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Racial disparities in access to transplant for multiple myeloma: reflections on the Brazilian healthcare system with local data

Disparidades raciais no acesso ao transplante para mieloma múltiplo: reflexões sobre o sistema de saúde com dados locais

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ABSTRACT

Multiple myeloma (MM) is a neoplasia whose treatment may include hematopoietic stem cell transplantation (HSCT). The literature points to racial disparities in access to HSCT, but information on this issue is scarce in Brazil. This study aimed to analyze the racial composition of patients subjected to autologous HSCT for multiple myeloma in a single Brazilian center, discussing access to treatment. A retrospective review was conducted considering HSCTs performed between 2014 and 2022 at a Brazilian academic center. The categorization adopted by the IBGE was used for white, pardo, and black patients. Variables such as age at the time of transplant and region of origin were evaluated. Data were presented through descriptive statistics. A total of 130 patients were included: 106 white (81.5%), ten pardo (7.7%), and 14 black (10.8%). 71 were men (54.6%) and 59 were women (45.4%), with no significant differences among racial groups. The median age was 60 years for white and 53 years for black and pardo patients. Among the subgroups, white individuals from the Southeast, Midwest, and Northeast regions represented 76.4%, 17%, and 2.8%, respectively, while black and pardo patients represented 62.5%, 12.5%, and 20.8%. This study identified a white majority among patients subjected to HSCT for MM management in a single center. A deeper analysis of these differences is essential, as these findings may reflect phenomena within the Brazilian healthcare system. Discussing this issue is crucial for better understanding access to transplantation in light of factors that contribute to inequality in this vulnerable patient group.

Keywords: Access to healthcare services. Hematopoietic stem cell transplantation. Multiple myeloma. Racial factors.

RESUMO

O mieloma múltiplo (MM) é uma neoplasia cujo tratamento pode incluir o transplante de células-tronco hematopoéticas (TCTH). A literatura aponta desigualdades raciais no acesso ao TCTH, mas há poucas informações sobre essa questão no Brasil. O estudo objetivou analisar a composição racial de pacientes submetidos ao TCTH autólogo para mieloma múltiplo em um único centro no Brasil, discutindo o acesso ao tratamento. Foi realizada uma revisão retrospectiva dos TCTH realizados entre 2014 e 2022 em um centro acadêmico no Brasil. Os pacientes foram categorizados conforme o IBGE: brancos, pardos e pretos. Foram avaliadas variáveis como idade no momento do transplante e procedência por macrorregião. Os dados foram apresentados em estatística descritiva. Foram incluídos 130 pacientes: 106 brancos (81,5%), dez pardos (7,7%) e 14 pretos (10,8%). Quanto ao sexo, 71 eram homens (54,6%) e 59 mulheres (45,4%), sem diferenças significativas entre os grupos raciais. A mediana de idade dos brancos foi de 60 anos e a dos pretos e pardos foi de 53 anos. Entre os subgrupos, os brancos do Sudeste, Centro-Oeste e Nordeste representaram 76,4%, 17% e 2,8%, respectivamente, enquanto pretos e pardos representaram 62,5%, 12,5% e 20,8%. Este estudo identificou maioria branca entre pacientes submetidos a TCTH para o manejo do MM em um único centro. É essencial aprofundar a análise dessas diferenças, pois esses achados podem refletir fenômenos do sistema de saúde brasileiro. Discutir essa questão é crucial para entender melhor o acesso ao transplante, considerando fatores que contribuam para a desigualdade nesse grupo de pacientes vulneráveis.

Palavras-chave: Acesso aos serviços de saúde. Fatores raciais. Mieloma múltiplo. Transplante de células-tronco hematopoéticas.

INTRODUCTION

Multiple myeloma (MM) is a neoplasia of clonal plasmacytes that develops by anomalies derived from cytogenetic mutations in the bone marrow. It is an incurable chronic disease, with heterogeneous clinical manifestations caused by abnormal production of immunoglobulins, in association with a case of bone marrow infiltration – a condition that impairs normal hematopoiesis. The main target-organ lesions happen in the kidneys and bones, leading to altered renal function and osteolytic lesions, respectively. Additionally, systemic symptoms resulting from anemia may onset, such as fatigue, and intense pain caused by the bone lysis component (Brigo & Rogers, 2017).

