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ORIGINAL PAPER

Descriptive Study of the *Brazilian Journal of Transplantation*: A Bibliometric Analysis

Bruno Pellozo Cerqueira[1], Thays Sellan Paim[1], André Kiyoshi Miyahara[1], Alexandre Vizzuso-Oliveira[1], Lara Baladi Garcia[1], Denis Campos Silva[1], Ilka de Fátima Santana Ferreira Boin[2], Érika Bevilaqua Rangel[3]*

1. Universidade Federal de São Paulo – Escola Paulista de Medicina – São Paulo (SP) – Brazil.

2. Universidade Estadual de Campinas – Faculdade de Ciências Médicas – Unidade de Transplante de Fígado – Campinas (SP) – Brazil.

3. Universidade Federal de São Paulo – Departamento de Medicina – Divisão de Nefrologia – São Paulo (SP) – Brazil.

*Corresponding author: erikabr@uol.com.br

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ABSTRACT

Introduction: Organ and tissue transplantation plays a crucial role in treating of advanced chronic diseases. In Brazil, this field has experienced significant growth driven by scientific research and an increase in the number of procedures. The *Brazilian Journal of Transplantation* (BJT) holds a pivotal role in disseminating knowledge in this research area. **Objectives**: To conduct a comprehensive bibliometric analysis of articles published in the BJT to identify trends and characteristics of articles related to organ and tissue transplantation. **Methods**: A bibliometric analysis was conducted on 433 articles related to organ and tissue transplantation published in the BJT from 2005 to 2023. Data were collected and analyzed regarding the year of publication, number of authors, sex of the first and last author, country and region of the first author, type of transplantation addressed, type of study, and methodology employed. **Results**: A total of 433 articles related to organ and tissue transplantation in the BJT were analyzed. Articles related to liver transplantation were the most prevalent (29.1%) followed by renal transplantation (28.6%). Original studies were the most frequent (58.4%) followed by reviews (21.7%). Among original studies, retrospective observational studies accounted for 46.6%. Regarding sex representation, women were the first authors in 59.6% of publications and the last authors in 46.7%. The Southeast Region represented 53.2% of all publications by Brazilian authors, with the state of São Paulo accounting for 42.7% of national publications. **Conclusion**: Our study offers valuable insights into the evolution and distribution of transplant research in Brazil. It highlights areas necessitating attention and intervention, such as promoting of inter-regional collaborations, investing in infrastructure in less developed areas, and initiatives to ensure gender equity in medical research.

Descriptors: Bibliometric; Transplantation; Journal; Sex Disparity; Authorship: Geographical Differences.

Estudo Descritivo do Brazilian Journal of Transplantation: Uma Análise Bibliométrica

RESUMO

Introdução: O transplante de órgãos e tecidos desempenha um papel fundamental no tratamento de doenças crônicas avançadas. No Brasil, essa área tem registrado um crescimento significativo, impulsionado pela pesquisa científica e pelo aumento do número de procedimentos. O *Brazilian Journal of Transplantation* (BJT) tem um papel fundamental na disseminação do conhecimento nesta área de pesquisa. **Objetivos:** Realizar uma análise bibliométrica abrangente dos artigos publicados no BJT para identificar tendências e características dos artigos relacionados ao transplante de órgãos e tecidos. **Métodos:** Foi realizada uma análise bibliométrica dos artigos relacionados ao transplante de órgãos e tecidos publicados no BJT no período de 2005 a 2023. Foram coletados e analisados dados referentes ao ano de publicação, número de autores, sexo do primeiro e do último autor, país e região do primeiro autor, tipo de transplante abordado, tipo de estudo e metodologia empregada. **Resultados:** Foram analisados 433 artigos relacionados ao transplante de órgãos e tecidos no BJT. Os artigos relacionados ao transplante hepático foram os mais prevalentes (29,1%), seguidos pelo transplante renal (28,6%). Os estudos originais foram os mais frequentes (58,4%), seguidos das revisões (21,7%). Entre os estudos originais, os observacionais retrospectivos representaram 46,6%. Quanto à representação por sexo, as mulheres foram primeiras autoras em 59,6% das publicações e últimas em 46,7%. A Região Sudeste representou 53,2% do total de publicações de autores brasileiros, sendo o estado de São Paulo responsável por 42,7% das publicações nacionais. **Conclusão:** Nosso estudo fornece

informações valiosas sobre o desenvolvimento e a distribuição da pesquisa em transplantes no Brasil. Destaca áreas que necessitam de atenção e intervenção, como a promoção de colaborações inter-regionais, investimentos em infraestrutura em regiões menos desenvolvidas e iniciativas para garantir equidade de gênero na pesquisa médica.

Descritores: Bibliométrico; Transplante; Periódico; Disparidade de Sexo; Autoria: Diferenças Geográficas.

INTRODUCTION

The milestone of the first organ transplant in Brazil occurred in 1964, at the Hospital dos Servidores do Estado (HSE), in the state of Rio de Janeiro, and involved a kidney transplant.[1] Despite the initial failure due to acute graft rejection, this event marked the beginning of a procedure that would alter the course of advanced chronic diseases in the country. In 1968, the first liver transplant in Latin America was carried out at the Hospital das Clínicas (HC), in the state of São Paulo. In the same year, the first heart transplant in Latin America, which was the second heart transplant in the world, was also carried out at HC. Additionally, the first pancreas transplant in Brazil took place in 1968 at the Hospital Adventista Silvestre, in the state of Rio de Janeiro.

According to Sistema Nacional de Transplantes (SNT) report from the Brazilian Ministry of Health, in 2022, there were 8,169 organ transplants, 14,078 corneal transplants, and 3,385 bone marrow transplants, representing a 150% increase compared to procedures in 2001.[2] In addition to increased incentives, scientific research has been a crucial ally in this growth, with Brazilian researchers playing a fundamental role.

