

Management of hemotherapy services in the context of the COVID-19 pandemic

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Abstract *This study aimed to analyze the management of hemotherapy services (HS) in the context of the COVID-19 pandemic from the perspective of municipal managers in different regions of Brazil. A qualitative approach with semi-structured interviews was applied to HS managers in the three Brazilian capitals, from different regions of Brazil, during the period between September 2021 and April 2022. The textual content of the interviews was submitted to lexicographic textual analysis using the free access software, Iramuteq. The managers' perceptions resulted from the descending hierarchical classification (DHC) analysis, which generated six classes: availability of resources for the development of work; installed capacity of services; strategies and challenges for attracting blood donors; risks and worker protection; measures for crisis management; and communication strategies for the adhesion of candidates for donation. The analysis highlighted several strategies used by the management, as well as pointed out limits and challenges for HS organization and management, exacerbated in the context of the pandemic.*

Key words COVID-19, Hemotherapy services, Blood banks, Health management

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Introduction

Donating blood and maintaining an adequate supply to meet the needs of the health system continue to be important challenges. In Brazil, blood donation is voluntary and, according to hemotherapy production data, 1.71% of the total population donated blood in 2019¹. However, a report with data from the hemotherapy information and production system identified a reduction in the percentage of donations in the first year of the pandemic, with differences between regions (Northeast: 1.14% and Southeast: 1.74%) and at least eight states with a percentage below 1%².

Promotional actions for voluntary donation aimed at ensuring the availability of an adequate supply of blood to meet the needs of the health system are usually developed by the teams that recruit hemotherapy services (HS). However, successfully attracting donors requires actions, strategies, projects, and educational programs that need to consider the situation, context, planning, monitoring, and evaluation in line with the societal possibilities and conditions³.

In most countries in general and in Brazil in particular, critical blood supply levels are expected at certain times of the year, especially for certain blood types. During vacation periods, epidemics, disasters, and major events, the blood donation rate tends to drop due to a lower demand for collection units^{4,5}.

Therefore, HS must have the organization, infrastructure, and resources that can be adapted and adjusted to different circumstances. For that reason, contingency and action/intervention plans must be designed in a way that facilitates the mobilization of resources in response to such situations.

The coronavirus pandemic has had an impact on blood donations in Brazil² and worldwide. Due to the need to adopt social distancing measures that interfered with donation rates – especially at the onset of the pandemic – this epidemiological situation challenged hemotherapy services, demanding from them and, particularly, from the collection units, the enactment of strategies and measures to reorganize routines and flows, as well as ensure that donors could trust the institutions to protect them from being infected by the coronavirus⁶.

The difficulties in obtaining blood donations unfolded throughout the pandemic. At first, there was fear of contagion by Sars-Cov-2, but with the protraction of the pandemic, vaccination, and the return of economic activities, new and old

challenges emerged, such as the need to update the criteria for temporary donation unfitness and the resumption of the mobilization strategies and actions to attract new donors³.

Blood is an “essential therapeutic resource for health systems”⁴, which is a vital part of any general or specialized hospital routine, especially during epidemic scenarios, and HS are responsible for collecting and supplying it⁷. Thus, this article intends to analyze HS management in the context of the COVID-19 pandemic from the perspective of municipal managers in three geographic regions of Brazil.

Methodological strategies

This study was conducted with a qualitative approach that integrates the research “Analysis of health inspection models and strategies in the COVID-19 pandemic (2020-2022)”, approved and funded through Call MCTIC/CNPq/FNDCT/MS/SCTIE/Decit No. 07/2020 and which involved HS from three capital cities in different parts of the country – the Northeast (NE), the Southeast (SE), and the North (N). The cities were selected based on the following criteria: they had to be the state capital, belong to different Brazilian regions, and present different stages of COVID-19 transmission (acceleration, deceleration, and stabilization) in the first wave of the pandemic.

