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ORIGINAL PAPER

# Attitudes and Knowledge of Professionals Regarding the Utilization of Kidneys from Expanded Criteria Donors in Brazil: Perspectives and Recommendations

Joel de Andrade[1], Claudia Affonso Silva Araújo[2,*], Marina Martins Siqueira[3], Mônica Ferreira da Silva[2]

1.Governo de Santa Catarina – Secretaria de Estado da Saúde de Santa Catarina – Central Estadual de Transplantes – Florianópolis (SC) – Brazil.

2.Universidade Federal do Rio de Janeiro – Instituto de Pós-Graduação e Pesquisa em Administração – Centro de Estudos em Gestão de Serviços de Saúde – Rio de Janeiro (RJ) – Brazil.

3.Hospital Israelita Albert Einstein – Centro de Políticas de Saúde – São Paulo (SP) – Brazil.

*Corresponding author: claraujo@coppead.ufrj.br

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## ABSTRACT

**Objectives:** To investigate how the attitudes and knowledge levels of transplant professionals affect the utilization of kidneys from expanded criteria donors (ECD) in Brazil and to identify managerial actions that could improve their use in clinical practice. **Methods:** This qualitative study involved semi-structured interviews with 25 key professionals from Brazil's organ donation and transplantation system, including transplant coordinators, medical teams, and representatives of the National Transplant System (Sistema Nacional de Transplantes). Thematic analysis was employed to extract insights into professional behaviors, decision-making processes, and opportunities for operational improvement related to the use of ECD kidneys. **Results:** The underutilization of ECD kidneys is linked to limited access to accurate information, inconsistent clinical practices, and risk perceptions not supported by empirical evidence. Participants emphasized the lack of standardized guidelines and variability in team decisions. Based on the findings, the study proposes actionable recommendations, including improving the transparency and accessibility of data on transplant outcomes, investing in professional training, standardizing evaluation protocols for ECD kidneys, and fostering better communication and alignment among transplant teams. **Conclusion:** The study presents practical contributions by identifying managerial actions to improve organ utilization and enhance transplant system efficiency in Brazil. It also contributes theoretically by applying a management perspective to a highly technical health system challenge. Addressing the identified barriers may increase the acceptance and use of ECD kidneys, expand the donor pool, reduce organ discard, and ultimately save more lives.

**Descriptors:** Kidney Transplantation; Tissue and Organ Procurement; Organ Utilization; Health Systems; Decision Making.

## *A Atitude e o Conhecimento dos Profissionais na Utilização de Rins de Doadores com Critérios Expandidos no Brasil: Perspectivas e Recomendações*

## RESUMO

**Objetivos:** Investigar como atitudes e o nível de conhecimento de profissionais da área de transplantes influenciam a utilização de rins de doadores com critérios expandidos (DCE) no Brasil e identificar ações de gestão que possam melhorar esse aproveitamento. **Métodos:** Estudo qualitativo baseado em entrevistas semiestruturadas com 25 especialistas do Sistema Nacional de Transplantes (SNT), incluindo coordenadores de doação, equipes transplantadoras e representantes institucionais. A análise buscou compreender os fatores que impactam a decisão de utilizar rins DCE e identificar oportunidades de melhoria no processo. **Resultados:** A baixa utilização desses órgãos está associada à falta de informação, percepções de risco não baseadas em evidências e práticas clínicas heterogêneas. A pesquisa sugere ações viáveis, como maior transparência de dados, capacitação profissional, padronização de critérios e melhoria na comunicação entre as equipes envolvidas. **Conclusão:** O estudo oferece recomendações práticas para gestores e profissionais com o objetivo de ampliar o uso de rins ECD, aumentar a efetividade do transplante renal no país e salvar mais vidas.

**Descritores:** Transplante de Rim; Doação de Tecidos e Órgãos; Utilização de Órgãos; Sistemas de Saúde; Tomada de Decisões.

