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Profile of clinical pharmacy services in hematopoietic stem cell transplantation centers in Brazil

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Abstract

Objective: To describe the profile of the clinical pharmacist's performance in public and private hospitals that perform hematopoietic stem cell transplantation in Brazil. **Methods:** This is a sectional study and the work was carried out in two stages. In the first one, a data survey was carried out based on the documental analysis of the websites of scientific societies and the DataSUS database. In the second stage, a questionnaire about the role of pharmacists was requested to be filled out by the Centers registered with societies related to bone marrow transplantation. Data was collected using Google Forms® and organized in an Excel® spreadsheet. **Results:** 73 centers were identified, none in the North and 44 in the Southeast. From the centers, 27 (43.5%) answered the questionnaire. Only 7.4% reported that they do not have a pharmacist on staff. Among the remaining, 7.4% reported having a pharmacist working only at the clinical area, 11.1% only at medication management and logistics, and the most (81.5%), at both areas. The distribution of clinical services provided by pharmacists contemplated: prescription analysis (92.6%); medication conciliation (77.7%); participation in the discussion of cases/rounds or clinical sessions (77.7%); pharmacotherapeutic follow-up (66.6%); pharmacotherapy review (59.2%); hospital discharge guidance (55,5%); monitoring of therapy and plasma dosage of medications (51.8%); outpatient care (44.4%) and health education (3.7%). **Conclusion**: Bone marrow transplant centers in Brazil are not properly distributed. Most respondent centers have a pharmacist developing management and clinical activities. The participation of the pharmacist in the team aims, through the services, to promote the rational use of medicines.

Keywords: hematopoietic stem cell transplantation; pharmaceutical services; health services; quality of healthcare.

Perfil dos serviços de farmácia clínica em centros de transplante células tronco hematopoiéticas no Brasil

Resumo

Objetivo: Descrever o perfil da atuação do farmacêutico clínico em hospitais públicos e privados que realizam transplante de células tronco hematopoiéticas no Brasil. **Métodos:** Trata-se de um estudo transversal que foi desenvolvido em duas etapas. Na primeira, foi realizado um levantamento de dados baseado na análise documental do site de uma sociedade científica e da base de dados do DataSUS. Na segunda etapa, foi solicitado o preenchimento de um questionário sobre a atuação dos farmacêuticos para os Centros cadastrados junto à sociedade relacionada ao transplante de medula óssea. Os dados foram coletados pelo Formulários Google® e organizados em uma planilha do Excel®. **Resultados:** Foram identificados 73 centros, sendo nenhum no Norte e 44 no Sudeste. Dos centros , 27 responderam o questionário (43.5%). Apenas 7.4% relataram que não possuem farmacêutico na equipe. Entre os demais 7.4% relataram ter farmacêutico atuando apenas na área clínica, 11.1% apenas na gestão e logística de medicamentos e, a maioria (81,5%), em ambas as áreas. A distribuição dos serviços clínicos providos por farmacêuticos contemplou: análise prescrição (92.6%); conciliação medicamentosa (77.7%); participação na discussão de casos/rounds ou sessões clínicas (77.7%); acompanhamento farmacoterapêutico (66.6%); revisão da farmacoterapia (59.2%); orientação de alta hospitalar (55.5%); monitorização da terapia e dosagem plasmática dos medicamentos (51.8%); atendimento ambulatorial (44.4%) e educação em saúde (3.7%). **Conclusão:** Os centros de transplante de medula óssea no Brasil não estão adequadamente distribuídos. A maioria dos centros respondentes conta com farmacêutico desenvolvendo serviços de gestão e clínica. A participação do farmacêutico na equipe visa, por meio dos serviços, a promoção do uso racional de medicamentos.

Palavras-chave: transplante de células tronco hematopoéticas; assistência farmacêutica; serviços de saúde; qualidade da assistência à saúde

Introduction

Hematopoietic Stem Cell Transplantation (HSCT) is a procedure performed to treat diseases, whether hematological, onco-hematological or autoimmune,[1,2] and is also called Bone Marrow Transplantation (BMT). Basically, the procedure is classified into two types: allogeneic and autologous. Transplantation takes place in stages: (i) pre-transplantation, also known as conditioning; (ii) infusion of hematopoietic stem cells; and (iii) post-transplantation.[3] Each phase has specific protocols.[4]

HSCT services in Brazil are necessary to promote access to the population in need of this specialty, and should be distributed in order to ensure equal access.[6] This treatment is complex and, in addition to different procedures, it includes the use of drugs related to HSCT, as well as for the management of complications.[2] Between January and September 2021, almost 2,600 procedures were performed, most of which were autologous.[6]