The data from this study were subjected to lexicographic textual analysis using the software *Interface de R pour Analyses Multidimensionnelles de Textes et de Questionnaires* (IRAMUTEQ), a free, open access program that makes it possible to conduct different analyses of textual data, ranging from frequency calculations of words to multivariate analyses, such as the Descending Hierarchical Classification (DHC).

IRAMUTEQ is a resource that makes it easy to organize and order information for interpretive purposes, minimizing the limitations identified by critics of qualitative studies regarding the absence of criteria and scientific parameters capable of supporting the analytical procedures of textual data. Lexicometry is a set of techniques used for the statistical treatment of textual data, making it possible to perform analyses of the structural characteristics and content of a text or a set of texts based on the vocabulary. Such a methodological approach identifies trends, regularities, and discursive styles underlying patterns of association between words, expressions, and

concepts, thus reducing the material and giving meaning to the data cluster.⁸

Seven managers from the public HS collection in the three regions participated in the study. Semi-structured interviews were conducted remotely through free access virtual platforms between September 2021 and April 2022. The audio portion of each interview was recorded and later transcribed.

Several steps were involved in processing the data from the interviews. First, the interviews were read and revised to produce the textual corpus. The questions used to produce the corpus submitted for analysis corresponded to those that had been discussed and defined by the research team based on the theoretical and conceptual framework⁹⁻¹¹ on surveillance models and strategies, health protection measures, and risk reduction, which made up the interview script and were grouped by blocks, such as questions related to the work executed during the pandemic, changes in service management, infrastructure, acquisition and availability of equipment, protection/prevention measures, articulation with other services, and risk communication related to COVID-19. The textual corpus was standardized in accordance with the software's recommendations. The responses of each respondent were grouped and separated by command lines that included the significant variables of interest to the study.

Next, the corpus was submitted to analysis by IRAMUTEQ and used the DHC analysis. In this method, the software divides the corpus into as many classes as there are associations resulting from the calculation of each lexical item and uses the distribution of the set of words in the text as a criterion for forming the classes, based on the frequency of the lemmatized forms and grouping them together into word classes that, simultaneously, have vocabulary similar to each other and different from the other classes¹².

The software associates the words with the class using a chi-square value equal to or greater than 3.84 and generates the percentage of word frequency in that class. The result of the analysis is presented in the form of a dendrogram that graphically represents the relationships between classes¹², based on typical lexical profiles of the corpus, the DHC analysis shows the commonality in the participants' responses¹⁰.

The analysis and interpretation of the meaning of the word classes were then performed. Three researchers made this analysis and assigned the meanings of classes to reduce risks of

allocation bias. It is noteworthy that the contextualization of each class was supported by theoretical reflections⁹⁻¹¹ as to its content based on the researchers' analysis, recovering the text segments in which the words were considered.

The ethical aspects were respected based on the Resolutions of the National Health Council and the collection started after receiving approval from the Ethics Committee of the respective services and/or institutions - state secretary and/or coordinating blood centers, according to opinions No. 4,820,138, No. 5,340,159, and No. 5,297,144.

Results and discussion

The corpus consisted of seven texts, corresponding to the number of interviewed managers. The DHC analysis divided these texts into 382 text segments (TS) and classified 324 TS, corresponding to 84.82% of corpus use, thereby meeting the software efficiency criteria¹². In the end, 13,442 occurrences of words were identified, 1,325 active forms, and 5.10% of the words were of single occurrence (hapax). The analysis generated six word classes, shown in the second column of Chart 1.

Availability of resources for the development of the work

Responsible for 19.14% of the analyzed TS, the typical vocabulary of class 1 enabled a contextualization of the availability of resources for the development of the work. The words age, let go, high, problem, world, rules, and difficulty denoted the situations and conditions that inform about the resources needed for the work during the pandemic. Managers from the Southeast played an important role in constructing the meaning of this class ($p < 0.0001$).