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## INTRODUCTION

Organ transplantation processes have a clear social relevance as they allow for greater survival or quality of life improvement for thousands of people each year. Despite the clinical and managerial advances that have brought a significant increase in the number of transplants performed in recent decades, the gap between the demand and the supply of organs for transplantation is growing, resulting in long waiting lists and contributing to the worsening health status of patients requiring the procedure.[1-3] The situation is even more severe for patients waiting in line for a kidney because renal transplantation is the most frequent modality in Brazil, and it has the highest number of patients on a waiting list. The scarcity of donated kidneys can significantly increase the mortality of patients on a list, representing a serious public health problem in addition to representing higher public spending compared to a continual dialysis regimen, which is a long-term treatment with high economic and social burdens for the patients.[3,4-7]

Added to this is the great geographical disparity of Brazil in terms of infrastructure and access to health services.[8,9] In 2022, of the 52,989 patients enrolled in the transplant waiting list, 29,690 (56%) were waiting for a kidney. Similarly, of the 8,021 solid organ transplants performed in the same year in the country, 5,306 (66%) were renal transplants, almost entirely from deceased donors.[10]

Several policies have been adopted to address this challenge, with some of them aimed at increasing organ donation and others focused on the use of the organs donated by using expanded criteria donors (ECD). Once the protocol for diagnosing brain death (BD) is closed, a legal requirement for organ donation in Brazil, and with family consent for donation, the viability of the potential donor is assessed by professionals on the donation teams, and this stage includes checking organ quality and absolute contraindications to donation in cases of donors with malignant tumors, active tuberculosis, HIV-positive serology, with COVID-19, among others.[11,12] Some donors, however, do not have a clinical condition that leads to an absolute contraindication, but they are also not in ideal conditions for their organs to be used, such as patients at an advanced age, diabetes, or a history of high blood pressure, among other cases. These patients are called ECD, or borderline or marginal donors, referring to the clinical and demographic characteristics that impact organ quality and expected transplant longevity.[13] Increasing the utilization of ECD is especially important to face the high demand for kidneys in the country, and studies point out that waiting for a standard donor results in survival levels that are lower than an early transplant with ECD organs.[14] However, evidence suggests an increase in not using these types of organs, but instead the disposal of ECD organs that could be transplanted with a good safety margin for the receptors.[15,16]

The use of ECD organs has been supported in the medical literature for decades due to its benefits for patients on the waiting list for an organ.[17-21] However, there is still a reluctance to offer and use such organs generally because of the belief that such organs present inferior quality or worse results, or because of the lack of familiarity by the transplant professionals with definitions and estimates of evidence-based risks.[16] Snyder et al.[22] assessed the hypothesis that transplanting high-risk kidneys could compromise the performance of the transplant teams, leading to the refusal and disposal of ECD organs. However, the authors did not find evidence that programs that accept such kidneys have low performance. Thus, the aversion to risk and negative attitude not based on evidence by key professionals in using these organs may limit patient access to organs for transplantation. In this context, some researchers have reflected on risk aversion and decision-making, suggesting applying behavioral economic principles to the decision of using or not using an organ donated by an ECD.[23,24] In this sense, using ECD organs supported by data, policies, and written procedures could reduce risk aversion.[25] However, the literature points to the lack of indicators on the transplantation process and the use of organs.[26,27]

Accepting a kidney donated for transplantation, either from an EDC under standard conditions or an ideal kidney, is a technical assignment that should be carried out exclusively by the transplant team, which must carefully evaluate the risk/benefit ratio of the existing alternatives.[12,28] However, there is a lack of standardization in the decision-making processes regarding accepting an ECD organ, which is a problem that causes great variability in the utilization rates of organs donated not only in Brazil but also in countries such as Canada, Spain, and the United States.[29-31] For some authors, in the absence of indicators, decisions are made subjectively, influenced by the label ECD, since organ utilization rates with such a denomination are significantly lower than those without this classification, reducing the number of organs available for transplantation.[32-34]

Using ECD kidneys requires informed consent from recipients, and the team must provide adequate counseling to the patient about the risks of receiving a borderline kidney, such as organ failure or loss and lower estimated post-transplant survival, versus the risks of waiting on dialysis for another compatible kidney, which could lead to deterioration in the patient's health and make future transplant surgery very risky.[28] Therefore, negative attitudes and insufficient knowledge about transplantation with an ECD among the involved professionals could lead to refusals not based on evidence, by both the transplant team and the patient, resulting in the waste of donated organs. Additionally, medical evidence on the subject has evolved rapidly and significantly, requiring professionals to stay up-to-date and receive ongoing training.[35-39]

