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Healthcare Professionals' Attitude and Knowledge and Opportunities for Improving Organ Utilization in Brazil: Findings from an International Expert Panel

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Abstract

To investigate how the attitude and knowledge of healthcare professionals impact organ utilization and what can be done to increase organ utilization in Brazil. An international Expert Panel was conducted with 13 experts in organ donation-transplantation (ODT) from Brazil, Argentina, Spain, and the United States. We used the "People, Process and Technology Model" (Leavitt, 1965) to analyze the findings. The findings reinforce the importance of the teams' knowledge about the ODT process and the transplant professionals' attitude on organ utilization in these countries. This study addresses a topic of significant importance that remains largely unexplored in the international literature, underscoring this research's novelty and potential impact. Data analysis is impacted by both the interviewees' perspective and the author's interpretation, which can lead to bias. Also, the results cannot be generalizable. This study can guide healthcare professionals, researchers, and policymakers in their efforts to improve organ utilization in the healthcare system. It can increase the number of organs available for transplantation, helping to save lives.

Keywords
Organ utilization; professionals; knowledge; attitude; expert panel; Brazil.

Resumo

Objetivo: Investigar como a atitude e o conhecimento dos profissionais de saúde impactam a utilização de órgãos e o que pode ser feito para aumentá-la no Brasil. **Desenho**: Painel Internacional de Especialistas com 13 especialistas em doação-transplante de órgãos (DTO) do Brasil, Argentina, Espanha e Estados Unidos. Utilizamos o "Modelo de Pessoas, Processos e Tecnologia" (Leavitt, 1965) para analisar os resultados. **Conclusões**: Os achados reforçam a importância do conhecimento das equipes sobre o processo de DTO e a atitude dos profissionais de transplante sobre a utilização de órgãos nesses países. **Originalidade**: Este estudo trata de assunto relevante e inexplorado na literatura internacional, ressaltando o potencial impacto deste estudo. **Limitações da pesquisa:** Os resultados não podem ser generalizáveis e a análise dos dados é afetada tanto pela perspectiva dos entrevistados como pela interpretação do autor, o que pode levar a vieses. **Implicações práticas:** Este estudo pode orientar os profissionais de saúde, pesquisadores e gestores políticos nos seus esforços para melhorar a utilização de órgãos no sistema de saúde. Implicações sociais: Este estudo pode aumentar o número de órgãos disponíveis para transplante, salvando vidas.

Palavras-chave
Utilização de órgãos; profissionais; conhecimento; atitude; painel de especialistas; Brasil.

1.Introduction

Organ transplantation has great social importance since it can be the best option for patients suffering from terminal illnesses, improving their quality of life, and increasing their life expectance. However, the number of donated organs from deceased donors is not sufficient to face the demand for transplantation, and this situation tends to worsen with the aging of the population and the increase in the prevalence of chronical diseases (Čož and Kamin 2020),
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Thus, there are long waiting lists for a donated organ, contributing to the worsening of the health status of patients who need this procedure (Almeida and Araujo 2021, Marinho and Araújo 2021, Neuberger and Callaghan 2020)). This mismatch between demand and supply of organs for transplantation stems from two factors: (1) reduced number of donations in relation to demand and (2) low utilization (waste) of donated organs (Almeida and Araujo 2021, Marinho and Araújo 2021, de Andrade and Figueiredo, 2019).

Some deceased donors are not in ideal conditions for their organs to be used (e.g., patients at an advanced age, diabetes, a history of high blood pressure, among other cases) but they do not have a clinical condition that leads to absolute contraindication to donate their organs (e.g., malignant tumours, active tuberculosis, HIV-positive serology, with COVID-19, among others)[6]. These patients are called "expanded criteria donors" (ECD), or borderline or marginal donors, referring to the clinical and demographic characteristics that impact organ quality and expected transplant longevity ((Bastani 2020, Brennan 2019, Mota et al. 2016, Aubert et al, 2019).