In 1997, the Associação Brasileira de Transplante de Órgãos (ABTO) inaugurated the Jornal Brasileiro de Transplante (JBT),[3] which became the official publication platform for related topics. In September 2021, it was renamed the *Brazilian Journal of Transplantation* (BJT), with ISSN 2764-1589.

The mission of BJT is to foster the development of activities related to organ and tissue transplants, promoting understanding and advancement in this field, especially in the Brazilian context and Latin-speaking countries.

Bibliometric analysis is an approach to exploring and analyzing large volumes of scientific data, enabling the assessment of the evolution of research in specific areas.[4] These analyses are considered an advanced method for illustrating collaborative networks. They include mapping collaboration among representative authors, institutions, and countries, as well as geographic distribution, authorship patterns, publication years, citations, keywords, and topical focus within a specific field through co-occurrence analyses.[5,6]

The purpose of this study is to conduct a bibliometric analysis of articles published in BJT over the past 19 years. Our goal is to identify distinct publication patterns in this significant medical journal and create a comprehensive mapping of the distribution of publications, considering variables such as transplant type, study type, publication origin, and gender distribution among first and last authors.

METHODS

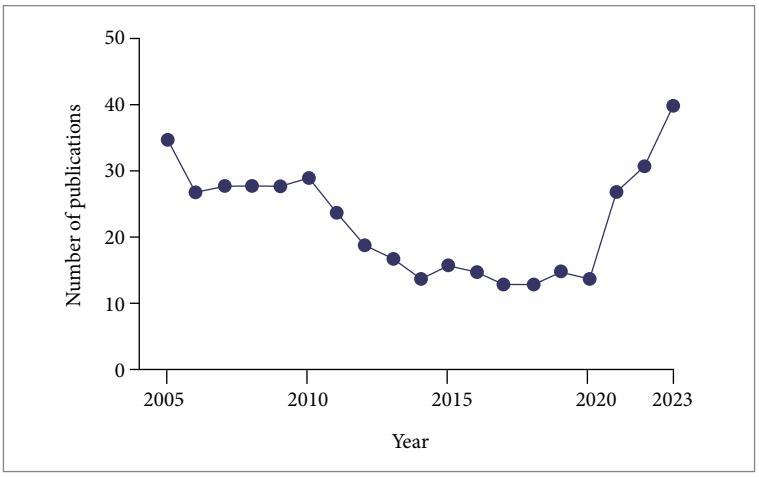
We conducted a comprehensive bibliometric analysis of all articles related to organ and tissue transplants published in BJT from 2005 to 2023. Each article was meticulously examined by at least two distinct authors to minimize potential bias in data collection. Articles that did not show a precise correlation with transplants were excluded.

The following data were scrutinized in all articles: 1) year of publication; 2) number of authors; 3) gender of the first and last author; 4) country of the first and last author (if the country of origin is Brazil, the state was also collected); 5) type of transplant (kidney, liver, heart, pancreas, pancreas-kidney, tissue, organ donation/retrieval, and others – articles not focusing on a specific organ or tissue type and/or describing regulatory processes for organ donation); 6) type of article (original, systematic or integrative review, case report, and others); and 7) methodology (if original, categorized into observational retrospective, cross-sectional, or prospective, randomized or non-randomized clinical trial, qualitative, and others). Analyses across two periods were also conducted to assess differences over time (2004-2014 vs. 2015-2023).

The analysis was performed using IBM® SPSS software (Statistical Product and Services Solutions, version 25.0, SPSS Inc., Chicago, IL, USA) for data tabulation and analysis, along with GraphPad Prism 8.0 software (GraphPad Software, San Diego, CA, USA) for figure creation. Continuous variables were described as mean and standard deviation (SD), while categorical variables were presented in frequencies and percentages. The chi-square test was employed to assess the association between gender and authorship position in the manuscript. A two-way analysis of variance (ANOVA), along with Tukey's multiple comparisons test, was used to examine the distribution of gender among first and last authors in studies on kidney and liver transplants. For comparisons across two periods, *t* tests and chi-square tests were utilized, followed by a *post-hoc* analysis to adjust the residuals and verify the alpha value to determine which variables were significant. A $p < 0.05$ was considered significant for all data analyses.

RESULTS

During the analyzed period, 433 articles related to organ transplants were published, with 2023 standing out as the year with the highest number of publications (Fig. 1). This growth is attributed to the encouragement for publications, aiming for the indexing of BJT in the SciELO-Brazil access network.



Source: Elaborated by the authors.

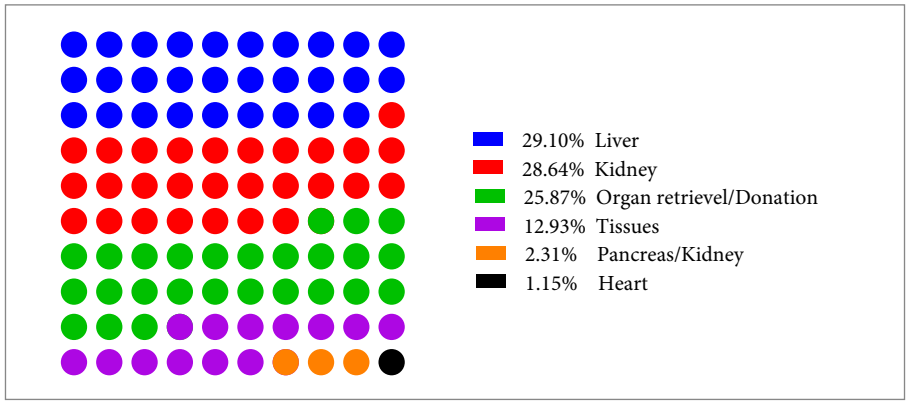
Figure 1. Number of publications in BJT over time.