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In this sense, there is extensive national and international literature about the importance of educational interventions to improve the organ donation-transplantation process, as well as the attitude and level of knowledge of professionals regarding the process.[1,3,40] However, in a systematic literature review conducted in eight databases (EBSCO, PubMed, Web of Science [WOS], Emerald, ProQuest, Science Direct, Scopus, and Virtual Health Library), aiming to synthesize evidence on the impact of educational initiatives (EI) on the attitude and knowledge of healthcare professionals regarding the organ donation and transplantation (ODT) process, 21 studies were identified and none of them were focused on the transplantation stage. Therefore, studies with a focus on the attitude and level of knowledge of the professionals working on the ODT process, in general, aim to increase organ donation and not to increase the use of the organs donated for transplantation.[3,27,41] Likewise, in another systematic literature review aimed at analyzing articles dealing with possible managerial practices to increase the utilization of donated organs, five databases were searched (EBSCO, Scopus, WOS, ProQuest, and SciELO), and only two articles focused on improving the transplantation stage.[42,43] Tolchinsky et al.[42] proposed an agent-based architecture in Spain to help manage the data that must be processed during the ODT flow, helping physicians in the decision-making about who is the better recipient of the organ donated. In turn, Ersoy et al.[43] proposed greater coordination between hospitals and distribution centers in the United States, creating standard tools in the ODT process and models to help decide which organ to accept.

Therefore, despite the relevance, the theme of using donated kidneys and the importance of the attitude and level of knowledge of the professionals working along the ODT process is still little explored in the literature, and no study carried out in Brazil addressing this issue was identified. Previous studies were carried out in several countries, such as the United States, Canada, Israel, Hong Kong, and India, to quantify the use of kidneys donated from deceased donors.[20,29,44-45] Regarding the use of ECD organs, there are several empirical studies, generally developed in the United States, and literature reviews, but with a focus on the clinical aspect of the theme.[17-19,21] Therefore, this study aims to contribute to the literature in dealing with the topic of using kidneys donated from an ECD in Brazil, with a focus on education and the level of knowledge of professionals who work with this process. The objective of this study is to answer the following questions: 1) How do the attitudes and level of knowledge of the transplant professionals affect the use of ECD kidneys in Brazil? 2) Which management actions could be taken to increase the use of organs donated for transplants in the country? To this end, 25 transplant coordinators and professionals working in 10 Brazilian states, responsible for 90% of the donation transplantation activity in the country, were interviewed.

This study is relevant for shedding light on a topic that has not yet been explored much in national and international literature and for awakening the interest of researchers in the theme. For those who formulate public policies and for the professionals who work with the organ donation transplantation process, this study is important to recommend ways to improve the process, resulting in greater utilization of donated organs and bringing the fields of medicine and management closer to achieving a greater number of transplants performed safely. In this sense, the greatest contribution of this study is to society since it makes it possible to increase the supply of organs for transplantation, reduce the waiting time for an organ, improve the quality of life of people who need an organ, and ultimately save lives.

## METHODS

This is an exploratory, descriptive, and qualitative study. This study follows the Consolidated Criteria for Reporting Qualitative Research (COREQ) guidelines for qualitative research reporting.

A total of 25 semi-structured interviews were conducted via Zoom, from October 8 to November 4, 2023, under the National Transplant System (Sistema Nacional de Transplantes [SNT]) that covered the 10 State Transplant Centres (Centros Estaduais de Transplante [CET]) with the best performance in renal donation and transplantation activity in Brazil, which are responsible for 90% of this activity in the country. based on data from the year 2023: São Paulo, Paraná, Santa Catarina, Rio de Janeiro, Minas Gerais, Ceará, Rio Grande do Sul, Pernambuco, Bahia, and Goiás.

The interviewees were selected through convenience sampling, based on their expertise in the field. The group included ten state-level transplant coordinators, 11 coordinators of organ transplant teams, two representatives from the general coordination of the SNT – the council responsible for overseeing all transplant activities in the country, its national coordinator, and one additional professional from the SNT. Of the 25 people interviewed, 20 are physicians and five are nurses. As for the educational background of those interviewed, four are doctors in their respective fields of activity, besides six with master's degrees, while the other 15 are specialists. Each of them has in common a wide insertion into one or more stages of the renal donation and transplantation process. Two of those interviewed have experience in national transplant organizations, 12 with state coordination, and 11 coordinate the renal transplant teams in their respective states.

