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Care actions in obtaining tissues and organs during the COVID-19 pandemic: a mixed methods study

Ações de cuidados na obtenção de tecidos e órgãos durante a pandemia de COVID-19: estudo de métodos mistos

Acciones de cuidado en la obtención de tejidos y órganos durante la pandemia de COVID-19: estudio de métodos mixtos

Neide da Silva Knihs[I]
ORCID: 0000-0003-0639-2829

Sibele Maria Schuantes Paim[II]
ORCID: 0000-0003-4249-9148

Aline Lima Pestana Magalhães[I]
ORCID: 0000-0001-8564-7468

João Luis Erbs Pessoa[III]
ORCID: 0000-0002-9266-102X

Laísa Fischer Wachholz[I]
ORCID: 0000-0001-9841-9798

José Luís Guedes dos Santos[I]
ORCID: 0000-0003-3186-8286

Elza Lima da Silva[IV]
ORCID: 0000-0002-0287-046X

Janine Schirmer[II]
ORCID: 0000-0003-0783-2961

[I] *Universidade Federal de Santa Catarina. Florianópolis, Santa Catarina, Brazil.*
[II] *Universidade Federal de São Paulo. São Paulo, São Paulo, Brazil.*
[III] *Estado de São Paulo, Secretaria Estadual da Saúde. São Paulo, São Paulo, Brazil.*
[IV] *Universidade Federal do Maranhão. São Luís, Maranhão, Brazil.*

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Corresponding author:
Neide da Silva Knihs
E-mail: neide.knihs@ufsc.br

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ABSTRACT

Objective: to map health care actions in the organ and tissue donation process in Brazilian regions during the COVID-19 pandemic. **Methods:** a mixed methods study. Data collection was performed simultaneously through an online questionnaire with 72 nurses. Descriptive statistical analysis and content analysis. **Results:** a total of 34.7% of professionals work in the state of São Paulo. The largest number of responses was from the Southeast region. Four categories emerged. The first addresses triage care actions; the second involves guidelines for SARS-CoV-2 prevention in potential donors; the third relates to the epidemiological screening of professionals; the fourth presents the scenario of donation training in pandemic times. **Conclusion:** care actions are aimed at tracking the path taken until arrival at the hospital, assessing temperature and saturation curves, in addition to screening for signs and symptoms for SARS-CoV-2 contamination among professionals.
Descriptors: Tissue and Organ Procurement; Pandemics; COVID-19; Organ Transplantation; Donor Selection.

RESUMO

Objetivo: mapear ações de cuidados em saúde no processo de doação de órgãos e tecidos nas regiões brasileiras durante a pandemia de COVID-19. **Métodos:** estudo de métodos mistos. Coleta de dados realizada de maneira simultânea através de questionário *online* com 72 enfermeiros. Análise por estatística descritiva e análise de conteúdo. **Resultados:** 34,7% dos profissionais atuam no estado de São Paulo. O maior número de respostas foi da Região Sudeste. Foram formadas quatro categorias. A primeira aborda ações de cuidados para triagem; a segunda envolve orientações para prevenção do SARS-CoV-2 no potencial doador; a terceira se relaciona com a triagem epidemiológica dos profissionais; a quarta apresenta o cenário das capacitações em doação em tempos de pandemia. **Conclusão:** as ações de cuidados direcionam-se para rastrear o caminho percorrido até a chegada do hospital, avaliar curva de temperatura e saturação, além da triagem de sinais e sintomas para contaminação do SARS-CoV-2 entre profissionais.
Descritores: Obtenção de Tecidos e Órgãos; Pandemias; COVID-19; Transplante de Órgãos; Seleção do Doador.

RESUMEN

Objetivo: mapear las acciones de atención a la salud en el proceso de donación de órganos y tejidos en regiones brasileñas durante la pandemia de COVID-19. **Métodos:** estudio de métodos mixtos. La recolección de datos se realizó simultáneamente a través de un cuestionario en línea con 72 enfermeras. Análisis estadístico descriptivo y análisis de contenido. **Resultados:** 34,7% de los profesionales actúan en el estado de São Paulo. El mayor número de respuestas fue de la Región Sudeste. Se formaron cuatro categorías. La primera se refiere a las acciones de atención de clasificación; la segunda se trata de lineamientos para la prevención del SARS-CoV-2 en el potencial donante; la tercera se relaciona con el tamizaje epidemiológico de los profesionales; la cuarta presenta el escenario de la formación en donación en tiempos de pandemia. **Conclusión:** las acciones de cuidado tienen como objetivo rastrear el camino recorrido hasta la llegada al hospital, evaluar las curvas de temperatura y saturación, además del tamizaje de signos y síntomas de contaminación por SARS-CoV-2 entre los profesionales.
Descriptores: Obtención de Tejidos y Órganos; Pandemias; COVID-19; Trasplante de Órganos; Selección de Donante.