Considering that HSCT is a highly complex therapy, the effective performance of a multiprofessional team is fundamental, with physicians, nurses, nutritionists, physical therapists, dentists, social workers and pharmacists, especially the "clinical pharmacist", aiming at the promotion and guarantee of therapeutic success.[5]

In the hospital environment, the clinical pharmacist can work with different patients, including those who are in the process of preparation, performance or post-bone marrow transplantation.[2] In these situations, the pharmacist acts with a focus on promoting rational use of medications. Among the possible clinical services are evaluation of the prescription, medication reconciliation, monitoring of therapeutic levels of drugs, guidance on patient safety and pharmacotherapy follow-up, as well as guidelines on hospital discharge.[9]

In this scope, several papers describe the pharmacist's duties in transplantations[10,11], although little is known about the structure and pharmaceutical services offered in Brazilian transplantation centers. Thus, the general objective of the study is to characterize the profile of hematopoietic stem cell transplantation in Brazil and the clinical pharmacy service developed. The specific objectives are to describe the profile of hematopoietic stem cell transplantation, identify the spatial distribution of centers, and determine the pharmacists' performance in HSCT services in Brazil, so that the findings can be used to propose improvements and even implementation of new services.

Methods

This is an exploratory study with a cross-sectional design based on the application of questionnaires. Data collection was conducted from September 2018 to May 2021. To identify the hematopoietic stem cell transplantation centers, a consultation was carried out in the Brazilian Association of Organ Transplantation (*Associação Brasileira de Transplante de Órgãos*, ABTO) website, through the following link: https://site.abto.org.br/transplantes/centros-de-transplantes/?estado=todos&orgao=. Each center's location, email address and telephone were related. The inclusion criterion consisted of being listed in the ABTO website, and the exclusion criterion was not having possible contact data, whether they were telephone numbers or email addresses.

The data were organized by geographic region, presenting the population estimate, according to the 2020 data calculated by the Brazilian Institute of Geography and Statistics (*Instituto Brasileiro de Geografia e Estatística*, IBGE, 2021). The quotient between the number of centers and the population treated was calculated. In addition to that, diverse information was collected about the type of transplantation performed, according to data of the Brazilian Society of Bone Marrow Transplantation (*Sociedade Brasileira de Transplante de Medula Óssea*, SBTMO).

Subsequently, the SBTMO website was consulted through https://sbtmo.org.br/centro-tmo to access the electronic addresses and telephone numbers of the previously identified centers, as well as the region of the country and federative unit.[12]

Data collection took place by applying a questionnaire in Google Forms®, forwarded to the centers via email. The questionnaire was proposed by the authors themselves and was not previously validated. When the transplantation center did not have an email address, or the email mentioned was not active, a telephone call was made and a new email address was requested to send the survey invitation with the link to the questionnaire. After sending the email message, one week was allowed to receive the answers, period after which a new message was forwarded to the non-responding institutions. This process was repeated three times, totaling four attempts. The centers with no email or telephone contact were excluded from the study, totaling 11 transplantation centers. It is worth noting that the centers participating in the study answered the form only once.

The questionnaire included information on the identification of the service, the participation of the pharmacist in the team and the services developed by this professional. The following was also requested: filling in the name of the institution and the federative unit to detail filling-in and response compliance; if there was a pharmacist involved in the BMT team, and if that was the case, how many were involved, if the pharmacists involved worked only in the management and logistics of medications, only in the clinic, with guidance on medications for patients and staff, or if they worked in both services, how many pharmacists were involved in the management and logistics and how many in the clinic, description of the services developed, between prescription analysis, medication reconciliation, drug therapy monitoring (plasma dosage), pharmacotherapy review, pharmacotherapy follow-up, hospital discharge guidance, outpatient care, participation in discussions of cases/rounds or clinical sessions, and if there were other services not mentioned, describe.

The data were organized in an Excel® 2019 spreadsheet and analyzed using descriptive statistics, that is, absolute numbers and proportions and amplitude ranges (minimum and maximum values).

This project was approved the Research Ethics Committee of the University of Brasília with code No. 4,607,522.

Results

Of the 73 transplantation centers described by ABTO in April 2021 (ABTO, 2021), 11 were excluded due to lack of information on the contact telephone number and email address (communication inaccessibility). Email messages were sent to the other 62 centers, of which 27 (43.5%) answered and comprised the sample of this study.

