old. Another essential piece of data for comparison is related to the causes of BD. In the Unicamp study, vascular and neurological causes (56.21%) were the most important and, third, neoplasms of the central nervous system[14].

Another similar study in Santa Catarina, an exemplary State in detecting BD, used the ONT instrument to audit death records from three large hospitals in the metropolitan region. In this case, hemorrhagic stroke was also among the leading causes of BD[8].

In comparison to studies, it was also found that hemorrhagic stroke (18.4%) is related to the cause of death of potential donors, as well as brain neoplasms (21.1%); the numbers were relevant in the sample.

What caught our attention, however, was the item classified as "other," which was the most prevalent (26.3%); in this aspect, other cases were considered if they did not have a defined cause but presented the possibility of donation[14].

It is essential to highlight that the profile of hospital institutions differs across regions of the country, resulting in divergent local specificities reflected in the etiology of the causes of BD. However, when it comes to potential donors, it has been confirmed that vascular neurological causes occur as a common diagnosis, regardless of geographic location.

These comparisons make it possible to understand that, in any hospital unit, it is necessary to remain alert about the possibility of donating to patients admitted to ICUs with neurological and vascular causes, as the evolution of these cases will rarely culminate in BD.

Regarding the classification of escapes, cases that did not end in donation but had the potential to do so, the most prevalent cause was classified as unidentified BD, accounting for 28.9% of escapes. To define the item "BD not identified", the ONT Quality Manual established the following criteria: what is BD? What does it represent? What are the clinical signs of BD, patients indicated for opening a BD protocol, prerequisites for opening a protocol and diagnostic steps? From these items, it was possible to check the exhaust.

Other reasons for escapes that the study highlighted refer to problems in maintaining potential donors and family refusal to donate. In an integrative systematic review that evaluated the weaknesses and potentialities experienced by healthcare teams in the organ transplantation process, the results were in line with those obtained in this study, as they indicate that potential donors are lost due to difficulties in maintaining hemodynamic stability and refusal of the family[15] according to Table 4.

Table 4. Data related to the university hospital.

In-hospital BD management	Cardiological ICU n (%)	General ICU n (%)	Excellence %
Generating capacity	8/312 (2.56)	30/312 (9.61)	54.50
Causes of losses			
Ignored	0 (0.0)	3 (10.0)	0
Logistical problems	0 (0.0)	2 (6.6)	< 1
Maintenance issues	8 (100.0)	16 (53.3)	< 3
Refusal to donate	0 (0.0)	4 (13.3)	10
Actual effectiveness	0 (0.0)	3 (10.0)	> 65

Source: Elaborated by the authors

In a systematic review study, it was found that, in the outcome category, there are difficulties in validating absolute contraindication criteria for donation, such as doubts regarding the tests to be carried out for the diagnosis of BD and insecurity in specific care in maintenance of the potential donor: ideal vital signs, hypothermia, diuresis volume, blood glucose and the low level of training on the subject. Such data corroborate the results obtained in this study, as there were losses due to failure to maintain potential donors and family refusals[15].

Family denials were also considered escapes, as a potential donor was lost in the interview. MA government management reports indicated that, in 2022, up to 70% of families who could donate did not do so. Not unlike state data, family refusals were observed in this study, representing 13.5% of escapes[16].

Therefore, it appears that there is room for improvement, as there are still many deaths of potential donors that have not even been identified. In Brazil, for example, the estimated values of deaths from BD are calculated based on the population of an area based on indicators of hospital care and ICU care. It is estimated that deaths from BD account for 10% to 15% of the total number of deaths in any ICU.[17]

The European community has established different standards to measure the institution's ability to generate and monitor potential donors, the so-called gold standards. These standards are based on the ONT quality instruments that track and monitor

all hospital deaths in Spain. The audit is so rigorous that it allows us to understand each death to the point of planning interventions so that errors are no longer repeated and it is possible to convert potential donors into effective donors. This process management was so vital that it placed the country at the top of global transplantation[18].

The audit indicated by the ONT was applied, and the generating capacity was calculated based on the total number of deaths obtained, resulting in a percentage of 12.7% of deaths with suspected unidentified BD. The gold standard determines that 54.4% of deaths with the possibility of donation must be verified, which would increase the actual number of donations.

Logistical problems were presented in 6.6% of the patients evaluated, while the gold standard indicates less than 1%. Maintenance issues exceeded 50% of the assessed patients; they should have been below 3%. The family refusal rate was the indicator closest to excellence, at 13.3%, while the gold standard points to an acceptance rate of up to 10%.