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INTRODUCTION

The organ and tissue donation process is made up of distinct stages, which are composed of: active search for a possible donor, patient with clinical criteria to start brain death (BD) diagnosis; identification, assessment and validation of potential organ and tissue donors (PD), patient with a completed BD diagnosis; hemodynamic maintenance of this PD; conducting the family interview; logistics of removal, transport and distribution of organs and tissues, according to criteria defined by legislation[1].

All these steps are marked by complexities, conducted by multidisciplinary teams in different health settings. Despite the need to conduct each stage, according to the current legislation valid throughout the national territory, each region presents a unique reality related to cultural, structural health, logistics and geography factors, gross domestic product, among others, that impact donation and transplant results[1-2]. With the advent of the COVID-19 pandemic, the organ and tissue donation scenario had a different impact on the regions of Brazil, considering the number of cases, deaths and the need for health system arrangements to meet the demand arising from the pandemic[3].

Given this scenario, the Brazilian National Transplant System (SNT - *Sistema Nacional de Transplantes*) and the Brazilian National Health Regulatory Agency (ANVISA - *Agência Nacional de Vigilância Sanitária*), through guidance and technical support from the World Health Organization (WHO), published guidelines and recommendations for conducting the organ and tissue donation process stages for transplants, starting in March 2020. With regard to PD, the main recommendations point to validate PD after having investigated and traced signs and symptoms that indicate possible contamination by SARS-CoV-2, in addition to the need for a negative PCR test. Furthermore, it is necessary to avoid possible contacts with endemic areas or to have participated in trips to places where there are restrictions due to the number of cases or the presence of new variants[4-9].

The first technical note issued by SNT was number 25, which defined the technical criteria for clinical screening of coronavirus (SARS, MERS, SARS-CoV-2) in candidates for organ and tissue donation as well as in the management of candidates and transplant recipients. In April, it was updated, and number 34 was then published, which changed the technical criteria for screening candidates for organ and tissue donation and the management of patients on the waiting list[4-5].

ANVISA, in turn, published technical note 04, which provided guidelines for health services, such as prevention and control measures, which must be adopted when assisting suspected or confirmed cases of infection with the new coronavirus. Technical note 34 guided how disinfection processes in public environments and hospitals should be carried out during the COVID-19 pandemic. Subsequently, technical note 60, also published by ANVISA, included general guidelines for Tissue Banks regarding the fight against the SARS-CoV-2 pandemic. The latter was recently updated by technical note 18 of 2021[6-9].

Such recommendations direct care actions both in the process of identifying clinical evidence of the presence of SARS-CoV-2 infection and in strategies to prevent contamination and spread of the virus. They bring strategies regarding the development of clinical, epidemiological and laboratory history of possible donors, evidencing the contraindication of organ and tissue donation, when SARS-CoV-2 infection is identified through RT--PCR exam[4-5]. They also guide the need for strict care regarding the use of Personal Protective Equipment (PPE), hand hygiene and disinfection of surfaces both in public environments and in hospitals. They also deal with the thorough disinfection of places where suspected or confirmed cases have been[6-7].

The recommendations of these documents must be applied throughout the national territory and carefully followed, in an attempt to minimize the risk of cross-infection, adverse events to recipients and teams involved. Other countries have implemented recommendations similar to those of Brazil, making it clear to teams the need for screening for signs and symptoms and epidemiological investigation of SARS-CoV-2, in addition to the recommendation to perform transplants only in acute situations and in extreme cases, considering the severity of patients on the list. International studies have shown the importance of teams following health authorities' recommendations of each country when it comes to organ and tissue donation, aiming at the safety and effectiveness of all stages, even in pandemic times[10-11].

It is considered that the production of knowledge about the adaptation of policies and practices of health services during the COVID-19 pandemic is a priority for research in nursing at this time[12]. Thus, it is understood that the impact of this study is aimed at presenting how health teams are conducting care actions in each Brazilian region, in order to present challenges, weaknesses, strengths and potential to health authorities.