The interviews were conducted with the aid of a semi-structured script composed of open questions, allowing the research subjects greater freedom of expression in their answers and the option for the researcher to capture objective and subjective information. The questions were inspired by the research questions and the revised literature. Two test interviews were conducted, whose data obtained do not constitute the result of this research, to evaluate the researcher's preparation for conducting the interviews and evaluate the suitability of the instrument to reach the research objectives, thus making small adjustments. In the final instrument, in addition to information about the interviewee (professional category, time of activity, and level of involvement in the daily routine of kidney allocations for transplantation), the following questions were prepared for the interviewees: 1) How do you evaluate using kidneys donated for transplantation in Brazil and in your state? 2) What factors/situations have a positive and negative effect on using kidneys donated for transplantation? 3) How do you assess the attitude of professionals about organs donated from an ECD? 4) How do you assess the level of knowledge of the transplant professionals about using ECD organs? 5) What measures could be taken to increase the use of organs donated for transplantation? Each interview lasted an average of 60 minutes.

All data collected were compiled into a Microsoft Excel spreadsheet to be analyzed in terms of convergences and divergences between the interviewees' answers. The intention was to foment a dialogue between the literature and the interviewees' perspectives about the subject. To ensure confidentiality for the participants of the study, pseudonyms were assigned to the subjects interviewed, adopting the terms "EC" and "ET", respectively, for interviews with coordinators and transplant professionals.

All interviews were conducted by the four authors of this study, all of whom hold doctoral degrees in administration and have prior experience with qualitative research in healthcare management. Three of the authors are professors and researchers, and one of them also works directly in the management of the ODT process in Brazil and was previously known to some of the participants. The research team consisted of one male and three female researchers. Participants were aware that the researchers were conducting a study to better understand the barriers and opportunities for increasing the use of donated organs for transplantation, to inform improvements to the Brazilian SNT. Interviews were conducted online, with each participant in a private and quiet setting to ensure confidentiality and focus. No third parties were present during the interviews. Interviews were conducted until data saturation was reached, defined as the point at which no new themes or relevant information emerged from additional interviews. There were no refusals or dropouts, and no repeated interviews were conducted. All interviews were recorded (with consent) and later transcribed. Transcripts were validated by the participants. Data were analyzed inductively by two of the four authors, with themes emerging from the interview content. The main categories were discussed among the authors, including points of convergence and divergence related to the participants' geographical location, professional background, and experience with ECDs. Although there was general agreement on key barriers to ECD kidney utilization, some participants highlighted divergent perspectives, such as regional differences in practice, varying levels of risk aversion among teams, and contrasting views on the role of training or data availability. These minor but relevant themes enriched the analysis and provided a more nuanced understanding of the ecosystem. Final interpretations were shared with the participants as part of an ethical feedback process and to validate the findings.

The project was submitted to the Research Ethics Committee of the Universidade Federal do Rio de Janeiro and approved under decision no. 4.297.286. This study was supported by funding from Fundação de Amparo à Pesquisa do Estado do Rio de Janeiro (FAPERJ) under the 2021 Nosso Cientista do Estado program (call no. 32/2021).

## RESULTS

The existence of renal transplant teams that accept ECD grafts was pointed out by 22 of the 23 people interviewed and is present in all states evaluated in this study. Many respondents emphasized that, although they accept ECD grafts, their teams are not specialized in this area and do not perform this type of transplant systematically. Two coordinators (EC11 and EC12) stated that only five of the 209 teams (2.4%) that perform renal transplantation in Brazil are dedicated to the systematic use of ECD and that the overall utilization of this type of organ is estimated at 20%. Four coordinators (ET2, EC10, EC11, and EC12) stated that they could improve the utilization in their respective states, and several interviewees expressed the desire to expand the number of teams dedicated to transplants with ECD. One of the coordinators (EC12) even mentioned that the "*teams using ECD in Brazil could be counted on one hand" and that "of the eleven transplant centers in the state, only two have a more liberal position about ECD.*"

Thus, the results from the interviews reveal that systematically using ECD is currently restricted to a few teams, and many respondents clarified that although they work with this type of donor, their teams are not specialized in ECD. In this sense, the interviewees emphasized the importance of the team's expertise in performing transplants with this type of organ, suggesting that the level of knowledge and experience of the transplant team and the institutions involved are relevant factors in using ECD