Table 1 presents the number of HSCT transplantation centers in Brazil by geographic region, according to the ABTO data. It was noticed that the Southeast region concentrates the highest number of centers (44) and the lowest inhabitants/center ratio. In turn, the North region does not have any registered center. The type of HSCT most frequently performed by the transplantation centers is autologous.

Of the transplantation centers participating in the study, 25 (93.0%) had pharmacists in the team, and the number of these professionals varied between one and 13. The performance of the Clinical Pharmacy service was exclusive to the clinical activities in two centers (7.4%), which had between 1 and 11 professionals, and exclusive to the logistics activities in three centers (11.1%). Table 2 presents the clinical services provided by the pharmacists that were verified in the centers participating in the study. The most frequent were as follows: prescription analysis, medication reconciliation, and participation in clinical sessions.

Discussion

This study describes the availability of clinical pharmacists in hematopoietic stem cell transplantation centers throughout the Brazilian territory, as well as the diversity of clinical services offered by these professionals when they are members of multiprofessional teams. However, low adherence to the questionnaire proposed was verified in the centers.

It is known that, as a tool, online questionnaires are a data collection option with countless advantages when compared to other modalities. It is possible to highlight the cost exemption or reduction, speed both for the management of the researcher and for the participants, direct and automatic data registration and a larger geographic reach, as presented by Neves, Augusto & Terra[14]. However, there are possible disadvantages such as lack of knowledge in the researcher and the participant, which can limit adherence and participation, according to the data presented. The low percentage of responses can also be related to the number of inactive centers, explaining the email messages that were not answered or that returned to the inbox.

Of the answers received, 88.9% stated availability of a clinical pharmacist. In the BMT center, the clinical pharmacist contributed to the management related to pharmacotherapy, pharmacotherapy assessment, preparation of guidelines and educational materials in health and training of professionals and patients related to a specific pharmacotherapy, as well as complementing the multiprofessional team in the discussion of cases.[10] The patients subjected to BMT had a complex pharmacotherapy and high risk of exposure to infectious agents or consequences from the use of numerous medications. Consequently, the presence of a pharmacist working with the team can result in interventions that improve the clinical results.[15]

Among the clinical services, those most frequently mentioned by the respondents were prescription analysis, followed by medication reconciliation, participation in the discussion of

Table 1. Distribution of the transplantation centers participating in the study, Brazil, 2021

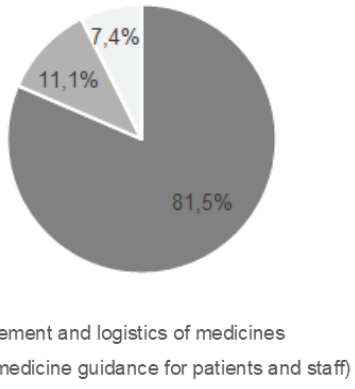
Region	Population estimate (2020)	Number of centers according to ABTO (April/2021)	Number of inhabitants per center	Type of transplantation performed according to SBTMO	Number of centers participating in the study (%)
Midwest	16,504,303	8	2,063,037	Autologous, allogeneic, related and unrelated	4 (50.0)
North	18,402,591	0	-	-	-
Northeast	57,374,243	10	5,737,423	Autologous, allogeneic, related and unrelated	1 (10.0)
South	30,192,315	11	2,744,755	Autologous, allogeneic, related and unrelated	4 (36.3)
Southeast	89,012,240	44	2,023,005	Autologous, allogeneic, related and unrelated	17 (38.6)
Brazil	211,485,692	73	2,897,064	-	27 (36.9)

ABTO - *Associação Brasileira de Transplante de Órgãos* (Brazilian Association for Organ Transplantation)

Table 2. Clinical services developed by pharmacists in HSCT centers, Brazil, 2021, N=27.

Clinical services described	n (%)
Prescription analysis	25 (92.6)
Medication reconciliation	21 (77.7)
Participation in discussion of cases/rounds or clinical sessions	21 (77.7)
Pharmacotherapy monitoring (in order to prevent or solve pharmacotherapy-related problems)	18 (66.6)
Pharmacotherapy review (focused on increasing the patients' adherence to the treatment)	16 (59.2)
Hospital discharge guidance	15 (55.5)
Drug therapy monitoring (plasma dosage)	14 (51.8)
Outpatient care	12 (44.4)
Education in health	1 (3.7)

Figure 1. Proportion of pharmacists in HSCT centers (%), by type of activity performed, Brazil, 2021



Source: prepared by the author

cases/rounds or clinical sessions, pharmacotherapy review and pharmacotherapy follow-up. The least mentioned services were guidance on hospital discharge, monitoring of therapy and plasma dosage of medications, and outpatient care. The health education service was only reported in one questionnaire, being considered relevant for developing the aforementioned services.