Moreover, the research may contribute to the identification of improvement opportunities for the follow-up of all organ and tissue donation process stages within ethical and legal standards, especially following safety recommendations in pandemic times. Therefore, the guiding question was outlined: how are health care actions being developed and implemented in the organ and tissue donation process in Brazilian regions amidst the COVID-19 pandemic?

OBJECTIVE

To map health care actions in the organ and tissue donation process in Brazilian regions during the COVID-19 pandemic.

METHODS

Ethical aspects

The research was approved by the Research Ethics Committee of the proposing institution in 2020. It followed Resolution 466/2012 and Resolution 510 of April 7, 2016 of the Brazilian National Health Council (*Conselho Nacional de Saúde*). Participants were invited to participate in the study, after clarifying the objectives and the proposed methodology, participating those who consented of their own free will through the Informed Consent Form. Participants were identified by codes composed of the letter P (participant) and an assigned number, according to the order in which the questionnaires were received.

Study design, period and site

This is a mixed methods study, with a parallel convergent strategy (QUAN+QUAL), with the objective of determining convergences, differences and combinations between quantitative and qualitative data[13]. A quantitative study was carried out, with a cross-sectional design, and a qualitative study, of a descriptive-exploratory nature, which had the same weight attribution. The adoption of a mixed methodology aimed at understanding the complexity of health care actions involving the maintenance of organ and tissue donation process activities, with perpetuation of safety at each stage, according to health authorities' recommendations[4-9].

The research was developed from June to December 2020 with nurses working in SNT, which includes State Transplant Centers (CETs - *Centrais Estaduais de Transplantes*), Brazilian National Transplant Center (CNT - *Central Nacional de Transplantes*), Organ Procurement Organization (OPO) and Intra-Hospital Commission for Organ and Tissue Donation for Transplantation (CIHDOTT - *Comissão Intra-hospitalar de Doação de Órgãos e Tecidos para Transplantes*).

Sample, and inclusion and exclusion criteria

Nurses working in the SNT care area were included. Professionals who are not working in the technical area of organ and tissue donation services were excluded, i.e., professionals in the administrative area and other professions that were not nurses. There was no sample size calculation, as there is no measurement of the number of professionals working at the CNT, OPOs, CIHDOTTs and CETs throughout Brazil. Thus, non-probabilistic, intentional sample was adopted, because the researchers encourage the participation of professionals from CET units throughout Brazil.

However, a greater representation of professionals from the state of São Paulo was sought, since this state was considered the epicenter of the pandemic, practically throughout 2020, and is the Brazilian state with the highest rates of organ and tissue donation and transplantation.

Data collection and organization

Data collection took place from June to December 2020 simultaneously. Initially, an email was sent to the CETs and CNT coordinators with the explanation of the research, along with the link to access the online form. Then, the coordinators were asked to send the form to all the other nurses linked to their CET, reaching OPO and CIHDOTT professionals.

Data were collected through a single questionnaire, prepared by the researchers on Google Forms®, containing 12 questions. The aforementioned questionnaire was validated by three professionals who work in the organ and tissue donation process, who suggested adjustments regarding sentence and text size. Before the wide dissemination, a pilot test was carried out by two nurses and such responses did not make up the data analysis. The questions in the form consisted of sociodemographic data (eight questions): age; sex; marital status; religion; ethnicity; state where they work; and academic training (undergraduate and graduate). Moreover, four questions were used with the possibility of closed-ended (quantitative data) and open-ended (qualitative data) answers.

The questions were constructed as follows: initially, the participants answered between two options (yes and no) and then they were invited to describe and detail the care actions, as stated. Therefore, the questions were: 1) Have differentiated routines been adopted to assist in screening for SARS-CoV-2 in the tissue and donation process? In the case of a positive response, detail some of these initiatives regarding clinical suspicion (signs and symptoms), history of hospitalizations, clinical investigation carried out with family members, investigation regarding community transmission, physical examination, laboratory and imaging tests; 2) Is there any guidance for the care team regarding care for PD to prevent COVID-19? If yes, cite; 3) Is there any epidemiological screening routine for professionals involved in the organ donation process? If the answer is yes, describe; 4) Was there care team training/qualification to develop care actions for PD in the context of the COVID-19 pandemic? If the answer is yes, what care does the care team develop with PD?

In the open-ended questions, we sought to understand which care actions were being developed and how they were performed in each region, considering the health authorities' recommendations. Both qualitative and quantitative data were answered by all participants.