The nonutilization of organs from consented deceased donors is a complex issue and limits patient access to transplantation[4]. Therefore, increasing the utilization of ECD is especially important to face the high demand for organs in Brazil, and studies point out that waiting for a standard donor result in survival levels that are lower than an early transplant with ECD organs (Axelrod 2016, Rose et al, 2015). However, evidence suggests an increase in ECD organ disposal, reducing the number of organs that could be transplanted with a good safety margin for the receptors (Rijkse et al. 2021, Ersoy et al, 2021, Ibrahim et al, 2020, Queiroz et al, 2013)

According to Neuberger and Callaghan (2020), precise metrics are essential for determining the extent and causes of organ wastage. Additionally, Stewart et al (2023) emphasize that the potential increased risk of less favourable outcomes after transplantation should always be balanced against the risks associated with remaining on the waitlist. In this sense, Ibrahim and Callaghan (Ibrahim and Callaghan 2023) advocate that a multifaceted approach is necessary to improve organ utilization.

Nevertheless, governments and public managers have been made efforts to increase the quantity of donated organs and little attention has been paid to increasing the utilization of donated organs (Pahl et al, 2020). Likewise, empirical research has been directed to improve the donation process and increase the number of organs available for donation. In a systematic literature review aiming at analysing articles dealing with possible managerial practices to increase the utilization of donated organs, we searched five databases (EBSCO, SCOPUS, WEB OF SCIENCE (WOS), PROQUEST, and SCIELO) and identified only two articles focused on improving the transplantation stage (Ersoy et al, 2021, Tolchinsky et al, 2006). Tolchinsky *et al.*(2006) proposed an agent-based architecture in Spain to help manage the data that must be processed during the organ-donation transplantation (ODT) flow, helping physicians in the decision-making about who is the better recipient of the organ donated, and Ersoy *et al*.[14] proposed greater coordination between hospitals and distribution centres in the US, creating standard tools to help decide which organ to accept. Therefore, there is a research gap regarding possible initiatives to improve the utilization of donated organs.

Similarly, by analysing studies dedicated to improving the ODT process, it is possible to observe that there is extensive national and international literature on the importance of educational interventions to improve the organ donation-transplantation process, as well as the attitude and degree of knowledge of the professionals in relation to the entire process (Araujo et al, 2016). However, in a systematic literature review conducted in eight databases (EBSCO, PubMed, Web of Science, 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 the healthcare professionals regarding the ODT process, we identified 21 studies and only one of them was focused on the transplantation stage. Santos *et al*.(2019) investigated the impact of a training directed to professionals on recovery, perfusion, and packaging of organs for transplants in Brazil. Therefore, studies focusing on the attitude and degree of knowledge of professionals working in the ODT process in general aim at increasing organ donation and not at increasing the use of the organs

donated for transplantation (Santos et al, 2019, Jawoniyi et al, 2018, Siqueira et al, 2016). However, Manzano and Pawson (2014) alert that the ODT process should be understood as a whole system rather than discrete parts or sectors.

Therefore, despite the great relevance of improving the utilization of donated organs and the importance of the attitude and degree of knowledge of the professionals working in the ODT process, it is still little explored in the international literature. Thus, this study aims to contribute toward closing this gap by answering the following research questions: (1) How do the attitude and knowledge of healthcare professions impact the organ utilization? and (2) What can be done to increase organ utilization in Brazil? To answer these questions, we conducted an international Expert Panel with thirteen professionals with extensive experience in the ODT process who work in reference institutions in Brazil, Argentina, Spain, and the United States.

We categorized managerial actions and recommendations into three critical dimensions, drawing upon the PPT Model conceptualized by Leavitt (1965): People, Processes, and Technology. This framework posits that organizational performance enhancement necessitates a harmonious balance among these three pillars. Also, it highlights the importance of considering the interdependencies between these three components. The "People" component emphasizes the human aspect, underlining the importance of having personnel with the necessary skills and knowledge. It also stresses the need for employee motivation and engagement to drive superior performance. The "Processes" dimension focuses on the interconnected work activities that convert inputs into outputs, delineating the operational procedures that underpin organizational efficiency. The "Technology" element, in turn, concentrates on integrating information management systems and other technological tools designed to increase work productivity. This theoretical construct supports the essence of managerial functions, allowing its application to enhance the overall system's effectiveness.