As for incidence, MM is a rare disease that accounts for 1% of all neoplasias, being the second most frequent hematological neoplasia. It has a worldwide incidence of 1.5 cases per 100,000 inhabitants and an estimated prevalence of five years among 230,000 patients in the West. The average age for diagnosis is 66-70 years and 37% of patients are under 65. In young people under 30, it is extremely rare, with a discreet predominance among males (Kazandjian, 2016; Palumbo & Anderson, 2011). In Brazil, between 2013 and 2022, 30,843 cases were diagnosed, according to data from the Brazilian Unified Healthcare System's Hospital Information System, mostly in elderly individuals in the Southeast region (Oliveira, Morais, Damasceno, & Bezerra, 2023).

Although this disease is incurable, with the introduction of autologous hematopoietic stem cell transplantation (HSCT), this population had significant gains in overall survival and progression-free survival (Attal et al., 1996). In the Brazilian context, especially for users of the Brazilian Unified Healthcare System (SUS), who count on public funding, this type of treatment is even more valuable because it is a procedure that helps minimize access inequality due to the enhancing of clinical response to first line treatment, considering all access barriers to innovative therapies that have been developing over the last decades.

Access to healthcare services is a complex and multidimensional phenomenon whose determination involves various aspects, including political, economic, organizational, technical, and social ones (Assis & Jesus, 2012). One must highlight that, despite the different approaches to its concept,

within a historical perspective, this ceased to be considered only as the phenomenon of taking part in healthcare services and is now seen as a process that comprises aspects such as the impacts generated on the population's health and on the quality of the services provided (Travassos & Martins, 2004). Sanchez and Ciconelli (2012) have named acceptability, affordability, information, and availability as the four dimensions of healthcare access and claim that, due to the phenomenon's complexity, there would be a need for intersectoral actions aimed at promoting equity. Viacava, Oliveira, Carvalho, Laguardia and Bellido (2018) argue that SUS faces issues such as underfunding, dependence on the private sector, and regional inequalities – factors that hinder access and could be minimized with improvements in the funding of primary care and the implementation of effective regional policies focused on equity, thus reducing social disparities.

In recent decades in Brazil, there has been an increase in the number of people who identify as either black or pardo, and data from 2015 reports about 53.9% of people self-declaring as such, which constitutes a majority of the country's population (Brazil, 2017). Gomes, Meira and Silva (2021, p. 77) use the concept of race in healthcare inserted into a sociopolitical perspective and consider it as an important separate category in studies that assess health inequalities, advocating that it should not be replaced with or encompassed by other variables, such as the socioeconomic factor, as there is a risk of "homogenizing the diversity and differences of this population".

The incidence observed in African populations is twice as that in European ones, with similar rates as to the transformation of monoclonal gammopathy of undetermined meaning to MM in both races. In other European studies, in which access to autologous HSCT was considered equal in both races, survival outcomes were not different (Waxman et al., 2010). Pan et al. (2021), when analyzing retrospective data of a single transplant center in New York, found no statistical differences on the time between diagnosis and cell collection for HSCT between white and black patients, but income-based socioeconomic differences impacted access to HSCT, with greater intervals for more vulnerable black patients being perceived by the transplant center.

Considering that there is controversy around the international literature on the subject of access to autologous HSCT for multiple myeloma in the context of racial differences, that research around it is scarce in Brazil, and that discussions on the subject are pertinent though incipient, the present study aimed to analyze the profile of patients who have undergone HSCT in a teaching hospital to foster this discussion from a local perspective.

MATERIALS AND METHODS

This is a retrospective descriptive study conducted through data consultation and data collection from the medical records of patients treated at São José do Rio Preto Base Hospital, which belongs to the FUNFARME/FAMERP complex of the State of São Paulo, from January 2014 to December 2022, who have undergone autologous HSCT for multiple myeloma. Patients whose epidemiological and clinical data could not be obtained from their medical records were excluded from the study.