Data analysis, and statistics

The analysis of quantitative data was developed using descriptive statistics, using a spreadsheet prepared in Microsoft Excel®, followed by SPSS v.25, in which categorical variables were expressed by frequencies and percentages. For analysis of qualitative data, the content analysis technique was considered, being manually developed from pre-analysis, material exploration, treatment of results and interpretation phases[14]. From analysis, four categories emerged. Subsequently, the combination of results was developed through the integration of quantitative and qualitative data[12]. This strategy was adopted in order to proceed with the mapping of care actions developed in the organ and tissue donation process amidst the COVID-19 pandemic in Brazilian regions, considering health authorities' recommendations. To illustrate the integration of results, a "joint display" was used as a strategy, through a data summary table[13].

RESULTS

The sample consisted of 72 nurses, 77.8% of whom were female, with a mean age of 39.4 years (median of 38 years). A total of 69.4% of participants declared themselves white, and 30.6%, brown. Most participants (54.2%) are married, followed by 27.8% who are single and 13.9% who are separated or divorced. The religions declared by the participants were Catholic (47.2%), Evangelical (25%), Spiritualist (16.7%) and others (11.1%).

The average time of professional training was 13.8 years, with a median of 13 years. Still, 90.3% of professionals reported having a graduate degree. As for the place participants work at, 34.7% of professionals work in São Paulo, 12.5%, in Santa Catarina, 11.1%, in Amazonas, 6.9%, in Paraná, 5.5%, in Ceará and Espírito Santo,

respectively. In Bahia, Maranhão and Rio Grande do Sul, there were 4.2% in each, 2.8% in the Federal District and Minas Gerais, and 1.4% in Mato Grosso, Mato Grosso do Sul, Rio de Janeiro and Roraima each.

The quantitative data, sum of Brazil and data by region were presented in Figure 1, considering the closed-ended questions. It is noteworthy that the percentage of respondents in Figure 1 represents the number of participants in this study. The largest number of responses to care recommendations was from the Southeast, followed by the South.

The analysis of qualitative data was developed from the four open-ended questions. Thus, four categories were formed, which will be presented below:

Question	Number of participants - 09			
	Yes		No	
	n°	%	n°	%
01	05	55.5	04	44.4
02	04	44.4	05	55.5
03	09	100	00	00
04	00	00	09	100

Question	Number of participants - 10			
	Yes		No	
	n°	%	n°	%
01	05	50	05	50
02	00	00	10	100
03	03	30	07	70
04	04	40	06	60

Question	Number of participants - 04			
	Yes		No	
	n°	%	n°	%
01	03	75	01	25
02	02	50	02	50
03	03	75	01	25
04	03	75	01	25

Question	Number of participants - 17			
	Yes		No	
	n°	%	n°	%
01	13	76.5	04	23.5
02	11	64.7	06	35.3
03	11	64.7	06	35.3
04	09	52.9	08	47.1

Question	Number of participants - 32			
	Yes		No	
	n°	%	n°	%
01	19	59.3	13	40.7
02	19	59.3	13	40.7
03	22	68.7	10	31.3
04	16	50.0	16	50.0

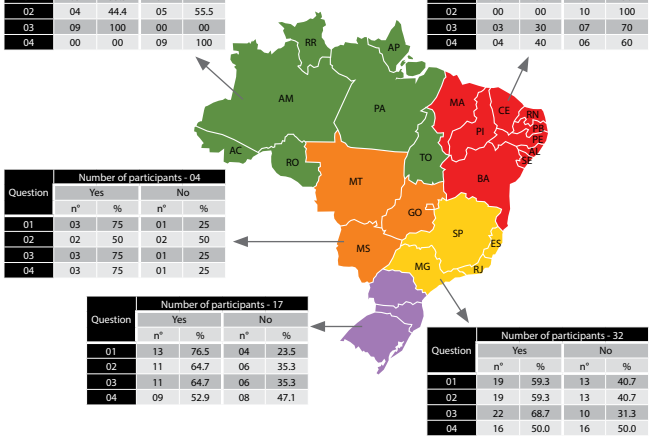

Figure 1 – Results of the quantitative stage regarding health authorities' recommendations in the organ donation process amidst the COVID-19 pandemic by Brazilian regions, Florianopolis, Santa Catarina, Brazil, 2020

Differentiated routines that assist in screening for SARS-CoV-2 in the tissue and donation process

This category represents the strategies adopted by nursing professionals capable of supporting PD screening in the face of the pandemic situation. Care actions in the assessment, investigation and tracking of possible signs of COVID-19, signs and symptoms, together with other health facilities, staff and other health bodies stood out. This includes the epidemiological investigation at health units close to patients, in addition to the analysis of the entire path of patients before and during hospitalization until arrival at the unit where they are.