The collected data are summarized in Table 1. When analyzing publications by type of transplant, liver transplants, and kidney transplants stood out, representing 29.1 and 28.6%, respectively, as demonstrated in Fig. 2. The average number of authors per publication was 5.5 ± 3.2 (ranging from 1 to 27). Regarding the types of studies, original studies were the most frequent, totaling 58.4%, followed by review studies (21.7%), case reports (14.4%), and others (5.1%) (Table 1).

Table 1. Description of the BJT demographic data.

Demographic data	Liver	Kidney	Organ retrieval/ donation	Tissues	Pancreas/ kidney	Heart	All
Number of publications (n, %)	126 (29.1)	124 (28.6)	112 (25.8)	56 (12.9)	10 (2.4)	5 (1.2)	433 (100.0)
Number of authors (mean ± SD)	6.1 ± 3.6	6.4 ± 3.1	4.2 ± 2.9	4.8 ± 3.5	6.9 ± 3.7	6.4 ± 3.4	5.5 ± 3.2
Type of study (n, %)							
Original	70 (55.6)	70 (56.5)	69 (61.6)	35 (62.5)	5 (50.0)	4 (80.0)	253 (58.4)
Review	32 (25.4)	25 (20.2)	26 (23.2)	9 (16.1)	2 (20.0)	0 (0.0)	94 (21.7)
Case report	21 (16.7)	27 (21.8)	2 (1.8)	11 (19.6)	2 (20.0)	1 (20.0)	64 (14.8)
Others	3 (2.4)	2 (1.6)	15 (13.4)	1 (1.8)	1 (10.0)	0 (0.0)	22 (5.1)
Methodology of the review (n, %)							
Narrative	31 (96.9)	25 (100.0)	26 (100.0)	9 (100.0)	2 (100.0)	0 (0.0)	93 (98.9)
Systematic	1 (3.1)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.1)
Methodology of the original studies (n, %)							
Retrospective observational	34 (48.5)	46 (65.7)	19 (27.5)	13 (37.1)	4 (80.0)	2 (50.0)	118 (46.6)
Prospective observational	14 (20.0)	5 (7.1)	1 (1.4)	0 (0.0)	0 (0.0)	0 (0.0)	20 (7.9)
Cross-sectional	15 (21.4)	15 (21.4)	28 (40.5)	5 (14.2)	0 (0.0)	2 (50.0)	65 (25.6)
Non-randomized clinical	1 (1.4)	0 (0.0)	0 (0.0)	1 (2.8)	0 (0.0)	0 (0.0)	2 (0.8)
Randomized clinical	0 (0.0)	1 (1.4)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.4)
Experimental	4 (5.7)	1 (1.4)	2 (2.8)	12 (34.2)	1 (20.0)	0 (0.0)	20 (7.9)
Others	2 (3.0)	2 (3.0)	19 (27.8)	4 (11.7)	0 (0.0)	0 (0.0)	27 (10.8)
Gender of the first author (n, %)							
Male	55 (43.7)	50 (40.3)	30 (26.8)	29 (51.8)	7 (70.0)	4 (80.0)	175 (40.4)
Female	71 (56.3)	74 (59.7)	82 (73.2)	27 (48.2)	3 (30.0))	1 (20.0)	258 (59.6)
Gender of the last author (n, %)							
Male	71 (56.8)	65 (52.4)	40 (38.8)	36 (67.9)	9 (90.0)	3 (60.0)	224 (53.3)
Female	54 (43.2)	59 (47.6)	63 (61.2)	17 (32.1)	1 (10.0)	2 (40.0)	196 (46.7)
First author from Brazil, divided by region (n, %)	122 (96.8)	119 (96.0)	109 (97.3)	55 (98.2)	9 (90.0)	5 (100.0)	419 (96.8)
Southeast	59 (49.4)	65 (54.6)	54 (49.5)	37 (67.3)	4 (44.4)	4 (80.0)	223 (53.2)
South	21 (17.2)	22 (18.5)	24 (22.0)	12 (21.8)	5 (55.6)	0 (0.0)	84 (20.0)
Midwest	2 (1.6)	5 (4.2)	3 (2.8)	0 (0.0)	0 (0.0)	0 (0.0)	10 (2.4)
Northeast	36 (29.5)	23 (19.3)	24 (22.0)	5 (9.1)	0 (0.0)	1 (20.0)	89 (21.2)
North	4 (3.3)	4 (3.4)	4 (3.7)	1 (1.8)	0 (0.0)	0 (0.0)	13 (3.1)

Source: Elaborated by the authors.