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organs. On this point, six coordinators reported that their teams have a double filter for refusals, meaning that no refusal occurs without the team leader's authorization. However, inconsistencies and inhomogeneity in responses regarding acceptance or refusal were identified in the interviews of four coordinators (EC2, EC8, EC9, and EC11), and 18 interviewees reported that there were neither clinical meetings dedicated to assessing acceptance and refusal nor any initiatives for the systematic assessment of decisions taken about offers received of organs. Only four interviewees (ET1, ET6, ET8, and EC11) mentioned isolated initiatives along these lines, but without systematization and developed by transplant teams without the participation of the respective CET. According to ET3, "*Utilization is relegated as being secondary,*" and for EC12, "*There isn't a concern. The record (of utilization) is poor and not specific.*"

The lack of data and indicators was also identified as a problem in the interviews. The majority, 13 interviewees, reported not using any indicators to quantify, monitor evolution, compare with other transplant centers and teams, nor to set targets regarding the use of ECD kidneys. Only EC12 mentioned the attempt to design an indicator. Furthermore, 14 of the 23 interviewees reported that the registration of negative responses is precarious and characterized by generic terms such as "poor donor conditions" or "poor organ conditions," and neither allowed for specifically evaluating the reasons for the negative response nor their adequacy. According to EC6: "*We don't use indicators (about the use of ECD), but the disclosure of results would help teams to improve their performance.*"

Regarding the offer of ECD kidneys for transplantation, there was a consensus among those interviewed that the decisions about which kidneys to offer should be made by experienced staff and that the final decision should be shared with someone with a lot of experience: "*There always needs to be someone with white hair or bald on the team. The level of utilization depends on knowledge and attitude,*" said ET1.

Regarding education and training actions, respondents revealed that there were no specific education or training initiatives aimed at improving utilization levels. There is only one isolated report on an event with part of the program dedicated to utilization developed by a single CET. According to ET5, "There are no specific activities for utilization, much less joint efforts (between coordinators and transplant teams)," and for EC11, "*There should be courses and the coordinators and transplant professionals should be brought together.*" In general, the interviewees demonstrated a negative perception of the lack of education, preparation, and training initiatives and stressed the importance of such initiatives for the development of the systems. "*The focus is to increase donations; utilization is a neglected topic,*" said EC12.

As for the attitude of the professionals and teams involved in the utilization, there is a consensus that there are more conservative transplant professionals who give preference to ideal donors, and others who are bolder and are willing to accept ECD organs, generating a lack of standardization in the supply process of organs for transplantation and the acceptance/refusal to transplant organs of a very similar standard. According to the interviewees, professionals with a conservative attitude contribute to lower utilization either by not removing the organ or by not accepting the transplant. Thus, conservative or very selective transplant teams were sometimes cited as negative factors for organ utilization. For ET5, the heavy workload of the transplant teams contributes to a negative attitude on the part of the professionals and a higher level of refusal of ECD organs. Another point is the relationship between a good donation rate and a greater selectivity when choosing donors and the utilization of organs. For ET2, EC4, and ET5, the higher the donation rate, the greater the selectivity of the transplant professionals about the organs offered, promoting a more conservative attitude among the transplant professionals and a greater refusal of ECD kidneys.

Some interviewees highlighted the importance of working on the education of the conservative teams regarding a wider variability in organ acceptance and low utilization. This can be done by collecting and disseminating more information about the utilization, including from ECD, by bringing together teams to discuss results and goals in this respect. On the other hand, one coordinator (EC3) claims that isolated attempts to discuss the theme with transplant professionals, including about using ECD, resulted in resistance by the teams and a possible interpretation as "pressure from the CET to improve utilization." The same occurred for the utilization stage, with some interviewees pointing out that there were no initiatives to improve the donor maintenance, or indicated fragility in the execution of this task in their states, reducing the quality of the organ to be offered: "*Maintenance is fundamental, But the donor maintenance courses were hindered by the pandemic." (EC6); "There was a maintenance education initiative last year that was interrupted.*" (ET7); "*There is lack of knowledge on the part of ICUs (intensive care units). Education for the maintenance of a potential donor is crucial.*" (EC11); and "*We lost donors due to poor maintenance. We offer nurses to donor hospitals to improve the maintenance.*" (EC10).

Table 1 summarizes the main findings of the research, as well as the initiatives suggested by the interviewees to increase the use of ECD kidneys.