> *Within the scope of the Brazilian National Transplant Center, we instituted the routine of asking teams to, in the specific field for this purpose, detail the PD's past history, possible contacts with infected people, places where they went, etc.* (P32)

> *We assessed medical records, whether there is any patient in the same positive or suspected sector, family report, tests performed, and we tested all potential donors with PCR screening.* (P10)

> *Triage is more focused on inpatient units and each patient's individual risk history.* (P56)

Guidelines for the care team regarding care for potential donor for COVID-19 prevention

Regarding this category, professionals reveal how they are working to prevent cross-infection of COVID-19 with professionals and the health environment. It is noted that there is restriction of people's access to the bed, creation of isolation protocols for this patient, routine maintenance of the vigilant team's donning, as well as increased care with the airways. The speeches of some participants make clear the team's effort to seek to minimize the potential for contamination for this PD.

> *We seek the geographic isolation of potential donors, use of PPE and use of collective equipment exclusively for this donor.* (P63)

> *After opening the brain death protocol, the potential donor is placed in an isolation bed, and precautionary measures are taken* [remembering that this potential donor will be in the General ICU]. (P26)

> *We ask questions about signs and symptoms among the communicators, if they have a history of positive COVID, if they are maintaining social isolation, what was the PD's routine before hospitalization.* (P55)

Routine of epidemiological screening of professionals involved in the organ donation process

This category shows care actions to try to minimize the risk of contamination between professionals and PD already validated for donation. The institution and team are concerned about reducing contact between these people, avoiding rotation in direct care to PD, while there is an investigation into possible symptoms of the team that indicate contamination by SARS-CoV-2. Still, it appears that there is apprehension in relocating a professional from the unit of critical patients if there is suspicion of contamination without confirmation.

> *Care professionals were separated only to attend to suspected and confirmed cases, with no rotation of these professionals to other sectors.* (P09)

> *Any suspicious symptoms, we are referred for investigation and medical care, but we did not have any cases in our group.* (P15)

> *We performed a questionnaire protocol as soon as professionals start their workday.* (P40)

> *All employees are changed sectors, if they present body temperature and presence of signs and symptoms for SARS-CoV-2, before starting the workday.* (P55)

Care team training/qualification to develop care actions for potential donors in the context of the COVID-19 pandemic

This category shows the team's insecurity in continuing the donation process in pandemic times, since this process involves different stages, which require a lot of competence from the professionals involved. In this category, they express the difficulty

in carrying out training on this topic, in addition to the need for consensus between the information obtained by the different health agencies. Due to several recommendations regarding PD validation for organ and tissue donation, these professionals mention the importance of brief and quick training to support care actions carried out by professionals, according to the following statements:

> *I know that everything is very rushed, there is no time for anything else. A crazy rush, but how are we going to continue validating the potential donor considering all the care we need to have without training?* (P56)

> *This process always requires a lot of knowledge from all of us. Now, with the pandemic, these trainings are of paramount importance to promote guidance and support in this process.* (P18)

> *We already had weaknesses and doubts before the pandemic, now, then? Pff, these trainings are important, even if they are brief.* (P44)

Figure 2 shows the integration of quantitative and qualitative data, to present the care actions that are being developed and implemented in the regions of Brazil in the organ and tissue donation process during the pandemic. It is worth noting that these percentages refer to the number of participants per region in this study. In the first column, the answers to the quantitative questions are related to health authorities' recommendations, presenting national compliance and compliance by region in percentage (%). Only the regions that obtained a percentage of compliance with health authorities' recommendations above 50% were presented, to enable data integration. In the second column, some care actions that are being developed in these regions are presented, which allowed compliance with health authorities' recommendations.