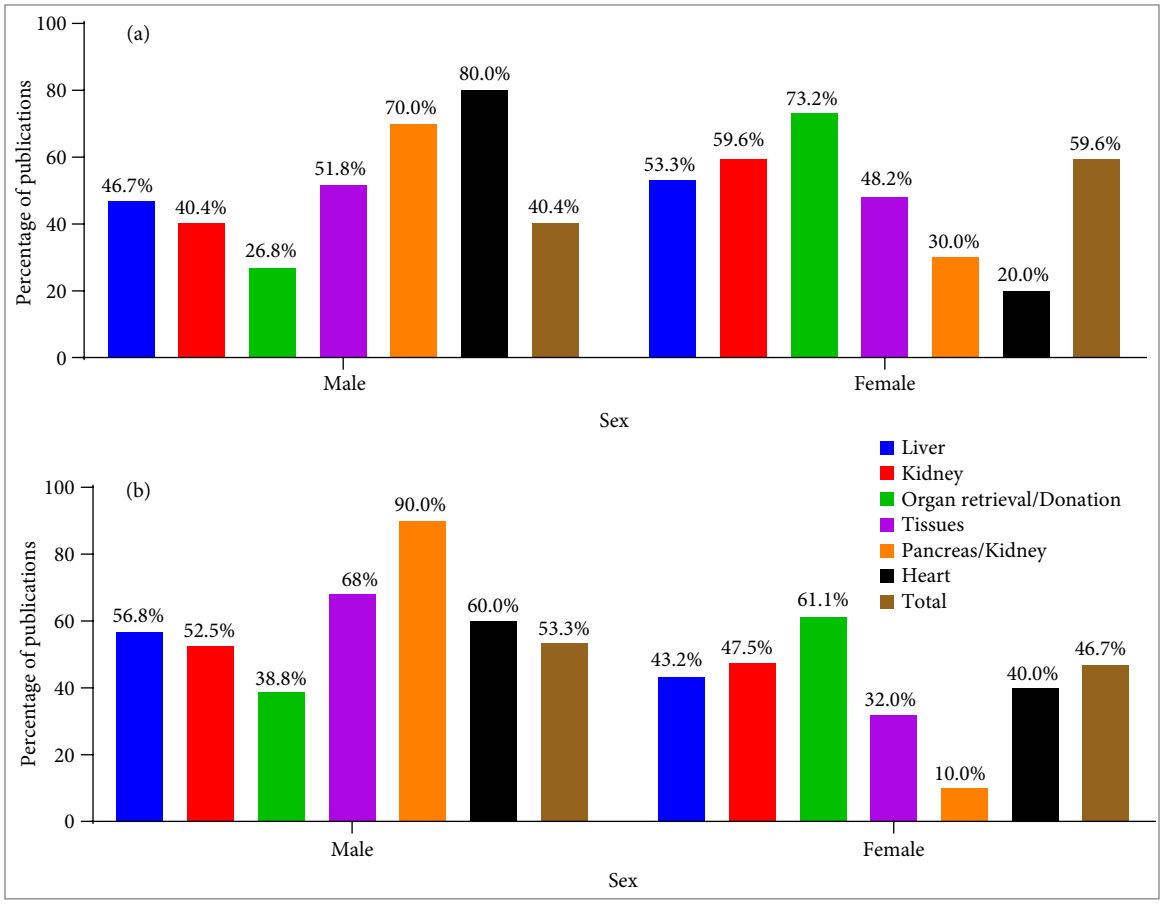


Source: Elaborated by the authors.

Figure 2. Percentage of publications categorized by the type of transplant.

Among the original studies, 80.1% were observational, with 46.6% being retrospective, 7.9% prospective, and 25.6% cross-sectional. Remarkably, experimental studies predominated in publications on tissue transplantation, representing 60% of the total articles.

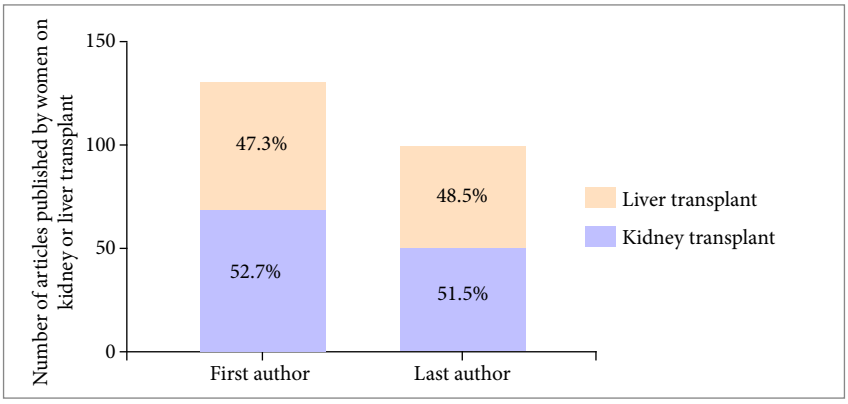
In terms of gender representation, women served as first authors in 59.6% of publications and as last authors in 46.7%, while men were the first authors in 40.4% and the last authors in 53.3% of the publications, as depicted in Fig. 3a, b (brown bars).



Source: Elaborated by the authors.

Figure 3. Distribution of gender based on the first (a) and last authors (b) by the type of transplant. The brown bars illustrate the overall publications for each gender and author position in the manuscript.

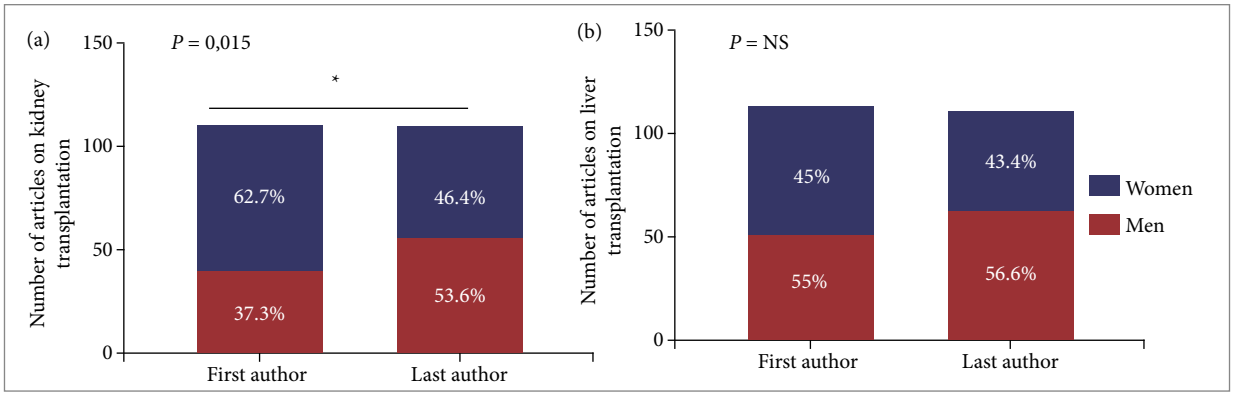
Given that publications on kidney and liver transplants were the most prevalent, we examined the distribution of women in both first and last authorship roles for these types of transplants and found no significant difference (Fig. 4).