The meanings in this class highlighted the restrictions to work and distancing arising from comorbid conditions as a way to protect the health of people in more vulnerable groups. The risk of contamination was referred to as the main problem by workers who worked while the pandemic was raging around them, which led to absence from work, illness, and death. In addition, there was intense psychic suffering, such as anxiety, sleep disorders, fear of becoming ill, and contaminating coworkers and family members¹³. Perrone et al.¹⁴ emphasized the importance of adequate rest, family support, as well as psycho-

Chart 1. Dendrogram of the descending hierarchical classification (DHC) of the textual corpus of interviews with managers of hemotherapy services in capital cities of the North, Northeast, and Southeast regions regarding the management of these services in the context of the COVID-19 pandemic. Brazil, 2022.

Distribution	Class (%)	Lexicographic analysis			Significant variable
		Word	X ²	%	
Organizational aspects, strategies, and challenges for HS management in the context of the pandemic	1 – Availability of resources for the development of the work (19.14%)	Age	21.46	100	Southeast managers p < 0.0001
		Let go	28.91	81.82	
		High	12.8	100	
		Problem	21.13	72.73	
		World	3.67	37.5	
		Rules	12.8	100	
		Difficulty	5.1	45.45	
	2 – Installed capacity of services (12.35%)	Room	52.19	76.92	Southeast managers p < 0.0001
		Guide	33.98	66.67	
		Donor	31.73	36.73	
		Inspection	16.67	66.67	
		Scheduling	41.64	57.14	
	3 – Strategies and challenges for recruiting blood donors (13.27%)	Donate	21.5	100	Southeast managers p < 0.0001
		Funding	10.93	33.33	
		Campaign	14.6	50.0	
		Gated community	7.5	66.67	
Form		17.27	62.5		
Fall		4.75	50.0		
Strategy		11.96	57.14		
Media		27.15	75.0		
4 – Risks and protection for workers (19.14%)	To need	21.93	53.33	Gestores Sudeste p < 0,0001	
	To exist/existed	9.61	50.0		
	Family	21.46	100		
	Thought/Think	14.75	46.43		
	Want/Wanted	17.25	70.0		
	Yet	15.74	61.54		
	To work	17.13	43.59		
	Blood donation center	9.22	45.0		
Crisis Management (18.83%)	I know/To know	10.18	41.38	Gestores Sudeste e Norte p < 0,0001	
	Fear	2.6	42.86		
	Committee	101.76	100		
	Crisis	82.17	100		
	Plan	16.94	75.0		
Management communication (17.28%)	Bulletin	61.82	93.75	Southeast managers p < 0.0001	
	Meeting	30.85	100		
	Candidate	59.64	100		
	Material	34.24	100		
	Procedure	29.26	100		
	Pandemic	9.78	40.0		
	Partner/Partnership	28.29	87.5		
Ministry of Health	19.38	100			

Source: Authors.

logical and legal support as safety and health protection measures for staff members.

The individual dimensions of the workers' health and conditions of the work environment were considered in the assessment and when it

came to making decisions on returning to work after recovering from a COVID-19 infection. They influenced decisions about the amount of time spent away from work, as well as changes in the workplace given the complexity of illness¹⁵.

Meanings about adaptations and changes in the work process were identified to ensure the workers' health, the operation of the collection units, and the availability of blood to meet the needs of the health system:

Due to the number of professionals that had been dismissed and the fact that there are still some of them today, we made an extra stopover with these workers so we could meet this scheduled donor (Southeast Manager)

The interviewees specifically mentioned the reorganization of surgeries and their relationship with the availability of blood and medical professionals. Scheduling surgeries had repercussions on transfusions, considering there were fewer orthopedic and vascular surgeries being performed, while the provision of blood for cancer and onco-hematological patients was marginally reduced¹⁶.

Managers highlighted the resources that were needed to handle the pandemic, especially personal protection equipment (PPE). Availability was assured on an as-needed and an ongoing basis. However, issues regarding procurement and overpricing were also emphasized. In addition, they mentioned the challenges in obtaining health protection resources, which has become a worldwide concern:

[...] in this pandemic period, we had to reinvent ourselves, as I had already told you, because the price of this equipment went up a lot, but it never ran out [...] (North Manager).