Quantitative data	**Qualitative data**
Question (Brazil/Region)	**Care actions, according to region**
First Question ➢ Brazil – 56.3% ➢ South – (76.5%); ➢ Midwest – (75%)	Carrying out PCR test (tracheal secretion) for all potential donors (already performed in the active search phase), epidemiological/clinical screening form, evaluation of the clinical condition by a CET doctor (South). Notification of the potential detailed donor and discussion of the case between CHT and CET doctor. Collection of secretion for all potential donors (Midwest).
Second Question ➢ Brazil – 40.8% ➢ South – (64.7%); ➢ Southeast – (59.3%)	Use of internal protocols of the institution with prevention and all precautions to avoid transmission of infectious diseases among ICU patients (South). Recommendation that the professional who is in the care of the potential donor on this day does not take care of other patients (Southeast).
Third Question ➢ Brazil – 28.2% ➢ Midwest – (75%); ➢ Southeast – (68.7%); ➢ South – (64.7%)	If a professional has symptoms or has had contact with someone confirmed, the PCR test is performed at the same time and he stays away until the result or while the symptoms last (Southeast). Upon arrival at the hospital, the temperature is checked daily and there are questions about symptoms (South). If a server presents symptoms, they stay away for at least 7 days, and in case of negative result and improvement of symptoms, they can return to the health unit (Midwest).
Fourth Question ➢ Brazil – 40.8% ➢ Midwest – (75%); ➢ Southeast – (50%); ➢ South – (52.9%)	There was training in gowning and dewearing of the servers that perform clinical and Doppler examinations for the diagnosis of BD (Midwest). Team training regarding standard contact isolation and aerosol precautions, in addition to the use of masks and guidance for hand washing (Southeast). Training to avoid cross-contamination, use PPE properly, keep the potential donor in another environment than that intended for assistance to suspects and/or positive for COVID-19 (South).

Figure 2 – Integration of quantitative and qualitative data between regions, according to the responses to the questionnaire regarding compliance with health authorities' recommendations in the organ and tissue donation process amidst the COVID-19 pandemic, Florianópolis, Santa Catarina, Brazil, 2020

DISCUSSION

The study shows the care actions carried out in the organ and tissue donation process in Brazil amidst the COVID-19 pandemic. In the sample of participants, there was a predominance of female professionals, with a mean age of 39.4 years and who self-declared themselves white, in addition to being married and with more than 10 years of training. These data reveal the characteristics related to nurses, supporting both data from the Federal Nursing Council (COFEN - *Conselho Federal de Enfermagem*) and other studies related to the profile of nurses, which characterize these professionals as mostly women (over 80%), young adults between 30 and 40 years old, white and with higher education for 10 years[15]. This same profile of professionals is identified in other studies involving the organ and tissue donation process, in which most are women, young people and with similar training time[16-17].

Over the years, there has been significant involvement of nurses in the organ and tissue donation process. This process consists of different stages, which require legal and scientific knowledge, care, sensitivity, decision-making and, above all, humanization and respect for the other's pain. It is understood that nurses are the professionals responsible for care management and supervision at each stage of this process, aiming to make it more agile, safe and effective[18-19].

Regarding the quantitative data, in the first and third question, which deal with PD screening and health team for SARS-CoV-2, the South, Southeast and Midwest have higher response rates regarding health authorities' recommendations. Given the findings, weaknesses are noted, especially regarding PD screening from the testimonies obtained in the qualitative stage. It is noteworthy that authorities' recommendations converge so that all PD is screened and investigated for symptoms related to COVID-19 in endemic regions, in addition to RT-PCR tests before officializing PD as a viable organ and tissue donor[4-5]. In this regard, there is an alert for nurses who are in the donation team to investigate more rigorously every detail with family members and support network, seeking to identify possible contamination alerts.

Regarding the third question, there was less participant compliance to respond to care related to the epidemiological screening of the health team in relation to authorities' recommendations. These recommendations are essential for nurses to identify important information, in order to ensure that there was a broad investigation for SARS-CoV-2. Thus, it is essential that this professional and team are trained to screen and investigate possible contamination, because these professionals are in contact with other patients, professionals and family members and are possible transmitters of SARS-CoV-2[20-21].

It is understood that the pandemic triggered an increase in the number of procedures, mainly related to patient and professional safety. The weaknesses identified in the study may be related to the learning curve of professionals and managers of each region, since new processes and tests were inserted, such as the testing of PD and professionals, and the organ and tissue donation process, which already involves several tests and procedures. Moreover, the reality of the new disease brought changes in conduct throughout the hospital flow, as well as in the reorganization of financial and human resources, which can also justify the weaknesses found.

In the second and fourth questions, which investigate whether there were guidelines for the health team regarding PD care for COVID-19 prevention and whether there was the development of training, participants' response rate reached 40.8% in both cases. It is noted that there is low compliance of health institutions regarding

the promotion of training and care guidelines that allow teams to act both in cross-infection prevention and in the screening and mapping of possible signs and symptoms of SARS-CoV-2. These aspects were also supported by the qualitative stage. Studies show that the health team that is facing PD, especially in pandemic times, must be totally safe and qualified to make decisions both in PD assistance and validation, as well as in the identification of possible indications of infection by SARS-CoV-2[22-23].