Source: Elaborated by the authors.

Figure 4. Number of articles published by women on kidney or liver transplant according to the authorship position ($p = 0.86$).

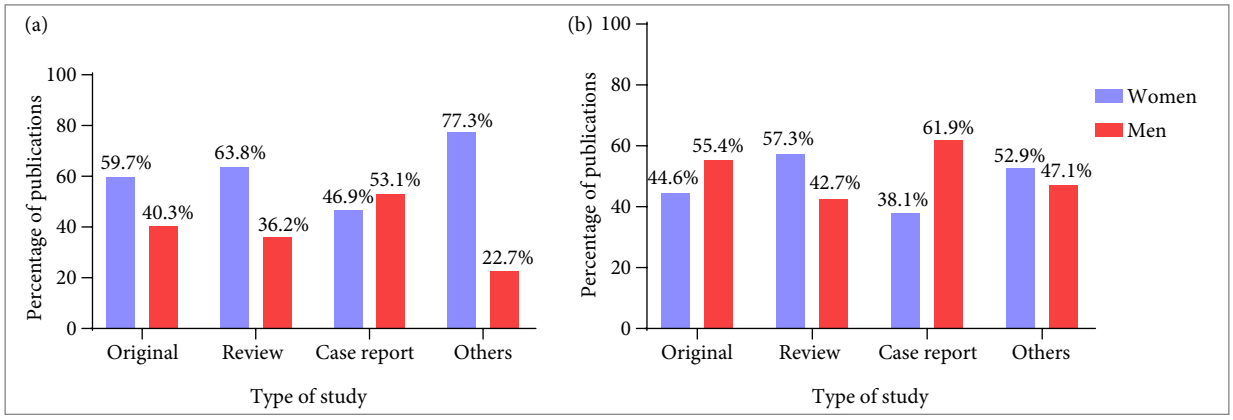
Upon scrutinizing the gender distribution in relation to the type of transplant, we discovered a significant trend wherein women were more frequently the first author compared to the last author in kidney transplant publications ($p = 0.015$) (Fig. 5a). In contrast, there was no discernible difference in gender distribution and authors' position in liver transplant publications (Fig. 5b).



Source: Elaborated by the authors.

Figure 5. Gender distribution according to the authorship position. (a) Women were more often the first authors compared to the last authorship position in kidney transplant (*$p = 0.015$). (b) No differences were found in liver transplants in terms of gender and authorship position ($p = 0.07$).

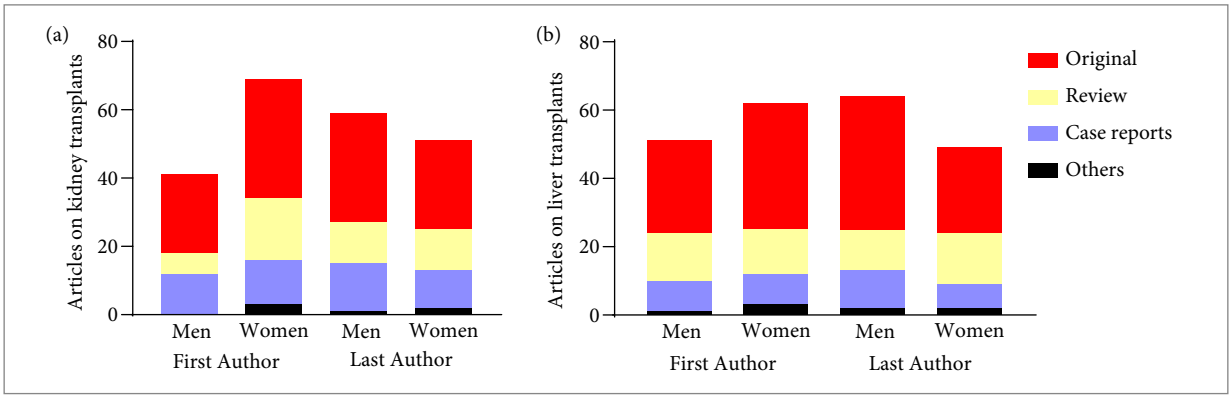
When stratifying gender across different types of articles, it is notable that women were more prevalent in reviews, occupying the first authorship in 63.8% and last authorship in 57.3% (Fig. 6a, b). For original articles, women accounted for 40.3% as the first author and 44.6% as the last author.



Source: Elaborated by the authors.

Figure 6. Distribution of gender in different types of studies based on the first (a) and last (b) authors.

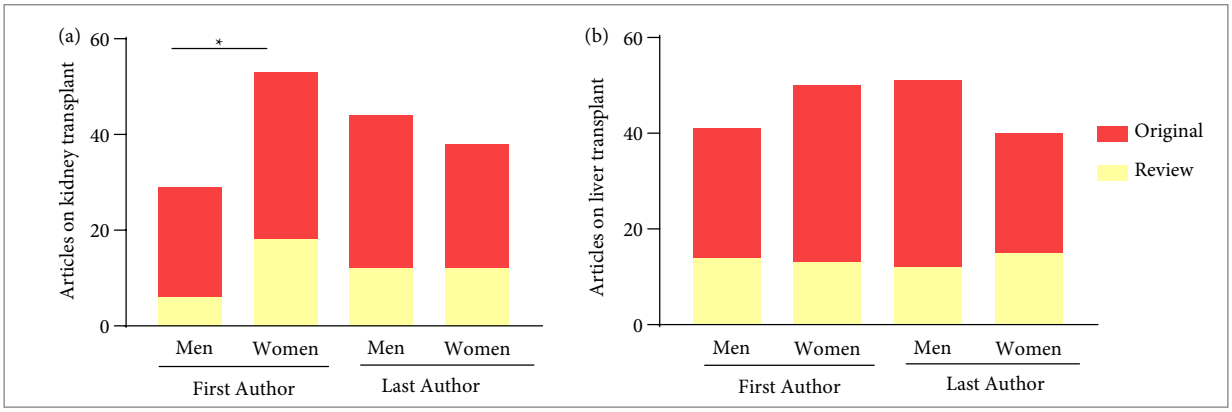
When we compared the type of article and authorship positions for kidney (Fig. 7a) and liver transplants (Fig. 7b), we found no differences in gender distribution for the types of articles studied.