2. Method

This is an exploratory and qualitative study aiming at investigating the opinion of experts from reference institutions in Brazil, Argentina, Spain, and the United States about the current scenario, obstacles, and possible actions to improve organ utilization. The Expert Panel aimed to complement the scarce academic publication on the theme. It is a method frequently used in the fields of psychology, administration, and social sciences and which makes it possible to obtain qualified perspectives about the theme analysed. The panel allows for a necessary interaction between the different areas of knowledge involved in the ODT process. It is a methodology in which experienced professionals in the different stages of the process are called upon to analyse the system from the perspective of their competences (Shanthanna et al, 2020). In this sense, it is possible that a small number of experts can point out the most relevant aspects of the system. The method ensures reliability in evaluating the phenomenon under investigation since each specialist brings a very specific perspective on the theme, which when integrated with other views, translates the richness of the panel, resulting in the collective character of the initiative. The competence of each participant gives the expert panel the status of a research technique.

In this research, the panel was composed of professionals that are experts in different stages of the ODT process since identifying a potential donor all the way to the final stage of organ transplantation. The panel was composed of thirteen professionals with extensive experience in the ODT process in four countries: Brazil, Argentina, Spain, and the United States. As for their titles, eleven are physicians (7 nephrologists, 2 health professionals, 1 anaesthesiologist, and 1 digestive system surgeon), one is a nurse with a career in the ODT process, and one is a mathematician working in an organ procurement and distribution organization. Regarding the academic background of the experts, there are eleven PhDs, one with a master's, and one is a specialist in their respective areas of activity. Ten of the specialists develop research and teaching activities regularly. All of them have a wide insertion in one or more stages of the ODT process in their country: seven of them are coordinators of multi-organ transplant services, four have experience in national transplant organizations in their respective countries, and two are heads of organ procurement structures in large donation and transplant centres. To ensure confidentiality for the research participants, pseudonyms were assigned to the subjects interviewed, adopting the acronym "PE1" "PE2" … "PE13" for the panel experts.

The interviews were carried out using a semi-structured script composed of open questions, allowing the research subjects greater freedom in their answers. The following research questions were made to the expert panel: 1. "How do you assess the utilization of donated organs for transplantation in your country?" 2. "What factors/situations act positively and negatively on using the donated organs?" 3. "What measures would you adopt to improve the allocation and use of donated organs? Please, highlight the priorities" 4. "How do you assess the attitude and knowledge of the healthcare professionals regarding the utilization of the donated organs?" Furthermore, the interviewees were allowed

to comment on questions that were not formulated within the scope of the theme proposed. The interviews were conducted online individually through the Zoom platform with each interview lasting around 60 minutes. All collected data were compiled into a Microsoft Excel spreadsheet to be analysed in terms of convergences and divergences between the experts' answers. The intention was to foment a dialogue between the interviewees' perspective about the subject.

More specifically, the qualitative data collected during the expert panel were transcribed and analyzed through thematic content analysis, with the support of two independent researchers. All contributions were grouped and coded manually, allowing the identification of recurring themes and managerial insights. The data were then categorized following the "People, Process, and Technology" (PPT) framework, which served as a guiding analytical lens to classify the suggestions according to their primary focus. For example, comments related to professional behavior, team dynamics, and training were grouped under "People"; while suggestions regarding flow, decision protocols, and communication were classified as "Process". Contributions involving tools, systems, and data use were organized under "Technology". Short, descriptive labels were applied to each sub-theme within the categories, and representative quotes were used to validate the consistency of the classification.

This research was approved by the Ethics and Research Committee of the Federal University of Rio de Janeiro – Approval number 4.297.286.

3. Results

1. How do the attitude and knowledge of healthcare professionals impact the organ utilization?

The experts argue that healthcare professionals should assume a positive attitude regarding organ utilization. According to one of the experts, "there is a lack of real transplant professionals" due to the lack of commitment on the part of the professionals involved with the transplant activity. This expert believes that some of the transplant professionals do not put the necessary effort into exercising their activity, thus compromising organ utilization. In this regard, one expert said that discarding an organ should be the last option, and all possibilities of using it should be sought. On the other hand, improving the status and prestige of these professionals is considered important by some of the experts. According to them, transplant teams have lost their status over the years, making it difficult to recruit members to join the teams. Likewise, the remuneration for transplant procedures has decreased during the years and the experts believe that this situation discourages and reduces the commitment of professionals to the transplant procedure and organ utilization.