Another relevant factor is the understanding of how the pandemic affected, in a different way, the various regions of Brazil. In locations that suffered the highest incidence of COVID-19 cases, it is likely that there was no time to conduct training for teams involved in organ and tissue donation. Managers were forced to immediately think of strategies regarding the availability of Intensive Care beds and reorganization of professional schedules. These situations were aggravated by the illness of several professionals, due to the first wave of the disease, in addition to the changes that occurred in people's social lives.[24-27].

South Brazil states had the first wave with significant numbers of cases, hospital occupations and deaths, as of July 2020. This may be one of the factors that led managers in these regions to have more time to train and prepare health professionals involved in the donation process. Still, it should be emphasized that, in recent years, these regions have often been ahead in number of notifications and effective donors, in addition to direct involvement in training. This fact encourages the rulers of these locations to keep the teams updated, so that the number of effective donors can be maintained[24].

PD may present several hemodynamic changes similar to those of a patient contaminated by SARS-CoV-2, such as pulmonary, cardiac, renal complications and clinical signs of infection. On the other hand, patients contaminated by SARS-CoV-2 may be asymptomatic and show no clinical signs relevant to the disease[22,28]. Given this scenario, it is necessary that nursing professionals directly involved in the donation process stages are prepared to manage this unique situation that involves the pandemic scenario. Thus, the need for training in each institution is understood through the development of educational programs capable of preparing these professionals, either through educational platforms or technological tools, such as recorded simulations, infographics, videos, among alternatives that can be used to support this team.

Studies[18-19] point out that actions aimed at permanent education and health is one of the activities developed by nurses working in the organ donation process, in addition to activities directed to PD care. Nurses are the most numerous professionals in the donation and transplantation system, in addition to being directly involved with management and care. Thus, it is important to be attentive to training opportunities, to improve knowledge about PD care, together with the team where it operates and other professionals involved in this scenario, especially in the assessment and validation of this patient as an effective donor.

From this experience in PD assessment and validation, other countries seek new strategies to manage each organ and tissue donation process stage. In this regard, guidelines were given to the teams, recommendations for care and alerts, which made it possible to support the decision-making of these professionals in times of a pandemic[29]. In some European countries, as well as in the United States, there was a recommendation that donation and transplantation should occur only with total safety of non-contamination in all processes, in addition to greater criteria for the selection of donors and recipients, due to the need to allocate or open new ICU beds to accommodate and treat patients contaminated by SARS-CoV-2, in addition to increased contamination of health teams[20-21]. This situation is also experienced in Spain, a prominent country in organ and tissue donation, in which stricter recommendations were made regarding the eligibility of donors and recipients, which represented a significant drop in effective donors during the pandemic[30].

The first three categories developed in the qualitative stage show important care actions, carried out throughout the national territory, by nurses involved in organ and tissue donation. These actions are able to support and support the safety in the donation and ensure compliance with health authorities' recommendations. It is noted that there is concern of nurses in tracking the patients' path to the ICU, investigating the history with the professionals who took care of these patients, as well as in the records in the medical records. Furthermore, the team contacts health services that map epicenters of the pandemic in the patients' region. All this information supports the team's decision-making to validate PD, in addition to pointing out that the WHO, SNT and ANVISA[4-5] recommendations are being followed.

The PD identification stage is crucial in the scenario of organ and tissue donation, as it is in this stage that the team seeks all possible information before validating PD for the CET. The results of this research, based on nurses' testimony, express the development of RT-PCR test for all PD, in addition to tomography and laboratory tests. The literature highlights the importance of the team ensuring that all investigations were carried out in search of possible indications of SARS-CoV-2 with PD[21-22]. In addition to this, there are strong recommendations that safety should be the center of attention at all stages of PD validation and effectiveness by the health team[29].

The information obtained in these categories shows professionals' effort, especially nurses, to maintain donations and transplantations based on data investigation, assessment and screening, signs and symptoms that can support these professionals in decision-making in PD validation. However, it is important that managers and rulers understand that each effective donor needs to be carefully analyzed and observed, from the perspective of health authorities' recommendations[31-33].

The second category extends the concern of these professionals to the care of the environment and the team involved in PD care. Studies show that PD isolation and professional restriction with this patient who awaits the completion of the process and organ removal[20,34] are essential care actions to ensure the safety of the process in pandemic times. However, these efforts are lower than expected when compared to the data of this study.