Further to the purchase and availability of resources, the managers mentioned the norms that guided their decisions, directives whose aim it was to ensure the continuity and development of the work in the services, the adopted safety measures, and the repercussions on the number of donors, not to mention the workers' resistance to using PPE:

[...] we had trouble getting some people to use the PPE, sometimes even the management itself, management had to issue a company policy forcing people to use it (North Manager).

Installed capacity of services

Class 2 (12.35% ST) denoted meaning related to the installed capacity of the services. The words room, guide, donor, inspection, scheduling, and donate revealed the managers' conceptions related to this class. Managers from the Southeast played an important role in constructing the meaning of this class ($p < 0.0001$).

The respondents were very much aware of any changes in furniture arrangement, occupation of the physical space, and the number of people in the collection rooms:

We worked with ten chairs and removed two. We started working with eight. We used several technological tools, one of them was the scheduling part, we scheduled this donor (North Manager).

A survey identified changes in the operation and organization of HS after safety measures and new routines had been adopted, for example, changing the layout of waiting rooms with respect to the minimum distance between donors and adding more hand sanitizer dispensers, expanding donation points, scheduling and calling for donation, change in days and hours of operation, incorporating information technologies, implementing various measures to encourage donations with the support of different partnerships – for example, transportation institutions and applications, collections in gated communities, and offering courses for workers⁶.

It should be noted that public health inspection appears in this class, associated with the word guide. However, the meaning does not appear to be linked to the objective of providing guidance and protection to minimize health risks. The managers even criticized the poor performance of health inspectors in hemotherapy units during the pandemic:

The health inspectors didn't come here to offer guidance, they came later to check the area, but then, things were much calmer, at first they weren't (Southeast Manager).

Adapting the physical structure and scheduling donors appears as a strategy to avoid crowds and contribute to donor safety, thus encouraging the decision to donate:

Always in publications and the interviews, we stressed the issue of being able to come to the hemotherapy unit. Donating blood is vital to saving lives, but be careful, make an appointment, and try not to bring a companion with you (North Manager).

HS adopted new practices, recommendations, and eligibility criteria during the pandemic to ensure donor safety. International recommendations were being adopted to provide adequate responses to patients' needs and ensure the staff's health and well-being. Furthermore, management, contingency strategies, and personnel flexibility were identified as relevant for future scenarios¹⁷.

Strategies and challenges for attracting blood donors

Class 3 (13.27% ST) revealed the fundraising strategies and challenges used in donor reduction situations. The words funding, campaign, gated community, form, fall, strategy, media, need, and exist stood out. The significant variable in this class refers to managers from the Southeast ($p < 0.0001$).

Municipalities adopted different strategies to attract blood donors, such as: using different means of communication, developing partnerships and action plans for maintaining internal collections at fixed units, and strategies for external collections, such as bloodmobiles and collecting in gated communities, as explained below:

There was a lot of media stuff, television, and radio. The blood center even has a tradition of running campaigns and having access to the press, so there was that too, and our fundraising sector when they had to call donors and they said that (Southeast Manager).

We created strategies at the blood center, we closed a collection program at home and we worked with the condominiums, all of this with a limit of potential donors, a team limit. We've cut back on the permanence of the entire team that we work with (Northeast Manager).

Different means of communication, such as letters, radio, telephone, and television, are still effective in attracting blood donors. Technological advances have made new tools available, such as apps for cell phones. Despite possible restrictions on the access to and use of these resources and the requirement for greater dissemination, such strategies have nonetheless expanded. In 2017, Dupilar et al.¹⁸ identified 27 domestic and free apps that provide information on blood donation and helping to maintain the supply of blood components.

A set of donor recruitment strategies has been commonly adopted by HS in Brazil and elsewhere. A study conducted in Spain and Brazil with HS managers identified programs developed with groups of schoolchildren as strategies to mobilize blood donations. Partnerships with universities, companies, and churches were also observed. It is noteworthy that communication with public managers and at meetings, as well as dialogue in the daily life of the services, were also verified strategies.