**Table 1.** Main findings and possible measures to be taken.

| Attitude and level of knowledge of the professionals – Findings | Possible measures to be taken |
|---|---|
| Attitude and knowledge – Despite the recognized relevance, the systematic use of ECD kidneys is restricted to very few renal transplant teams. | Share information about the process and indicators, and train the teams so that they are motivated and prepared to use ECD kidneys. |
| Attitude – 1) The coexistence of more conservative transplant professionals with more bold ones was reported, generating different results for organs of a very similar standard. Similarly, there is a lack of standardization in the supply of organs for transplantation. Thus, there is a great oscillation in the utilization of kidneys donated from an ECD, and room for improvements and greater standardization in these activities. 2) The conservative attitude of the transplant teams and professionals, which is not based on data and indicators, may contribute to low utilization, increased perceived risk, and high variability of unjustified acceptance. | Train and prepare the transplant teams, as well as the harvesting team, fostering evidence-based decisions. Develop a robust public data registry system that makes it possible to evaluate the evolution of organ utilization indicators. |
| Attitude and knowledge – There is a great variation in the prevalence of transplant teams (who systematically use ECD) among the state units, suggesting local inequities across the country. | Identify sites that need greater support, as well as high-performance sites that could contribute to the training and dissemination of good practices. |
| Knowledge – The level of knowledge and experience of the transplant teams and institutions involved seems to be a relevant factor for the safe utilization of ECD organs, and the decisions about kidneys offered for transplant should continue to be made by experienced staff members. | Train and develop professionals to make decisions consciously and based on data. Having reliable data and indicators was also pointed out as fundamental to increasing utilization. |
| Knowledge – Precarious records regarding the acceptance or refusal of the organs offered as the measurement and follow-up of organ utilization indicators in the country are still incipient. This gap negatively impacts the monitoring and encouragement of performance and targets in this area, as well as identifying services that need training and preparation to reach a higher utilization, or otherwise, that can inspire good practices in this respect. | Develop performance indicators aimed at organ utilization. |
| Attitude and knowledge – Lack of regular and dedicated clinical meetings to assess the reasons for and the adequacy of the acceptances and refusals, or any initiatives for the systematic evaluation of the decisions taken about the offers received of organs. | Hold periodic training meetings to discuss cases and propose process improvement actions. |
| Knowledge – A shortage of education or training initiatives aimed at improving the utilization and optimizing the use of ECD. | Hold periodic meetings with the transplant teams to discuss results and utilization targets, sharing relevant data and important information about ECD. |
| Knowledge – Need to expand the initiatives to optimize the maintenance of the potential donor. | Implement maintenance protocols and EIs to improve the attitude of the professionals and raise awareness of the importance of proper maintenance of the potential donor. |

Source: Elaborated by the authors.

## DISCUSSION

The findings reinforce the importance of training and preparation of the transplant teams, along with building data and indicators on the utilization of ECD kidneys from evidence-based decisions. Such actions would reduce the perceived risk of the decision to accept an ECD kidney, increasing the standardization in transplant decisions and maximizing the utilization of donated kidneys.[14,23-25] Thus, it is important that regulatory authorities seek to design more effective strategies to maximize kidney utilization and minimize disposals. The decision to accept an offer or wait for the next one should be made by a qualified professional based on reliable and published data and indicators, not on subjective criteria and the ECD label, as alerted by Hirth et al.[32] and Volk et al.[33]

Regional inequalities in the transplant system in Brazil are also mentioned in the literature.[8] Such disparities, which tend to reflect socioeconomic and infrastructure differences in local health systems, should be identified as places that need greater support, as well as the high-performance sites that can contribute by sharing good practices.[8] If the disposal of a small fraction of donated organs is unavoidable, the disposal of potentially transplantable organs needs to be avoided. A better understanding of the factors that contribute to disposal is essential, as well as the role of the level of knowledge, attitude, and incentives to health professionals and transplant centers involved in the decision-making process of accepting or refusing the organ.

The strategy of directing the offer and the decision of accepting or rejecting organs, to be done by experienced staff, converges with the literature. In an article on a surgeon's decision to accept and use an organ, Schnier et al.[23] point out that this decision is complex and typically taken within a narrow time window, being aware of numerous health-related risks and under the influence of considerable regulatory and institutional pressures. In accepting or refusing a kidney offer for transplantation, the doctor must

weigh the probability of the outcome if the offer is accepted against waiting for another offer, which may or may not come. This is where the fundamental importance of an experienced and trained professional being in this role.