With regard to guidance for PD care, there are regions where participants show to focus attention on care actions in PD isolation in a single environment, separate from other patients, in addition to creating specific protocols within their own institution, to meet the demands of health authorities' recommendations. International studies in endemic regions of Europe emphasize the importance of such care, while they reinforce the need for exclusivity in maintaining the same health professionals caring for PD after they have been

validated and tested for SARS-CoV-2 until the time of explantation. The justification of the studies for this care is supported by the possibility of this patient being contaminated after validation, if there is a change of professionals who develop care[21-22].

The fourth category, which is related to the health team training to act in times of COVID-19 in the donation process, three regions stood out: South, Southeast and Midwest: In these regions, from the testimonies, it was possible to perceive that training is directed to team guidance regarding the type of isolation, donning and doffing personal protective equipment, as well as signs and symptoms that may indicate infection by SARS-CoV-2 and alert for the arrival of patients from endemic areas.

In the daily life of organ and tissue donation, the health team already experiences a lack of training and specific knowledge to act in the stages of this process[16-17]. Other research shows the need for professionals who work in this scenario to be able and safe to conduct the organ and tissue donation process, and, with the advent of the pandemic, it became even more urgent[22-23]. From this perspective, a unique opportunity is opened for nurses in the scenario of training in the organ and tissue donation process, given that this professional encompasses important activities in this process[18-19]. Thus, it becomes a professional with greater ability to prepare the health team regarding SARS-CoV-2 prevention care. Due to being in the front line of care for critical patients and patient safety, especially during the pandemic, there was a role of nurses, not only for care actions for COVID-19 prevention, but for dissemination of knowledge and promotion of training[35-36].

Finally, it is understood that there are different realities in the pandemic scenario in Brazil in different regions and that certainly leads to different outcomes and behaviors by nursing professionals. Each region of Brazil had a specific impact, especially with regard to the availability of ward and ICU beds, access to care, system and health professional overload, number of contaminated and deaths caused by COVID-19. It is noteworthy that the North and Northeast were the most affected by the pandemic. In addition to regional differences, between March and May 2020, the country suffered from the lack of inputs, such as PPE, tests to detect SARS-CoV-2 and health system and ICU saturation[22-23,28].

Study limitations

The main limitations found in the development of this study involve researchers' difficulty to access all professionals working in the donation and transplantation system in Brazil. Also noteworthy is the scarce scientific production related to organ and tissue donation during the COVID-19 pandemic, which made it difficult to discuss the results. It was also fragile to carry out the qualitative stage through digital means. Given this, it was not possible to generate specific inferences of the regions.

Contributions to nursing and health

The study presents care strategies developed by the health team according to health authorities' recommendations in the organ and tissue donation process in pandemic times. Certainly, these findings can help nursing professionals to understand how this care is being developed with PD in different Brazilian regions, which can arouse in these professionals the need for internal adjustments in the care of this patient, contributing to the improvement of safety, effectiveness and quality in the stages of this process in the context of the pandemic. In addition to this, it is believed that such information may directly impact nurses' work process, in which they will perceive the primordiality of reviewing management and care in the organ donation process, as well as the importance of ensuring compliance with health authorities' recommendations.

CONCLUSION

This study mapped the health care actions developed by a sample of professionals who work in the organ and tissue donation process in Brazilian regions, amidst the COVID-19 pandemic, considering health authorities' recommendations.

Regarding care actions carried out in the organ and tissue donation process during the COVID-19 pandemic, most participants point out that there was a change in the routine to insert the screening for SARS-COV-2 in PD, as well as patient isolation strategies and testing of professionals with symptoms of COVID. However, they emphasize that there was partial preparation of the health team regarding the care to be developed with PD.

Such information identified can generate potentialities regarding the epidemiological investigation with the family, health units and other professionals who took care of PD, as well as the trajectory of this PD and patient isolation from other patients. The weaknesses identified were regarding the maintenance of training for health teams and consolidation of testing for the presence of SARS-CoV-2 both for PD and for the team.

From the results obtained, the important role of nurses was visualized, even in the face of the difficult scenario, and the contribution of care strategies and actions so that, increasingly, these regions come closer to health authorities' recommendations for safe maintenance of the organ and tissue donation process.

SUPPLEMENTARY MATERIAL

The database collected in this survey is available for access at: https://docs.google.com/spreadsheets/d/1ha-9VwO51UGhsts7BPkT8v7cPFwD8086l/edit?usp=sharing&ouid=100492800818931011723&rtpof=true&sd=true.

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