As a strategy traditionally adopted by HS, campaigns were perceived with a certain amount of caution and reservation at the onset of the

pandemic due to the fear of crowding and the demand for more workers, as shown below:

So, this whole apparatus for protection [...] what we felt the most was people's fear of coming to the hemotherapy unit, also fear of closing the campaigns, of even receiving a team of health professionals (North Manager).

Specialized campaigns aimed at appealing to altruistic motives and sending messages related to safety measures¹⁹, along with various communication modalities used to build this trust, were highlighted as strategies aimed at boosting blood donations during the pandemic²⁰.

Fundraising strategies tended to intervene in reducing donations. However, respondents referred to the "lack of blood" as predictable, since, at certain times of the year, there are fluctuations in the frequency of donors at the collection services/units, which affected the availability of blood and blood components:

[...] whether or not there are times in the year when we deal with the lack of blood, this is somehow predictable, the unpredictable thing was the rest (Southeast Manager).

Different situations can influence the number of donations in collection services, for example, vacation periods, parties, and climatic and epidemiological events, such as the COVID-19 pandemic.⁴ Research highlighted a decline in the blood supply in early 2020 as compared to the same period of 2019, and in the second wave of the pandemic, but moderate in this phase.²¹ Text²² highlighted a decline in the blood supply in the hemonets, especially in some blood groups. This situation was also reported in another publication that portrayed restrictions in the blood supply from November 2020 to April 2021²³.

The WHO suggests a donation percentage starting at 3% to maintain safe levels of blood supply. In Brazil, the percentage of donations varied in the period 2014-2020, with the lowest percentage (1.47%) recorded in 2020, the first year of the pandemic, with the highest percentage of 1.83% in 2016.²

Risks and protection for workers

Class 4 (19.14% ST) expressed situations and conditions of risk and protection for workers. The words family, I thought/I think, I want/wanted, to work, to the blood donation center, I know/to know, and fear were significant for this class, as were the comments by managers from the Southeast.

The level of fear triggered by the pandemic and the need for family support and affection were mentioned in the interviews. Contact with family members who lived in different situations, some isolated at home and others working, increased the risk of contagion.

Personal and family issues led managers to reflect on HS workers, since the risk was also related to the need to care for family dependents, mostly performed by women, although men were also involved in care-giving roles:

This was very heavy for everyone who works with us [...], especially the women, because most of them have someone to take care of (Southeast Manager).

[...] we also have some male staff members here who, like, are single and still live with their parents, so they were afraid of bringing the disease into the house (Southeast Manager).

Gender issues, class status, and professional valuation figured prominently in studies on the care of health workers in the context of the pandemic. Factors included fear of contamination, concerns about children and family, experiences with death and illness of themselves and coworkers, in addition to the precarious conditions of daily health work associated with psychological suffering (fear, depression, anxiety, and stress), while factors such as the support network of family and friends were protective factors among workers²⁴.

With regard to learning from the pandemic, perceptions about the need for individual and collective care, incorporating new practices in HS aimed at reducing risks for workers, patients, and donors, and reflecting on the limits of digital means to promote this protection, stood out:

I still can't filter out everything we managed to learn, but I still think, in my opinion, the psychological part was the hardest of all (Southeast Manager).

It's possible to work with a schedule that was a legend that we would never be able to. We still have to improve these tools because our donor population is not all digital (Southeast Manager).

As for the use of social networks, the respondents commented on their limitations, evidenced by the limited reach of social networks and the lack of confidence in communicating through them:

The blood center has a social network, but I think it's still in its infancy, it's still growing (Southeast Manager).

A lot of people send orders over the phone and stuff, they ask for everything over the phone, and when something arrives from the blood center, they think it's a prank, a scam (Southeast Manager).

