Historical Overview of the Authors of Revista Brasileira de Cancerologia: a Quantitative Analysis

Panorama Histórico dos Autores da Revista Brasileira de Cancerologia: uma Análise Quantitativa
Panorama Histórico de los Autores de la Revista Brasileira de Cancerología: un Análisis Cuantitativo

Helena Cargnelutti Grimaldi[1]; **Sandro da Silva Camargo**[2]

ABSTRACT

Introduction: The Brazilian Journal of Cancerology (RBC) is a scientific journal published by the National Cancer Institute (INCA). Created in 1947 and through its seventieth volume in 2024, it has generated an extensive documentary collection that serves as an important historical record of disease control policies in the country and the researchers who contributed for the development of these policies. **Objective:** To identify the main researchers and co-authorship networks that have been formed throughout the journal's history. **Method:** Analysis of all articles published by RBC up to 2024, collecting authors' names and publication titles. The Levenshtein algorithm was used to identify discrepancies in the spelling of the same author's name. Based on Graph Theory, the following metrics of author importance were calculated: degree, betweenness centrality, and PageRank. Subsequently, Social Network Analysis techniques enabled the visualization of co-authorship networks. **Results:** A total of 5,777 authors was identified in the 2,445 contributions published during the period analyzed. A ranking was created featuring the 40 authors with the highest number of publications in the journal, and the main co-authorship communities were identified. The results demonstrate that RBC plays a central role in consolidating scientific networks and strengthening collaboration among researchers in the field. **Conclusion:** This study formally acknowledges the researchers who have shaped RBC's history and contributes to the understanding of the journal's impact on the national scientific landscape.
Key words: Bibliometrics; Science Communication and Dissemination; Periodicals as Subject/trends; Electronic Journals.

RESUMO

Introdução: A Revista Brasileira de Cancerologia (RBC) é um periódico científico publicado pelo Instituto Nacional de Câncer (INCA). Criada em 1947, até seu septuagésimo volume em 2024, foi gerado um amplo acervo documental que constitui importante registro histórico sobre políticas de controle da doença no país e sobre os pesquisadores que contribuíram para a construção dessas políticas. **Objetivo:** Identificar os principais pesquisadores e as redes de coautoria que se formaram ao longo da história do periódico. **Método:** Análise de todos os artigos já publicados pela RBC até 2024, com coleta dos nomes dos autores e títulos das publicações. Foi usado o algoritmo de Levenshtein para identificar divergências na grafia do nome de um mesmo autor. Com base na Teoria dos Grafos, foram calculadas as métricas de importância dos autores: grau, centralidade de intermediação e *PageRank*. Posteriormente, a técnica de Análise de Redes Sociais permitiu a visualização das redes de coautoria. **Resultados:** Foram identificados 5.777 autores nas 2.445 contribuições publicadas no período analisado. Foi criado o *ranking* com os 40 autores com mais publicações na revista e identificadas as principais comunidades de coautoria. Os resultados demonstram que a RBC desempenha um papel central na consolidação de redes científicas e no fortalecimento da colaboração entre pesquisadores da área. **Conclusão:** Este estudo apresenta um reconhecimento formal aos pesquisadores que construíram a história da RBC, além de contribuir para a compreensão do impacto da revista no cenário científico nacional.
Palavras-chave: Bibliometria; Comunicação e Divulgação Científica; Publicações Periódicas como Assunto/tendências; Revistas Eletrônicas.

RESUMEN

Introducción: La Revista Brasileira de Cancerología (RBC) es una revista científica publicada por el Instituto Nacional de Cáncer (INCA). Fundada en 1947, hasta su septuagésimo volumen en 2024, ha generado una extensa colección documental que constituye un importante registro histórico sobre las políticas de control de la enfermedad en el país y sobre los investigadores que contribuyeron a la construcción de estas políticas. **Objetivo:** Identificar a los principales investigadores y redes de coautoría que se han formado a lo largo de la historia de la revista. **Método:** Análisis de todos los artículos publicados por la RBC hasta 2024, recolectando los nombres de los autores y los títulos de las publicaciones. Se utilizó lo algoritmo de Levenshtein para identificar divergencias en la ortografía del nombre de un mismo autor. Con base en la Teoría de Grafos, se calcularon las métricas de importancia de los autores: grado, centralidad de intermediación y PageRank. Posteriormente, se utilizó la técnica de Análisis de Redes Sociales para visualizar las redes de coautoría. **Resultados:** Se identificaron 5777 autores en las 2445 contribuciones publicadas durante el período analizado. Se creó un ranking con los 40 autores con más publicaciones en la revista y se identificaron las principales comunidades de coautoría. Los resultados demuestran que la RBC desempeña un papel central en la consolidación de redes científicas y en el fortalecimiento de la colaboración entre los investigadores del área. **Conclusión:** Este estudio presenta un reconocimiento formal a los investigadores que han construido la historia de la RBC y contribuye a la comprensión del impacto de la revista en el panorama científico nacional.
Palabras clave: Bibliometría; Comunicación y Divulgación Científica; Publicaciones Periódicas como Tema/tendencias; Revistas Electrónicas.