Source: Elaborated by the authors.

Figure 7. Distribution of gender among first and last authors in different types of studies on kidney (a) and liver (b) transplants ($p > 0.05$).

Next we compared the most common type of articles, including original and review articles, between kidney and liver transplants. In kidney transplant articles, women were found more often as first authors in both original ($p = 0.038$) and review articles ($p = 0.038$) compared to men (Fig. 8a). However, no differences were found in last authorship positions (Fig. 8a). For liver transplant articles, no differences were found in either first or last authorship positions (Fig. 8b).



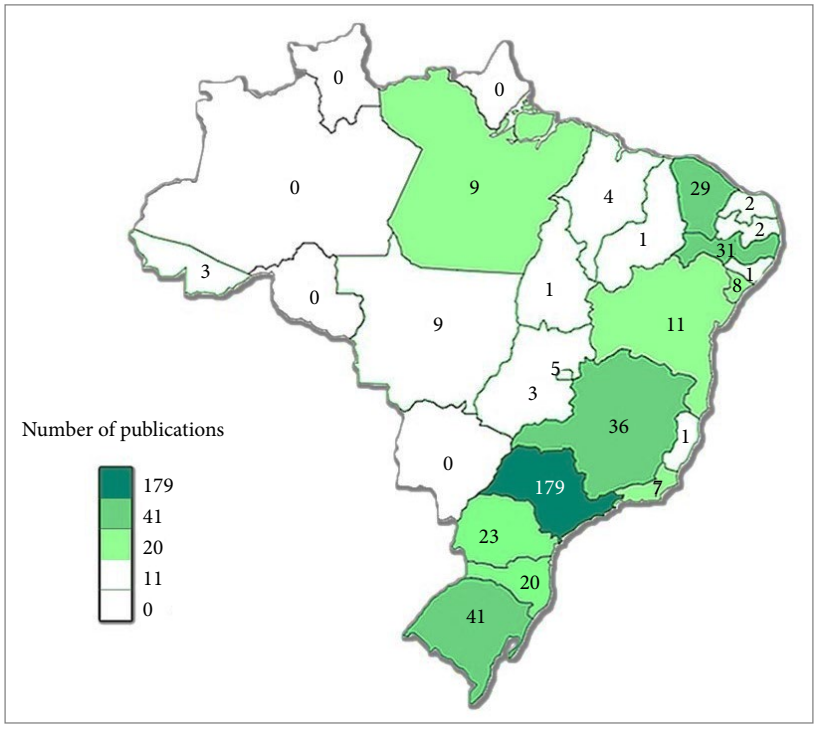
Source: Elaborated by the authors.

Figure 8. Authorship positions in original and review articles for kidney (a) and liver (b) transplants. *$p = 0.038$ for both original and review articles in the first authorship position for kidney transplants.

Regarding the country and region of the first author, 96.8% of the publications were from authors residing in Brazil, while the remainder were from residents of Portugal (nine publications; 2.1%), the United States (three publications; 0.7%), and the Dominican Republic, and Nigeria, each with one publication (0.4%).

Highlighting the state distribution in Brazil, São Paulo led with 179 publications (42.7%), followed by Rio Grande do Sul with 41 publications (9.8%), Minas Gerais with 36 publications (8.6%), and Pernambuco with 31 publications (7.4%) (Fig. 9). Notably, the states of Amazonas, Amapá, Roraima, Rondônia, and Mato Grosso do Sul did not record any publications. When grouped by geographical region, the Southeast Region predominated, accounting for a total of 53.2%.

When we analyzed the number of publications across two periods, 2004-2014 and 2015-2023, BJT published 249 (57.5%) and 184 (42.5%) manuscripts, respectively (Table 2). The number of authors per publication remained constant over time. Publications on liver transplantation increased (21.3 vs. 39.7%, $p < 0.001$), whereas the number of publications on tissue and pancreas transplantation decreased. There was a decline in the number of original articles (63.1 vs. 52.2%, $p = 0.005$), and the authorship position did not change over time. Although the demographic disparity persisted, we observed a slight increase in the number of publications from the Midwest ($p = 0.001$) and Northeast Regions ($p = 0.027$), while the Southeast saw a decrease in the number of publications (55.9 vs. 45.7%, $p = 0.035$).



Source: Elaborated by the authors.

Figure 9. Geographical distribution in Brazil of the number of publications in the BJT.

Table 2. Description of the BJT demographic data comparing two periods.

Demographic Data	2004-2014	2015-2023	*p*-value
Number of publications (n, %)	249 (57.5)	184 (42.5)	
Number of authors (mean ± SD)	5.5 ± 3.1	5.5 ± 3.4	0.662
Type of transplant (n, %)			0.662
Liver	53 (21.3)	73 (39.7)	< **0.001**
Kidney	73 (29.3)	51 (27.7)	0.689
Pancreas/kidney	10 (4.0)	0.0	**0.005**
Heart	5 (2.0)	0.0	0.057
Tissue	43 (17.3)	13 (7.1)	**0.001**
Organ retrieval/donation	65 (26.1)	47 (25.5)	0.920
Type of study (n, %)			
Original	157 (63.1)	96 (52.2)	**0.005**
Review	42 (16.9)	52 (28.3)	0.423
Case report	34 (13.7)	30 (16.3)	0.133
Others	16 (6.4)	6 (13.3)	0.133
Gender of the first author (n, %)			
Male	110 (44.2)	65(35.3)	0.064
Female	139 (55.8)	119 (64.7)	
Gender of the last author (n, %)			
Male	131 (54.6)	93 (51.7)	0.553
Female	109 (45.4)	87 (48.3)	
First author from Brazil, divided by region (n, %)			
Southeast	139 (55.9)	84 (45.7)	**0.035**
South	53 (21.3)	31 (16.8)	0.230
Midwest	1 (0.4)	9 (4.9)	**0.001**
Northeast	42 (16.9)	47 (25.5)	**0.027**
North	9 (3.6)	4 (2.2)	0.368

Adjusted alpha for the type of transplant = 0.004, for the type of study = 0.00625, and for the first author from Brazil, divided by region = 0.004. The numbers in bold represent values with statistical significance ($p < 0.05$).