The use of social networks is not commonplace for everyone, whether they are users or workers. Educational strategies are needed to know how to properly use and maintain the resources that are already being used.

The lack of blood and concerns over the rational use of blood and blood components stood out among the challenges mentioned by the managers¹⁸. Measures focused on the rational use of blood, and blood components were also mentioned in other studies^{25,26}. Patient blood management programs are intended to promote the appropriate and ethical use of resources, techniques, and materials²⁷, together with a rationalization of the use of blood products and a potential reduction in costs and complications, thereby improving patient outcomes²⁸.

Situations that would expose workers to the high risk of exposure to the virus fueled the conflicts over the obligation to work in person. Exposure during transportation, double bond, and fear of contagion stimulated the desire for telecommuting:

It was much more psychological than operational because people were terrified of coming to work and wanted to stay in telework, even operational people, so it was a battle to say no, it has to be face-to-face (Southeast Manager).

Respondents reported health protection initiatives and measures to minimize the risk of contamination, including making adjustments to starting times to reduce exposure while commuting to work, interacting with other institutions, and using a scale system for distributing workers adapted to their needs and in accordance with the regulations.

We worked on a scale system even if there was no group that was not at risk, they showed up, they had a scale, a time when the pandemic was at its peak (North Manager).

Yet I also saw that the staff member was afraid, so I tried to understand their side and manage them more confidently, so they wouldn't feel so afraid of the virus (Southeast Manager).

The workers' situation at the onset of the pandemic was reported on the websites of some blood centers, including the possibility of removing those who were at risk, remote treatment guided by the criteria set forth in state decrees,

relocating risk group workers, and team rotation to keep everything working²².

Crisis management measures

Class 5 (18.83% ST) revealed measures aimed at managing the crisis. The words committee, crisis, bulletin, and meeting denoted the understanding of the measures HS managers used to deal with the challenges of the health crisis. Southeast and North managers were relevant to forming the meaning of this class.

References to the Crisis Committee, Crisis Cabinet, and/or Committee to Combat the Pandemic, organized by the municipality, state, or the service itself, were mentioned by the managers as a powerful measure for decision-making and guidance.

The performance of the crisis committees or offices was based on the contingency plans developed by the municipal and/or state departments. They produced reports, action plans, or bulletins that reported on the behavior of the pandemic and measures to be adopted by HS workers.

In the set of strategies to maintain the blood supply for health services, studies identified that contingency plans had been adopted in several countries^{29,30}. Furthermore, practices focused on blood management and blood bank operations have been in place since the onset of the pandemic²⁶.

In Brazil, contingency plans have been published on blood donation center websites since the beginning of the pandemic, aimed at enhancing the safety of donors, employees, and patients, including highlighting such measures as rescheduling chronic patients, limiting the number of companions, increasing the distance between chairs in the waiting room, attention to the daily cleaning routine, and to external collections and restrictions on campaigns²².

The respondents also mentioned the transfusion committee. The content presented guidelines on the organization and practices in HS based on scientific evidence related to quality and safety during transfusion:

The committees belong to the units, we have our own. We worked, we learned that we could hold remote meetings, we worked and it worked like that. But, the transfusion committee, ours here, it continued with the attributions that were theirs and that they always were (Southeast Manager).

The transfusion committees are permanent, unlike the emergency committees, and were established to deal with the pandemic and develop

different actions. In Brazil, they are responsible for monitoring the hemotherapy practice with a focus on the rational use of blood, continuous education, hemovigilance, and the preparation of hemotherapy protocols.

Communication strategies for the adhesion of donation candidates

Finally, Class 6 (17.28% ST) revealed the managers' conceptions about communication strategies for the adherence of donation candidates. The words candidate, material, procedure, pandemic, partner/partnership, and Ministry of Health were significant for this class and strongly associated with managers from the North and Northeast.

Respondents mentioned using different means of communication to share information and guidance on behaviors, practices, and activities to reduce the risk of COVID-19 infection. Such measures were also applied to donation candidates, workers, and other health services. There was also information with greater reach for the general population:

The TV itself also held a limited event at the mall in which we distributed hand sanitizer (Northeast Manager).