Data will be presented by means of descriptive statistics with frequency calculations and central tendency measures. Information was collected in accordance with parameters concerning sex, age at the time of transplantation, region of residence, race, education, funding type for the transplantation procedure, and response to pre- and post-transplantation treatment. Patients were categorized in accordance with the Brazilian Institute of Geography and Statistics (IBGE): white, pardo and black, as reported in medical records by administrative professionals, mostly through heteroidentification. The presence of yellow or indigenous people was not expected. To evaluate response to treatment, criteria from the International Myeloma Working Group (Kumar et al., 2016) were used within the reality of access to the transplant center's exams, listed as follows and ranked from worst to best therapeutic results: stable disease, partial response, very good partial response, and complete response (based on negative immunofixation).

This study was approved by the Research Ethics Committee of FAMERP – São José do Rio Preto Medical School (CAAE: 69801823.5.0000.5415), in accordance with Resolution No. 466/2012 of the National Health Council. Because there was no direct contact with human beings, exemption from a consent form was requested. The project was awarded with the 2023-2024 PIBIC FUNFARME/FAMERP incentive scholarship.

RESULTS AND DISCUSSION

A total of 130 patients subjected to transplantation were analyzed, with 106 individuals being classified as white and 24 as black or pardo (Table 1). As for sex, the proportion of men was similar among white (57; 53.8%) and black/pardo (14; 58.3%) patients. The median age at the time of transplantation was lower in the black/pardo group, with 53 (31-67) years, compared to the 60 (36-71) years observed in the white group.

Regarding geographical origin, most white and black patients were from the Southeast region, with a predominance of incomplete elementary education. With respect to funding for the transplantation, since this is a procedure provided by SUS and private healthcare, there was a predominance of public funding in both groups.

Most patients had stable diseases in both groups, considering comparisons between pre- and post-transplantation responses. A significant portion of the patients had a deepened response with the transplantation, 31% of white and 25% of black patients. It is important to evaluate the group that remained with the disease stable, in view of the possibility that part of the evaluated patients had already reached a good clinical response (very good partial response or complete response), and therefore, by the available evaluation criteria, could not be deepened further. Thus, of the 61 white patients who remained stable after HSCT, 48 (78.7%) already had a good pre-HSCT clinical response, 25 (41%) of them presenting complete response. As for black and pardo individuals, out of the 17 patients, 13 (76.5%) responded well before HSCT, and of those, seven (41.2%) presented complete response. Table 1 describes the parameters analyzed in this study.

The data of this study showed that most patients were white individuals (81.5%), mainly from the Southeast region (73.8%), and with a low level of education. Although the results do not provide direct evidence for disparities of access to transplantation, they allow for reflecting on structural aspects of the population assisted by the service. Despite the predominance of white patients in the sample, Table 1 shows that, among black and pardo patients, none of them reported having received complete higher education, and a significant part did not have this information present in their medical records, which also reveals weaknesses in the recording of patient data.

This difference suggests a possible educational asymmetry among these racial groups, even though everyone had access to the transplantation procedure. However important final access is, there may be difficulties in the healthcare line for less educated patients relating to their access to diagnosis, their understanding of the health-disease process, their compliance

with treatment, and their autonomy in clinical decisions – factors not analyzed by this study. It is important to consider that access to transplantation does not eliminate educational and socioeconomic vulnerabilities that affect these individuals, and the presence of less educated patients belonging to a racial minority group in this scenario may reflect the intervention of public policies that broaden access.

Table 1
Results found among white and black/pardo patients, based on the parameter analyzed in the medical record review.

Parameter	White (n = 106)	Black/Pardo (n = 24)
Sex		
Male – n (%)	57 (53.8%)	14 (58.3%)
Female – n (%)	49 (46.2%)	10 (41.7%)
Age at the time of transplantation		
Median (min-max)	60 (36-71)	53 (31-67)
Region of origin		
Southeast	81 (76.4%)	15 (62.5%)
Northeast	3 (2.8%)	5 (20.8%)
Midwest	18 (17%)	3 (12.5%)
South	1 (1%)	-
North	3 (2.8%)	1 (4.2%)
Education		
Incomplete elementary education	39 (36.8%)	7 (29.2%)
Complete elementary education	13 (12.3%)	5 (20.8%)
Complete secondary education	20 (18.9%)	5 (20.8%)
Complete higher education	14 (13.2%)	-
Illiterate	2 (1.9%)	-
No information	18 (16.9%)	7 (29.2%)
Treatment funding		
Public	88 (83%)	21 (87.5%)
Private (priv. healthcare)	18 (17%)	3 (12.5%)
Response to transplantation		
Deepening	33 (31.1%)	6 (25%)
Disease progression	12 (11.3%)	1 (4.2%)
Stable disease	61 (57.6%)	17 (70.8%)

Source: The authors.