Still regarding attitude, the experts mentioned that there is a lack of objective criteria to judge the viability of an organ and to perform transplants. There are incoherent responses for the same type of offer, as well as days of the week when acceptance is more difficult. There are also reports of organs in excellent condition being denied by several teams. An American interviewee stated: "Surgeons are a difficult group to approach". For her, mechanisms capable of detecting patterns of inappropriate behavior would be quite useful, and to improve performance it is essential to address behavioral and attitudinal issues involved in the ODT process. Likewise, four interviewees emphasized the importance of organ maintenance and that in many centers the care team does not assume this task, but delegate it to the transplant coordinators, which often ends up delaying the procedures. In this context, ideal donors can become borderline donors and in some cases the organ is lost.

Concerning the knowledge of the professionals about organ utilization, the experts mentioned that it is essential to direct the offer of the organ to an experienced and capable member of the transplant team. According to PE5, these contacts often take a long time to reach the professional who decides, causing a delay in the process and resulting in a greater chance of organ refusal. Therefore, these experts argue that it is important to invest in the training and qualification of the donation and transplantation teams. In this regard, one of the experts believe that bringing the ODT process closer to the academy and promoting process improvements based on scientific evaluation of each stage of this process would increase organ utilization. According to the experts, organ utilization depends on the staff's knowledge and attitude.

The availability of surgical teams dedicated to organ harvesting is considered a relevant initiative. The surgical removal of an organ for transplantation requires training and is a sporadic event in most hospitals. In this sense, the recommendation of teams dedicated to extraction to avoid losses makes perfect sense. Experience and familiarity with the various issues involved, since the removal through the surgical act to the packaging and transport of the organs,

are essential. The Spanish experts mentioned that around 3% of the kidneys removed in the country are not transplanted due to accidents during the removal. Therefore, experienced removal teams can improve usability.

Creating an integrated educational program for organ utilization including transplant coordinators and transplant teams was one of the most highlighted initiatives mentioned by the experts. In Spain, the National Transplant Organization has sought this integration through the promotion of various technical-scientific events. The three Spanish interviewees (PE8, PE9, and PE10) approve this initiative and PE10 declared himself a “fervent supporter” of these events. Similarly, the North Americans have been seeking this integration between transplant coordinators and transplant teams. Although activities of this nature generate some resistance, the need to integrate different groups that carry out the same process seems very clear. In this sense, it is evident that groups that interact so closely need to cooperate so that the use of donated transplants increases in Brazil. For PE1, the lack of dialogue between transplant coordinators and transplant teams is a consequence of a lack of knowledge and technical training on the part of both groups. PE1 mentioned that the transplant teams get used to a way of working without contemplating national or even international protocols. He believes that the path to improvement is training the team to gain the level of extreme specialization. Long-term and longitudinal training would allow professionals to broaden their horizons and understand the ODT system. He believes that with adequate training the coordinator can discuss with the transplant team in other terms. In the same line, transplant teams should be trained in the donation process to understand the entire process.

In Brazil, to be part of a transplant team, the professional needs proven previous experience and physicians need to present a negative certificate of legal ethical process at the Regional Council of Medicine. The recommendation is to develop a training program for the transplant coordination teams with specific certification for exercising the function. Such a program, aimed at covering the corresponding ODT process stages, would have the purpose of training and certifying competent transplant coordinators, including specific content on the use of organs for transplantation.

Another aspect mentioned during the interviews was the importance of data and that the knowledge of healthcare professionals regarding the ODT process must be developed based on data. In this regard, the experts proposed the follow-up of primarily rejected organs to monitor the results of organs that were primarily rejected by one or more transplant teams. After being accepted and transplanted by others, the results of the procedure are available to the teams that refused them so that they can assess the adequacy of their decision. It is a North American initiative whose description by the interviewee is very clear: “Look, you refused all those organs! Maybe you can rethink your acceptance decision in the future..." The idea is to make this practice current in Brazil. Feedback on the evolution of non-accepted organs can increase organ utilization in Brazil. According to the experts, systematizing and making this practice a reality has enormous potential.