Therefore, after the audited analysis of all deaths in the ICUs in 2018 and 2019, we detected 38 patients classified as possible donors. Of these, 35 were lost or escaped, and the actual implementation, that is, the number of patients who had their diagnoses completed and went through the entire donation election process and whose families agreed to donate, was three in this period.

However, as already demonstrated, among patients with possible BD, some presented an absolute medical contraindication to becoming effective donors, for example, those with human immunodeficiency virus (HIV) or resistant infection. However, even if these were not eligible for donation, it must be said that institutions and teams must diagnose BD.

The data must correspond to medical records and exam reports, ensuring that all physiological prerequisites have been met. The requirement of a brain death certificate for all cases favors the exercise of the right to a diagnosis of BD for each citizen. It provides the possibility of more reliable information on the epidemiology of BD in the country[12].

CONCLUSION

Quality and management tools are effective strategies for improving work processes. They help map the work, allowing us to understand it in detail. They can also help correct weaknesses, point out ways to optimize resources and promote safe decision-making.

An essential objective of using quality tools is assessing indicators. Indicators can represent quality measures, as they measure quantitative and qualitative aspects of a service and can be related to structure, work processes and results.

The study enabled an understanding of the related indicators for identifying the number of possible, potential, and actual donors. It also determined the leading causes of death according to the medical records evaluated, highlighting the incidence of BD cases across genders and ages.

The tool used actual data from the hospital collected from medical records. It allowed us to observe that there is still room for improvement, showing that 31.1% of escapes or losses of potential donors occurred due to deaths not identified as BD, generating indicators that were unknown before. Furthermore, the tool showed that patients who receive surgical treatment for brain tumors and stroke are more likely to develop BD. These patients are in the general ICU, which indicates that they should receive greater attention during daily assessments, as they can quickly become potential donors.

By applying the tools to the donation processes, accuracy and quality are promoted in the stages of BD diagnosis since indicators and actions will support decision-making to enable more donations to be effective by considering the local reality. Such planning must aim to increase donations, as the impact this brings to society is incalculable. One donor can donate to up to eight people.

Obtaining these clinical impact indicators helps develop strategies to increase BD diagnoses and possible donations at the local level. With the data obtained, management can propose improvement activities to optimize diagnoses and improve the work process's reliability, minimizing potential organ donor losses.

Due to the country's demand for bodies, monitoring, controlling and scaling these processes is necessary. Although Brazil does not have an established quality program, strategies such as those presented here, which aim to monitor care teams and encourage the achievement of indicators, should be seen as an opportunity for improvement, as future results will depend on current actions.

CONFLICT OF INTEREST

Nothing to declare.

AUTHOR'S CONTRIBUTION

Conceptualization: Pimenta GJ; **Metodology:** Pimenta GJ, Carneiro SCS; **Investigation:** Pimenta GJ; **Data curation:** Pimenta GJ; **Supervision:** Carneiro SCS, Fontenele AMM; **Article writing:** Pimenta GJ; **Critical revision:** Jacob G, Cruz ACMR, Veiga AIB; **Final approval:** Pimenta GJ, Carneiro SCS, Fontenele AMM, Cruz ACMR, Veiga AIB, Jacob

DATA AVAILABILITY STATEMENT

All dataset were generated or analyzed in the current study.