As already seen in previous studies, race and regionalism play crucial roles in access to treatment. Research shows that African American patients, compared to white ones, are less likely to receive triple therapies and autologous HSCT, even when controlled by factors such as age, sex, and socioeconomic conditions (Derman et al., 2020). Additionally, Shavers and Brown (2002) point out that African American patients have a 33% higher risk of cancer mortality compared to white patients, a reflection of the unfavorable conditions of limited healthcare access.

In our study, the predominance of white and southeastern patients may be indicative of easier access to treatment, possibly influenced by greater economic development and greater concentration of healthcare services in that region. It is noteworthy that the white population is predominant in the Brazilian Southeast, according to IBGE data (Brazil, 2022), with approximately 45.7% of the region's municipalities comprising a white majority. The black population has less representativeness in this region, with a larger presence in specific municipalities, such as São Paulo and Rio de Janeiro. Such a predominance may have influenced the results of our study, in which most of the analyzed patients were white. The lower proportion of black people in the Southeast may have contributed to the smaller number of black patients in our study, but one should consider the possible barriers to treatment access for this population, especially in less favored regions.

Analyzing the results obtained in relation to the effectiveness of treatment, one finds that most patients responded to the transplantation or maintained the same response prior to the procedure, that is, it can be inferred that this therapy is effective for MM management in all racial groups, as pointed out in previous studies (Kristinsson, Landgren, Dickman, Derolf, & Bjorkholm, 2007; Turesson, Velez, Kristinsson, & Landgren, 2010). The literature has retrospective studies that point to similar overall survival between groups of white and non-white patients undergoing MM treatment (Ailawadhi et al., 2017; Ailawadhi et al., 2018), although these studies state that, during the analyses, disparities between the studied groups were found, referring to when the treatment started being used and to treatment standards, with white patients being the most benefited ones.

Furthermore, there are also other studies that describe greater overall survival in black patients compared to white ones, especially when they were exposed to similar treatments, though it is also emphasized that white patients were more likely to have faster access to treatment and new therapies (Dong et al., 2022; Waxman et al., 2010). Thus, based on the literature and the results obtained, we stress the need to discuss equity in treatment for MM in order to improve the patients' quality of life, especially for the black population suffering from access disparities. It is necessary to investigate possible variables that may be related to the patients' difficulty in reaching transplantation and which factors could be related to a better response to transplantation and other therapies, with the aim of better understanding them and hence using this knowledge to ensure greater effectiveness in the disease's treatment.

It is noteworthy that there are studies showing significant differences in access to multiple myeloma treatment between white and black people in relation to palliative radiotherapy (Fossum, Navarro, Farias, & Ballas, 2021) and to clinical studies with advanced therapies such as CAR-T cells (Al Hadidi, Schinke, Thanendrarajan, Zangari, & van Rhee, 2022). This phenomenon does not apply only to multiple myeloma and the black population, but extends also to ethnic minorities and has several determinants that may be related to unconscious prejudices from agents and the healthcare system's organization against certain social groups (James, 2017). In Brazil, the determination of access is also multifactorial, and organizational issues of the healthcare system, besides the socioeconomic and educational inequalities of racial groups, help perpetuate differences in accessibility and access to healthcare (Goes & Nascimento, 2013).

A study based on the analysis of elderly patients' data, with the aim of investigating racial differences in treatment access within one year of multiple myeloma diagnosis, ratified

that, despite the availability of therapeutic options and updated guidelines recommending the use of new agents, there was a persistent difference concerning the treatment received and the time when therapy began (Ailawadhi et al., 2018). No difference was found in survival among treated patients considering racial groups. Likewise, compared to previous studies, black patients were less likely to undergo treatment and demonstrated a greater tendency to delay its start (Ailawadhi et al., 2017; Derman et al., 2020; Fakhri, Fiala, Tuchman, & Wildes, 2018). The literature has shown that, although there has been some improvement in treatment access for all racial groups in recent decades, white individuals have had a more positive impact, even when it comes to innovative therapy and clinical studies.