To help transplantation teams decide about the organ offered, some experts proposed that images of the donated organ (pre- or post-removal) can be very useful for transplant teams. Although less common, videos can also be incorporated into the arsenal of information. Adding these images can be decisive for the judgment of acceptance or refusal of organs offered. The availability of the clinical history of potential donors is an essential element in the process of validating and accepting organs for transplantation and constitutes another recommendation of the experts. The previous morbidity history represents a fundamental source of data in evaluating the donor and must be provided in a clear and reliable way. Previous disease data involving diagnoses of infections and neoplasms are equally critical in this process. In this sense, Spain has sought to integrate medical records, facilitating the search for information. Interviewees reinforce the role of the donor hospital as the primary source of this information.

Another suggestion was using data about team acceptances and rejections. This recommendation is based on an idea already adopted in the US of using the history of the teams’ decisions regarding organ utilization to match the characteristics of the donor to the acceptance pattern of each team in the system. The essence of the change consists in the order of offers, which means that the teams that usually accept organs with those characteristics would receive the first offers. The idea is to eliminate offers with zero chances of acceptance and, in this way, speed up distribution and improve utilization.

Some experts mentioned the importance of clinical meetings to discuss acceptances and refusal of donated organs to improve the teams’ decisions related to organ utilization. By holding meetings in working groups, each donor's data can be reviewed and analyzed. In this way, there is the possibility that during this retrospective analysis, the acceptance and rejection criteria of each offer can be reviewed. For accepted organs, it is possible to follow the concrete results of each transplant performed, both in the successes and in those that presented intercurrences. In the case of refusals, in

the analysis of each offer, there is the possibility of reviewing the criteria adopted and improving them prospectively. Activities of this nature are performed in some transplant systems and have the potential to improve utilization in Brazil.

Interactions between transplant teams was also proposed to increase organ utilization. This recommendation aims to stimulate exchange experiences between transplant teams with different performances, or even between different transplant systems, and foment a positive attitude regarding organ utilization. The exchange of know-how related to various aspects of transplantation can enhance the use of donated organs for transplantation.

In contrast to the Brazilian reality, the Spanish System regularly publishes performance reports entitled "donation effectiveness". In these reports, as reported by PE8, the use of organs appears related to numerous variables and is expressed in a historical series that allows evaluating its evolution. Similarly, in the US, achievement is assessed monthly in reports (PE11). In both countries, the control of these indicators is the starting point of quality programs that seek to improve performance. According to the experts, improving organ utilization in Brazil necessarily requires adopting performance indicators so that a diagnosis can be prepared and consequently have the possibility of a plan to improve the system. This requires awareness and training of the actors involved in the collection, systematization, analysis, and use of the data in question.

Another aspect mentioned by most of the experts was regarding the utilization of organs from donors who are not in ideal conditions for their organs to be used, such as patients with advanced age, diabetes, history of hypertension, among others. These donors are called "expanded criteria donors" (ECD). The experts believe that using their organs is perhaps the resource with the greatest impact on organ utilization. Therefore, dedicated and experienced transplant teams in using organs from ECD is considered essential. The practice of organ transplants from ECD, although established in some countries, finds different penetration in the different transplant systems. In the US, its use is still inhibited by accountability. In turn, in Spain the using ECD is consolidated in centers of excellence and there are initiatives to make it even more widespread. The autonomous community of Catalonia is a solid reference in this practice. In fact, Spain seems to be the reference in using ECD according to the panel experts, even for the American expert. In Brazil, the experts mentioned that the practice is restricted to two or three centers across the country. For several interviewees, this explains the low utilization rates we face in Brazil and the use of organs from ECD is considered essential to increase organ utilization in the country.

Finally, the experts advocate that is important to involve patients in the decisions related to their treatments, including organ utilization. The full clarification of patients about the threats and benefits of the organ transplantation is essential. Risk counseling is paramount and can assist patients in decision making. In Spain, in a transplant service that uses ECD, a detailed work is carried out to support the decision of transplant candidates. However, transplant teams should be trained, well informed, and motivated to talk to patients and clarify all their doubts.