As for the precarious records regarding the acceptance or refusal of the organs offered, this fact makes it difficult to reduce the disposal rates and regional disparities. Therefore, clearer information on organ refusal is urgent. Collecting such data requires coordinated efforts by the transplant centers and their respective CET. Better data collection will support efforts to estimate organ quality more reliably, allowing better allocation and utilization while reducing disposals. It can be observed in the literature and the findings of this study that there is a lack of precise criteria, both national and international, to guide clinical training and protocols aimed at the decision to accept or refuse ECD organs.[32,33]

The literature indicates that clear information and evaluation meetings of acceptances and refusals are essential to evaluate the adequacy of the decisions taken.[16] Inaccurate records prevent any training and measures aimed at improving the process. Cho et al.[44] point out that factors that transcend the quality of the organ are involved in the disposal of kidneys and that there is great regional variability in the utilization and a clear demand to investigate this phenomenon better and train the teams.

As in the case of ECD utilization, tools that recommend training and awareness of the professionals involved, an evidence-based decision, standardization, and rationalization of the decision-making process seem to favor the maintenance stage of potential donors. When set up early on, this strategy has the potential to improve utilization by generating donors with organs in better condition for use.

## CONCLUSION

The results of the research brought insights into the challenges and improvement spaces in the utilization of ECD kidneys in Brazil, enabling some management recommendations (Table 2). In general, these recommendations aim to streamline the activities and processes relevant to the utilization and to base the decisions made by the professionals involved in the acceptance of ECD organs, mitigating decisions based on lack of knowledge, unsubstantiated fears, or negative attitudes.

**Table 2.** Recommendations for improving kidney utilization for transplantation.

| Item | Recommendation |
|---|---|
| Utilization data and indicators | Develop a robust public data registry system that makes it possible to evaluate the evolution of organ utilization indicators. |
| Training and preparation | Implement education and training programs aimed at improving utilization within the framework of the SNT with joint activities between transplant coordinators and transplant professionals.<br>More specifically, develop within the CET, in their relationship with transplant teams, training for dialogue and negotiation regarding the offers made to decide to accept or refuse the organ, clarified and shared.<br>Develop a national program of early maintenance of the potential donor based on clear guidelines and protocols. |
| Assessment of acceptances and refusals | Implement activities to evaluate the acceptances and refusals for the offers of organs received. Perform them in such a way that these assessments are regular and allow the system to be improved. |
| Data sharing and information systems | Provide historical filters of offers, acceptances, and negative responses from teams to shape future allocations and speed them up, preferably incorporating such filters into the computerized allocation systems |
| Make sure that the human and physical resources relevant to the utilization are adequate | Ensure that offers of kidneys are made to experienced professionals from each of the teams.<br>Along the same line, ensure that the kidney removals are done by teams specialized in organ removal, ensuring training for the surgical teams. |

Source: Elaborated by the authors.

Although there is considerable room for research and development in the context of the utilization of kidneys for transplantation using ECD in the country, the use of high-risk organs by experienced teams and for cases with a positive risk-benefit ratio should not be generalized for all transplant centers, patients, and donors, and therefore deserves further analysis. As a continuation of the effort and based on the results found here, qualitative and quantitative investigations are suggested to evaluate steps and elements relevant to the use of kidneys for transplantation. In particular, communication and dialogue between transplant coordinators and transplant professionals, and the relationship between the attitude and knowledge of the professionals involved with the level of utilization are key points in the process and have been little examined.

This study contributes to the scientific advance on this theme by complementing scarce knowledge of academic literature with the empirical findings from in-depth interviews. For managers, this study shows ways to increase the utilization of organs donated for transplantation. And, most importantly, it contributes to society by enabling more organs to be made available for transplantation, thus helping to save lives. However, it is important to mention some limitations of this study. Since it is qualitative research, it is subjective by itself, and data analysis is impacted by both the interviewees' perspectives and the author's interpretation, which can bring some bias; also, the results cannot be generalizable.

## CONFLICT OF INTEREST

Nothing to declare.

## AUTHOR'S CONTRIBUTION

**Substantive scientific and intellectual contributions to the study:** Andrade J, Araújo CAS; **Conception and design:** Andrade J, Araújo CAS; **Data analysis and interpretation:** Andrade J, Araújo CAS, Siqueira MM; **Article writing:** Araújo CAS, Siqueira MM; **Critical revision:** Silva MF; **Final approval:** Araújo CAS.

## DATA AVAILABILITY STATEMENT

All data were generated in this study.

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