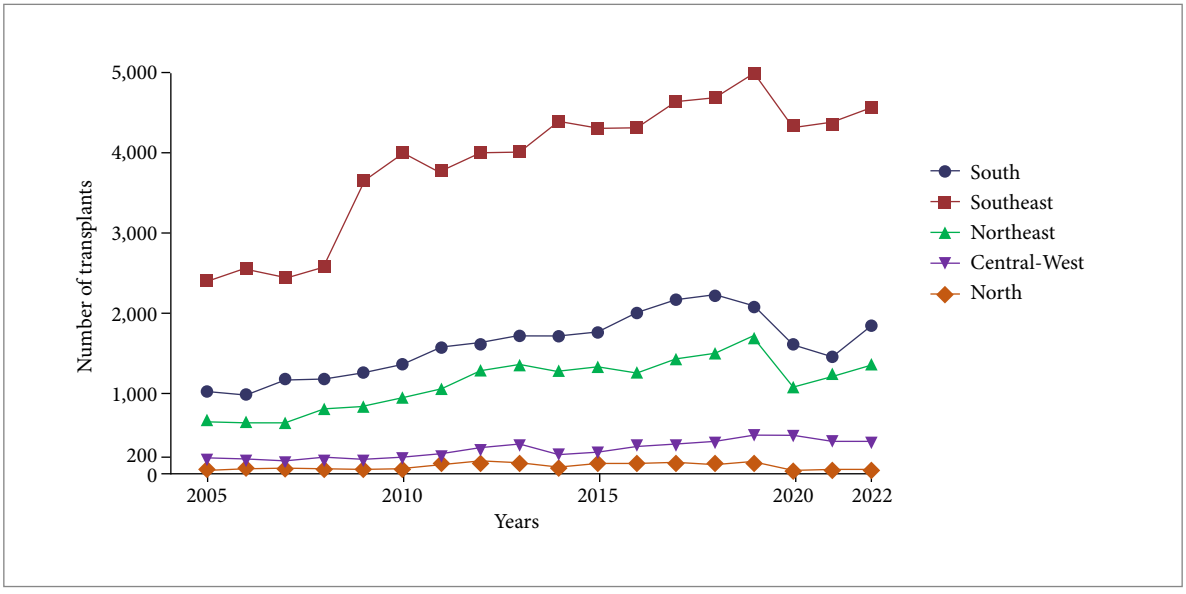
DISCUSSION

We evaluated 433 articles related to organ and tissue transplantation published in the BJT from 2005 to 2023. We identified a higher prevalence of studies related to liver and kidney transplants. An important regional disparity in the number of publications was also observed, with the Southeast Region predominating. Furthermore, among the types of transplantation, a significant disparity related to gender and author position was noted, with males being more prevalent as the last author, while females predominated as the first author.

Bibliometric studies are analytical tools used to examine research productivity. They employ sophisticated tools, such as VOSviewer, to analyze annual trends, authors, institutions, articles, keywords, and collaborative networks in the field of transplantation.[7] Qualitative data ranging from the gender of the authors to the presence of collaboration among different centers of excellence are meticulously observed, as in our study, to assess possible trends in the scientific production of the country. Additionally, studies like this can identify potential gaps in the scientific field,[8] suggesting the need for interventions to strengthen the development of Brazilian science.

When comparing publications in the field of transplantation by geographical region, we identified the persistent concentration of scientific literature production in centers of excellence in the South-Southeast, a phenomenon not limited to medicine, but also observed in other areas of knowledge. There is a hegemony of states like São Paulo, Rio Grande do Sul, and Minas Gerais in the production of Brazilian science as a whole,[9] which is also evident in the BJT. The concentration of publications in geographically more economically developed areas is a global reality, not exclusive to Brazil. There is a significant preponderance of publications from Anglo-Saxon countries, such as the United States and England, in the case of kidney transplants.[6] This underscores the need for initiatives to increase the number of publications in the North and Midwest Regions, given their limited or non-existent scientific production compared to others. The establishment of inter-regional and international collaborations, along with the allocation of financial and human resources to these areas, emerges as crucial solutions.

The disparity in publications among the regions of Brazil can also be correlated with the number of transplants performed in each locality. The number of publications reflects the quantity of transplants carried out in each region, correlating with the uneven regional distribution of transplant centers, which are concentrated in the South and Southeast Regions. In an analysis from 2005 to 2022, the Southeast Region represents more than half of the total organ transplants performed in Brazil, followed by the South and Northeast Regions ($p < 0.0001$) (Fig. 10). According to the Registro Brasileiro de Transplantes (RBT) of 2022,[2] the absolute number of effective donors was 1,634 in the Southeast Region, 997 in the South, and 661 in the Northeast. However, concerning the number of effective donors per million population (pmp), the South Region had 32.8, the Southeast 18.2, and the Northeast 11.5.



Source: Elaborated by the authors.