We always make phone calls. At this moment, this more individualized approach is very important [...] (North Manager).

Other communication strategies are implemented through software and apps for blood donation. Dupilar et al.¹⁸ identified that these devices are able to locate nearby blood donation centers, find possible donors belonging to a given blood group, summon donors, and remind them of the date of the next donation.

The publication of information for risk communication was strengthened by the press, HS communication offices, and mobilization with leaders. Furthermore, procedures were developed to guide safe practices at the units.

Managers used partnerships to broaden the scope of information. Souza⁶ and Souza, Lima and Cavalcante²² state that, during the course of the pandemic, communication strategies were maintained with different partners and new ones were incorporated to maintain donations and an adequate supply of blood.

Misinformation, lack of knowledge about virus transmission, and concerns about contact with other blood donors were reported reasons for the blood donation candidates distancing themselves. This required HS to disclose their

risk reduction measures to reinforce donor confidence³¹. Sachdev et al.²⁰ observed that the main reasons that made it difficult to donate blood included a lack of confidence in safety measures, fear of transmitting the COVID-19 virus to the donors' families, and the risk of getting infected at the collection unit.

Furthermore, managers made a point of broadcasting the health protection measures incorporated into the risk communication adopted at the services and guided by Anvisa and Ministry of Health regulations:

The Ministry of Health determined a social distancing of two meters. We adopted one-and-a-half meters due to our physical structure, which is small, and donors' temperature is being taken at the entrance (North Manager).

Technical notes have been published since the onset of the pandemic to guide practices in HS, such as NT No. 12/2021 (on the temporary unfitness of candidates who have been vaccinated) and NT No. 04/2022 (updates the technical criteria contained in NT No. 13/2020 for the clinical screening of candidates related to the risk of COVID-19 infection).

Final considerations

The pandemic in Brazil required HS management to develop measures that would permit the services to operate safely and mitigate the effects on blood supplies. Managers in this study reported on these effects, especially at the onset of the pandemic, due to misinformation, lack of knowledge, and concerns regarding contact with and transmission of the virus, which led potential blood donors to stay away.

Managers had to come up with appropriate actions in the face many challenges. Infrastructure problems, such as the shortage of personnel and space restrictions, which had existed before the pandemic, became more significant due to the context of worker illness and limited ways to reorganize spaces to avoid crowds.

The insecurity many people felt about entering the units demanded creative actions from the HS to restore the confidence of both patients and donors. Measures that included reorganizing seating space, developing measures to protect the health of workers, sharing information, and creating strategies for collecting donations were implemented and publicized as a way to inform the population and enhance the level of confidence.

The use of social media has expanded and at least part of the population has proven to be receptive to this means of publicizing information, especially younger people and those with a higher level of education. This result proved relevant to maintaining inventories and meeting the demand, and ought to be investigated in further studies.

The managers' perception of workers' risk and protection factors underscored the need to incorporate new practices into HS's ability to minimize the health risks. The fear of becoming contaminated or contaminating family members, experiences with illness and death from COVID-19, as well as precarious working conditions, were perceived in this study as associated with heightened psychological distress, as well as the existence of a support network comprising family members and friends was a protective factor among workers.

The results and discussion presented here raise new questions for the research agenda related to the evaluation of actions from different perspectives (managers, professionals, candidates/patients) or an analysis in the post-pandemic context, with greater reach into the territories/regions of the country.

Although this study did not aim to analyze or identify the profile of donors and how the pandemic affected their experience, it is relevant that future studies should strive to understand this issue.

Finally, it is worth highlighting the qualitative approach taken to analyze the interviews, organized and processed through the use and support of software, while other methodological approaches and techniques can also be used for new investigations.

Collaborations

All authors contributed substantially to the design and planning of the study, writing the final version of the manuscript, critically reviewing the content and approving the final version.

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