2. What can be done to increase organ utilization?
All interviews began with an inquiry about the general view of organ utilization in their respective regions. All experts mentioned that the utilization can and has to be improved and one of the interviewees classified the performance as "poor". However, perspectives regarding the possible interventions to address this issue vary widely among respondents and 24 recommendations to increase organ utilization emerged. These recommendations were analysed considering the PPT model (Table 1).

Table 1. Suggested actions to increase the use of donated organs for transplantation

Dimension	Proposed actions
People	Address behavioural problems of healthcare professionals.
	Create integrated education and training programs for organ utilization including transplant coordinators and transplant teams.
	Create specialized and dedicated retrieval teams.
	Create specialized and dedicated teams to deal with organs from ECD.
	Do not penalize transplant teams based on the results of transplants from ECD.
	Improve knowledge regarding organs from ECD.
	Increase the status and professional prestige of those involved in the ODT process.
	Review the remuneration of professionals working in the ODT process.
	Stimulate interactions between transplant teams to exchange experiences.
	Train the donation and the transplant teams.
	Value the professional who works in the ODT process.
Process	Control the results of ECD utilization.
	Offer the organ to an experienced staff.
	Present images or videos of the organ offered to transplant teams.
	Stimulate interactions between transplant teams to exchange ideas.
	Analyse historical data about team acceptances and rejections.
	Create clinical meetings to discuss acceptances and refusal of donated organs.
	Create protocols about organ utilization.
	Encourage communication throughout the ODT process.
	Hold regular acceptance and rejection assessment meetings and data sharing.
	Inform about potential donor clinical history.
	Share decision with patients.
Technology	Analyse and monitor data related to organ utilization and disclose them on internet pages.
	Invest in Information Systems.

Source: The authors.

4. Analysis

The findings reinforce the importance of the teams' knowledge about the ODT process and highlight the impact of the attitude of the transplant professionals on organ utilization not only in Brazil but also in Spain, Argentina, and the US. Furthermore, the study reveals that, according to the perspectives of interviewed experts, the People and Process dimensions emerge as critical areas of focus. While acknowledging that technology can offer support, most recommendations revolve around enhancing the People and Process aspects, suggesting a prioritization of human and operational elements in improving the ODT system's effectiveness.

The need for data and indicators about organ utilization to support the teams' decision regarding an offered organ is also strengthened by the experts interviewed. These results are aligned to previous studies (Cooper et al, 2019, Stewart et al, 2023).

The decision between accepting an offer or waiting for the next one must be made by a qualified professional and based on reliable and disseminated data and indicators, and not on subjective criteria (Volk et al, 2017). The strategy of directing the supply of organs to experienced staff also converges with the literature. Likewise, the literature indicates that clear information and acceptance and rejection assessment meetings are essential to assess the suitability decisions taken (Ibrahim and Callaghan 2023). Inaccurate records prevent any training and measures aimed at improving the process (Cooper et al, 2019, Husain et al, 2019).

In short, the research results brought insights into actions needed to increase the use of donated organs for transplantation enabling some managerial recommendations.

This study contributes to the scientific advance on this theme by complementing scarce knowledge of academic literature with the empirical findings from the expert panel with people from four different countries. Still, it is important to mention some limitations of this study. First, the number of participants in the expert panel was limited to thirteen, which, although adequate for qualitative research, may restrict the diversity of perspectives. Second, cultural and contextual biases may have influenced the participants' responses, as the experts are rooted in distinct

healthcare systems with different regulatory, operational, and financial structures. Third, the qualitative nature of the method implies that the findings are not generalizable, and the data interpretation depends on both the participants' narratives and the researchers' analysis. These limitations should be considered when interpreting the results and deriving policy recommendations. However, this study contributes to academia by exploring a topic little explored in empirical studies. For public managers, the study points out ways to increase the utilization of donated organs for transplantation. And, most importantly, it contributes to society by enabling more organs to be made available for transplantation, helping to save lives.

As a continuation of the effort and based on the results of this study, we suggest quantitative investigations that evaluate stages and elements relevant to using organs for transplantation. In particular, the relationship between the level of attitude and knowledge of the professionals involved and their level of performance are points of fundamental importance in the process and could be explored quantitatively in future studies.

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