Figure 10. Distribution of solid organ transplants performed in Brazil by geographical region. Data taken from the SNT of the Ministry of Health ($p < 0.0001$).[2]

Additionally, well-established organ procurement systems are also a factor contributing to regional disparities in publications. The observed outcomes arise from the uneven distribution of transplant centers, primarily concentrated in the Southeast

Region and spearheaded by the state of São Paulo.[9] The centralization of these centers contributes to increased scientific activity related to transplantation, as there is the availability of infrastructure, materials, human resources, and financial resources that enable research. According to the RBT of 2022, the Southeast Region transplanted 78.6 pmp of cornea, 33.5 pmp of kidney, and 12.0 pmp of liver. In comparison, the Northern Region transplanted 28.0 pmp of cornea, 2.3 pmp of kidney, and 0.2 pmp of liver. This difference may be related to the distribution of Organização de Procura de Órgãos (OPOs) across the country. Out of the total of 61 OPOs in Brazil, 24 (39.3%) are in the Southeast Region, while four are in the Northern Region, one in each of the following states: Amazonas, Acre, Pará, and Rondônia. The other three states in the region (Amapá, Roraima, and Tocantins) do not have OPOs. Amapá and Roraima were among the states that had not published in the BJT, possibly influenced by the absence of OPOs in these locations.

Bibliometric analyses can also uncover a broader geographic distribution of publications, providing a global perspective. For kidney transplantation, the 100 most cited articles were predominantly from the United States (61%), followed by Canada (11%).[10] The most common topics of publication included immunosuppressive regimens (34%), clinical outcomes (26%), and pathology (22%). Similar findings were observed in liver transplant publications, where the United States led the number of publications (61%), followed by France (9%).[11] For lung transplantation, the United States accounted for 41.2% of publications, followed by Germany 7.1%, and Canada 6.4%.[12]

Over time, the topics of interest have evolved. In liver transplantation, during the pioneering era, there was a focus on refining surgical techniques.[11] More recently, attention has shifted to the utilization of marginal organ and the optimization of organ preservation, including machine perfusion.

Regarding the distribution of gender in BJT publications, data related to renal and hepatic transplants were analyzed to assess the prevalence of male and female authors as the first and last authors. In both cases, a higher prevalence of female first authors and male last authors was observed. This difference was statistically significant for renal transplants; however, for hepatic transplants, the difference was not significant.

Despite the current growth in female authorship, women are still predominantly first authors rather than last authors, correlating with their lower representation in leadership positions.[13,14] Studies in specific medical fields support this trend of fewer female last authors. Women may often be a minority even as first authors, despite their significant presence in the workforce.[9] This tendency is also observed globally; in a study analyzing cardiology scientific journals (Journal of the American College of Cardiology, Circulation, JAMA Cardiology, and European Heart Journal), in the first half of 2020, women were first authors of 230 (27.4%) articles and last authors of 138 (19.3%), highlighting not only the underrepresentation of women in the scientific landscape, but also a lesser tendency to be senior authors.[15]

In the field of transplantation, this scenario can be even more alarming. Over 85% of first/last authors were men in heart transplantation,[16] and a similar finding was observed in liver transplant publications, where over 90% of first and last authors were men.[11] These data on liver transplants contrast with our data in BJT, where there was equity in gender authorship position.

Thus, there is a gap that needs to be addressed to mitigate gender disparity, reducing impacts on women's academic careers. To achieve this, some measures can be taken, such as: changing project submission policies; adopting multiple co-authorship assignments for lead positions in scientific articles as a strategy to alleviate authorship disparity; creating funding and support for childcare and dependents along with longer deadlines for the submission of interim and final reports for projects funded by funding agencies; ongoing analysis of gender gap trends in scientific production across all fields; and double-blind peer review of scientific articles, which could contribute to increasing and equalizing the representation of female authors.[17]

Finally, another noteworthy aspect related to this issue is the difference in productivity scholarship levels between men and women in Brazil, with women occupying lower levels. This fact once again reflects the existing gender disparity in the highest-ranking positions within science-producing institutions.[18]

Our work has some limitations: 1) The BJT collection does not encompass all transplant articles published by Brazilian authors, as there are specific journals in related fields that address this theme. This is mainly because some authors only submit work to indexed journals with impact factors; 2) It was not possible to identify the authors' affiliations for more in-depth comparisons between areas.

CONCLUSIONS

This bibliometric study provided a comprehensive analysis of scientific production related to organ and tissue transplants in the BJT over 19 years. The results revealed a significant increase in the number of publications over time, reflecting the growing interest and engagement of Brazilian researchers in this field of medicine.

Thematic analyses highlighted liver and kidney transplants as the most studied types. Additionally, there was a notable regional disparity in scientific production, with the South and Southeast Regions leading in the number of publications, especially in states like São Paulo. This indicates an uneven distribution of resources and research opportunities across the country. Importantly, there was a sex disparity in leadership positions of the articles, with women less frequently occupying the senior author position.

In summary, this study provided valuable insights into the evolution and distribution of transplant research in Brazil, highlighting areas that require attention and intervention, such as promoting inter-regional collaborations, investing in infrastructure in less developed areas, and measures to promote gender equity in medical research.

CONFLICTS OF INTEREST

Nothing to declare.

AUTHOR'S CONTRIBUTIONS

Substantive scientific and intellectual contributions to the study: Cerqueira BP, Rangel EB; **Conception and design:** Cerqueira BP, Paim TS, Miyahara AK, Vizzuso-Oliveira A, Garcia LB, Silva DC; **Data analysis and interpretation:** Cerqueira BP, Rangel EB; **Article writing:** Cerqueira BP, Paim TS, Miyahara AK, Vizzuso-Oliveira A, Garcia LB, Silva DC, Rangel EB; **Critical revision:** Cerqueira BP, Rangel EB; **Final approval:** Rangel EB.

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DATA AVAILABILITY

The data are available on request from the corresponding author.

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