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REFERENCES

1. Associação Brasileira de Transplante de Órgãos. Dimensionamento dos transplantes no Brasil e em cada estado (2012-2019). Registro Brasileiro de Transplantes. 2019 [access on 26 Jun 2022]; XXIV(4). Available in: https://site.abto.org.br/wp-content/uploads/2020/08/RBT-2019-leitura.pdf
2. Associação Brasileira de Transplante de Órgãos. Dimensionamento dos transplantes no Brasil e em cada estado (2013-2020). Registro Brasileiro de Transplantes. 2020 [access on 24 Jun 2022]; XXVI(4). Available in: https://site.abto.org.br/wp-content/uploads/2020/08/2020_populacao_1.pdf
3. Associação Brasileira de Transplante de Órgãos. Dimensionamento dos transplantes no Brasil e em cada estado (2015-2022). Registro Brasileiro de Transplantes. 2022 [access on 24 Jun 2022]; XXIX(4). Available in: https://site.abto.org.br/wp-content/uploads/2023/03/rbt2022-naoassociado.pdf
4. Knihs NS, Schirmer J, Roza BA. Aplicação de instrumentos de qualidade em doação de órgãos e transplantes da Espanha validados em hospitais pilotos em Santa Catarina. J Bras Nefrol. 2015; 37(1): 323-32. https://doi.org/10.5935/0101-2800.20150052
5. Associação Brasileira de Transplante de Órgãos. Dados numéricos da doação de órgãos e transplantes realizados por estado e instituição no período: Jan/Jun – 2021. Registro Brasileiro de Transplantes. 2021 [access on 24 Jun 2022]; XXVII(2). Available in: https://site.abto.org.br/wp-content/uploads/2021/08/RBT-2021-Semestre-1-Pop_compressed.pdf
6. Westphal GA, Garcia VD, Souza RL, Franke CA, Vieira KD, Birckholz VR, et al. Diretrizes para avaliação e validação do potencial doador de órgãos em morte encefálica. Rev Bras Ter Intensiva. 2016; 28(3): 220-55. https://doi.org/10.5935/0103-507X.20160049
7. Knihs NS. Tradução, adaptação e validação dos instrumentos do modelo de gestão de qualidade da organização nacional de transplantes da Espanha à realidade brasileira. Thesis [PhD in Nursing] – Universidade Federal de São Paulo; 2013. http://repositorio.unifesp.br/handle/11600/47472
8. Conselho Federal de Medicina. Resolução nº 2.173, de 26 de outubro de 2017. Brasília (DF): CFM; 2017. [access on 30 Jun 2024] Available in: https://sistemas.cfm.org.br/normas/visualizar/resolucoes/BR/2017/2173
9. Paraná. Secretaria da Saúde. Diretoria de Gestão em Saúde. Sistema Estadual de Transplantes do Paraná. Manual para notificação, diagnóstico de morte encefálica e manutenção do potencial doador de órgãos e tecidos. 4ª ed. Curitiba: SESA/DGS/CSET; 2023.
10. Cuende N, Cañón JF, Alonso M, Martín C, Sagredo E, Miranda B, et al. Programa de garantía de calidad de La Organización Nacional de Trasplantes para la evaluación del proceso de donación. Nefrologia. 2003 [access on 17 Dez 2014]; 23:28-31. Available in https://www.revistanefrologia.com/es-pdf-X0211699503029260
11. Miranda B, Alonso M, Cuende N, Sagredo E, Martín C, Cañón JF, et al. Metodología del procedimiento de autoevaluación del programa de garantía de calidad de la Organización Nacional de Trasplantes. Nefrologia. 2003[access on 20 agosto]; 23 Suppl 5: 32-41. Available in: https://www.revistanefrologia.com/es-pdf-X0211699503029252
12. Westphal GA, Garcia VD, Souza RL, Franke CA, Vieira KD, Birckholz VR, et al. Diretrizes brasileiras para o manejo de potenciais doadores de órgãos com morte encefálica. Uma força-tarefa composta por Associação de Medicina Intensiva

Brasileira, Associação Brasileira de Transplantes de Órgãos, Brazilian Research in Critical Care Network e Coordenação Geral do Sistema Nacional de Transplantes. Rev Bras Ter Intensiva. 2021; 33(1). https://doi.org/10.5935/0103-507X.20210001

13. Ayres M, Ayres JRM, Ayres DL, Santos AS. Bioestat 5.3: aplicações estatísticas nas áreas das ciências biológicas e médicas. Belém: IDSM; 2007.

14. Bertasi RAO, Bertasi TGO, Reigada CPH, Ricetto E, Bonfim KO, Santos LA, et al. Profile of potential organ donors and factors related to donation and non-donation of organs in an organ procurement service. Rev Col Bras Cir. 2019; 46(3). https://doi.org/10.1590/0100-6991e-201922180

15. Senna CVA, Martins T, Knihs NS, Magalhães ALP, Paim SMS. Fragilidades e potencialidades vivenciadas pela equipe de saúde no processo de transplante de órgãos: revisão integrativa. Rev Eletr Enferm. 2020; 22: 58317. https://doi.org/10.5216/ree.v22.58317

16. Cinque VM, Knihs NS, Schirmer J. Estressores vivenciados pelos familiares no processo de doação de órgãos e tecidos para transplante. Rev Esc Enferm USP. 2010; 44(4). https://doi.org/10.1590/S0080-62342010000400020

17. Knihs NS, Schirmer J. Adaptación del modelo Español de gestión en transplante para la mejora en la negativa familiar y mantenimiento del donante potencial. Texto Contexto Enferm. 2011; 20(1): 59-65. https://doi.org/10.1590/S0104-07072011000500007

18. Silva A, Lima S, Lima V, Knihs N. Quality improvement tools to manage deceased organ donation processes: a scoping review protocol. Nurse Educ Pract. 2022; 61:103322. https://doi.org/10.1016/j.nepr.2022.103322