As MM treatments evolved over time and the new agents were more effective than former ones, patients who received more innovative treatments were able to benefit from them (Wang et al., 2024). Thus, it is noted that, although there are no significant differences in the treatment itself oftentimes, one must recognize that access barriers such as discrimination, financial burdens, and delayed treatment start, are factors that impact the most vulnerable populations, which may lead to different outcomes for the negatively affected population. Therefore, new studies should be conducted to detail the reasons why such disparities occur and then correct them to ensure equity.

Considering that this is a study of data consultation and data collection from medical records, the veracity of the provided "race/color" information should be reflected upon so as to question accessibility failures concerning the health of Brazilian black populations. Since 2017, once ethnicity was recognized as an important health determinant, individuals must necessarily inform their self-declared race/color, as set forth by Ordinance No. 344 of the Brazilian Health Department. However, there are social challenges for self-declaration and for providing this piece of information; racialization, race consciousness, and social location should be taken into account. Moreover, a study by Silveira et al. (2021) revealed three other main problems related to the insertion of this piece of data in medical records: difficulties concerning questions and answers around self-declaration, the whitening of the population during the collection of this information due to racism, and the difficulty professionals have in recognizing the importance of this matter. Thus, as the study by Geraldo et al. (2022) points out, there are evident errors in the process of filling out patients' medical records, so much so that, in a university hospital, only 2.22% of the data was collected by self-declaration, with the remainder being by heteroidentification. So there is a need to map this phenomenon of identification among healthcare system users with a view to obtaining more reliable data regarding ethnic and racial proportions, so that regional and hospital differences can be minimized and, as a result, public policies can be developed to mitigate the access issue for black people with multiple myeloma and any other clinical conditions requiring healthcare.

Evidence suggests that educational, racial, and regional barriers still persist, influencing access and a timely treatment start, especially for black patients and those from less favored regions. Previous studies corroborate these disparities, pointing out that, even when access to treatment is ensured, populations considered vulnerable often face additional obstacles, such as discrimination and socioeconomic inequality.

This study has its limitations, as it reflects the perspective of a single Brazilian transplant center, with most patients having been referenced from regions with white majorities. Nevertheless, public policies allow patients from any regions to be treated in the transplant centers, considering the funding model of these procedures of high technological complexity, which may reflect flaws in the regulation of access to transplants at the national level. Finally, as has been discussed previously, it is not possible to ensure that the identifications of black/pardo users who receive treatment correspond fully to their self-declared ethnicity, which could increase the number of patients who would be classified as white. According to Estrela, Santos and Lima (2021), reliable information on the race/color parameter will only be provided when racism is recognized as one of the social determinants of health, which points to the need to further discussions on this subject and for educational action.

CONCLUSION

The present study identified a white majority among patients subjected to HSCT for MM management in a single center. This finding may reflect the self-declared skin color distribution in our territories, or point to possible racial and socioeconomic disparities in the access to transplantation for this disease, as the literature has been showing in other centers. Another important finding was the predominance of public funding for the procedure, which reflects the fundamental role of SUS in attempting to equalize access to high-complexity treatment. Continuous public policies for overcoming racial and regional barriers are necessary. The search for more accurate data on patients' racial and social characteristics is also essential for the development of strategies that promote more inclusive and effective care. Future research should seek to elucidate these factors further, with studies mapping all matters involved – from the incidence of the disease to its treatment –, and to propose practical interventions so as to ensure that all patients, regardless of race or socioeconomic status, have equitable access to the best treatment modalities for multiple myeloma.

CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest.

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AUTHOR CONTRIBUTIONS

Conceptualization: J. V. P. F. *Data curation*: J. V. P. F. *Formal analysis*: J. V. P. F., G. S., C. A. P. *Funding acquisition*: J. V. P. F. *Investigation*: C. A. P., G. C. B. N., I. C. O., T. M., G. S. B. B., G. S., J. V. P. F. *Methodology*: J. V. P. F. *Project administration*: J. V. P. F., C. A. P. *Supervision*: J. V. P. F. *Validation*: J. V. P. F., G. S. *Visualization*: C. A. P., J. V. P. F. *Writing the initial draft*: C. A. P., G. C. B. N., I. C. O., T. M., G. S. B. B., G. S., J. V. P. F. *Revision and editing of writing*: J. V. P. F.

PEER REVIEW

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