It is possible to notice agreement in the results found in some studies, especially in those addressing the pharmaceutical services developed in the HSCT centers. In the papers presented by Clemmons et al.[16] and Barboza Zanetti et al.[10], they describe the main functions, contributions and responsibilities of the pharmacist in hematopoietic cell transplantations, highlighting the importance of working in the multiprofessional team, participation in meetings/discussion of cases, pharmacotherapy follow-up, care transition (medication reconciliation) and education in health (for patients and team), as well as elaboration of educational materials, in addition to acting in teaching and research. A comprehensive performance and in line with the results found in this study, as already described. The services of lower prevalence, such as monitoring of therapy and plasma dosage of the medications, depend not only on the performance of the Clinical Pharmacy services, but on contracts and other institutional aspects that may justify the minority among the answers to the survey. Barros, Silva and Leite[17] present clinical pharmaceutical services in Primary Health Care; despite an area and level of care complexity different from that proposed in this study, it is noteworthy that there was low presentation of the health education service in the studies evaluated, as well as the results found. However, this same study discusses the need to standardize the terms and concepts used in clinical pharmacy and for clinical services, which intersect.

Education in health was not included in the form as one of the services performed, although it was mentioned as a service offered by one of the centers participating in the study. Nevertheless, this situation can explain the low percentage of this service. A number of studies consider that education in health helps to prevent and solve Drug-Related Problems (DRPs), in particular the adverse effects caused by pre- and post-transplantation pharmacotherapy, which will require identification, opinion and solution. These facts emphasize the importance of the face-to-face presence of the clinical pharmacist in the transplantation center.[18] In addition to that, the services that involve hospital discharge are generally characterized as health education activities.

In this sense, discharge guidance, even though it is not one of the clinical services prioritized by the respondents of this study, is important for transplantation patients as a result of the numerous precautions to be taken, from risk of infections, access and adverse effects of medications for home use to coexistence with pets, among others. It is important that the patients return to their homes knowing about all the information regarding the medications to be administered. Discharge guidelines can be offered verbally, but also complemented with materials that help the patient and companions to better understand all processes of administration, storage, access and also disposal of materials and medications, as well as materials that help monitor the patients' signs and symptoms.[11]

Outpatient care is included in the patient care modalities. It is important that the patient returns to the pharmacist to analyze the access, adherence and possible difficulties in using the medications after the transplantation. In this case, the focus should be on the effectiveness and safety of the medications, presenting solutions to the facts reported when necessary.[19]

As already reported, the low response rate is mentioned as a limitation of this study. In addition to that, it is noted that the constant updates referring to the centers in the association's page and the scarcity of contact data impaired identification of the services. In addition to hat, the questionnaire did not have items on the pharmacists' participation in the manipulation of chemotherapeutic drugs, as well as education in health was not listed among the clinical services, which may have underestimated the declaration of this service and also did not go through a validation process. Furthermore, this study did not aim at assessing the effectiveness of the services.

The results obtained through the answers to the forms indicate an important performance of the professional pharmacist. The Clinical Pharmacy profile can be described as effective in the HSCT centers since, in most of the answers, the pharmacist is present in the center and performs not only logistics and management services but also clinical ones, exemplified by most of the services described. It is important to include pharmacists in this area, both due to the expressive numbers of centers and to the number of procedures conducted in Brazil. In addition to that, the role of this professional is complementary in the team and excels in the rational use of medications, which is closely linked to the prognosis and quality of life of these patients.

Conclusion

It was observed that most of the responding centers have a pharmacist who develops management and clinical services. In this sense, the pharmacist has participated in the activities of the Bone Marrow Transplantation centers, developing both logistics activities and clinical services. Among the clinical services provided by the pharmacists, those directly related to patient care with a focus on promoting the rational use of medications stand out.

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Collaborators

Conception of the project: BLS and DG. Data collection: BLS. Data analysis and interpretation: BLS and DG. Writing of the article and responsibility for all the information presented in the paper, ensuring accuracy and integrity of any of its parts: BLS, LCLO, LM and DG. Relevant critical review of the intellectual content and final approval of the version to be published: BLS, LCLO, LM and DG.

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Conflict of interest statement

The authors declare that there are no conflicts of interest regarding this article.

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