[1]Pesquisadora Autônoma. Bagé (RS), Brasil. E-mail: hgrimaldi87@gmail.com. Orcid iD: https://orcid.org/0009-0002-2762-4094
[2]Universidade Federal do Pampa (Unipampa), Campus Bagé, Programa de Pós-Graduação em Computação Aplicada (PPGCAP). Bagé (RS), Brasil. E-mail: sandrocamargo@unipampa.edu.br. Orcid iD: https://orcid.org/0000-0001-8871-3950
Corresponding author: Sandro da Silva Camargo. Avenida Maria Anunciação Gomes Godoy, 1650, Gabinete 3139 – Malafaia. Bagé (RS), Brasil. CEP 96413-172. E-mail: sandrocamargo@unipampa.edu.br

INTRODUCTION

The Brazilian Journal of Cancerology (RBC) is a reference scientific journal published by the National Cancer Institute (INCA). Created in 1947, RBC is consolidated as an essential vehicle for research and scientific discussion in the area[1] and has played a key role in disseminating oncologic knowledge. Until 2024, RBC published 70 volumes. Through its history, these publications reflect the evolution of the strategies of cancer prevention, diagnosis and treatment in Brazil, incorporating the guidelines and advances associated with actions of oncology-related assistance, teaching, research and surveillance.

This documentary collection is a key historical register of the control policies in the country. Reaching its eightieth anniversary, it is relevant to revisit its trajectory and acknowledge the researchers whose contribution was fundamental for its development. This historical rescue not only values the advances achieved but also provides inputs to guide future researches and improve the strategies of cancer surveillance, prevention and control in Brazil.

The historical analysis of a scientific journal in commemorative cornerstones is a common practice in the literature based on bibliometric techniques, a branch of the Library and Information Science which addresses the quantitative analysis of bibliometric data. Bibliometric analysis, which primarily focuses on academic productivity, scientific collaboration and co-authorship networks, utilizes published scientific literature to measure research activities in a certain area[2].

For example, a bibliometric analysis was performed for the journal "*Arquivos Catarinenses de Medicina*", encompassing all its 1,173 articles published since its creation up to the celebration of its 65th anniversary. The study identified the most outstanding authors and their main research communities[3]. The scientific production of the social security and social service of the workers of Mexico along its 60 years (1969-2021) was analyzed, comprehending 2,063 publications, which allowed the identification of the main authors and institutions associated with this national entity[4].

Similarly, the Journal of Dental Research was the object of a one century comprehensive bibliometric analysis of its publications, where the most cited 100 articles in this period have been identified, demonstrating the impactful influence of the journal in the area. The findings highlight the range of its scientific impact and the transformations of the citation standards and priorities along 100 years[5].

A bibliometric revision about breast cancer bone metastasis with 7,381 articles published by different journals from several countries was performed. This systematic analysis provided a thorough overview of the state-of-the art of the research, highlighting the main authors and institutions. The results indicated that the findings are a valuable resource to guide researchers in defining the themes and pathways of the investigation, in addition to contributing for a deep understanding of the evolution and emerging trends[6].

In this context, the objective of this study is to analyze the history of nearly 80 years of RBC, identifying the main researchers and co-authorship networks created along the history of the journal.

METHOD

This study is an applied and descriptive research with quantitative approach supported by a documental procedure performed at RBC digital repository. The method consists in data collection, structuring of the database, construction of the co-authorship network and application of metrics to evaluate the influence and centrality of the authors in the corpus analyzed.

Data collection employed the technique web scraping, an automated method to extract information from websites[7]. To support this phase, a web crawler was developed to full download all the volumes available at RBC portal. The extraction was conducted on December 28, 2024 at 10:10 A.M. to ensure full capture of the content at that moment. The process resulted in data acquisition of all the volumes since Volume 1, Number 1 (1947) up to Volume 70, Number 4 (2024). All the 70 volumes have been reviewed, encompassing 2,445 articles published by 5,777 authors. The supplements were not included in the investigation.

A common problem of this type of study is the presence of inconsistencies of the name spelling of the authors or name changes[8]. The algorithm of Levenshtein[9] was applied to minimize this problem and calculate the distance among names, identifying several authors whose spelling had variations. For example, the name of the author Luiz Claudio Santos Thuler was registered differently as Luiz Cláudio Santos Thuler, Luiz Claudio Thuler, Luiz Claudio S Thuler and L. C. S Thuler. The name INCA was also written in seven different ways. It has been decided to adopt the most common spelling utilized by the author in the process of name standardization in order to quantify accurately the number of publications. The most recent nomenclature was utilized for INCA: National Cancer Institute.

Two sets of different data were created from the identification of the authors for each article: the first contained the individual list of authors and the other, the structure of co-authorships, showing the collaborations

among researchers. A protocol of Social Network Analysis (SNA) previously used in related studies conducted in other datasets was employed[3,10,11].

Eventually, the files containing the list of authors and respective collaborations were imported from the tool Gephi[12], enabling the construction and visualization of the graph of the collaboration network and calculation of the metrics associated with the authors. The concept of graph[13] is critical for SNA or collaboration networks because it provides an abstract representation of a set of elements and their interconnections. In the context of SNA applied to scientific production, the nodes represent the authors and the edges correspond to co-authorship connections.

The main concepts of the theory of graph[3,11,13] utilized in the analysis are:

- Nodes: each author who published a contribution in the journal.
- Edges: co-authorship connections between two authors.
- Graphs: the global structure of interaction between the authors, reflecting co-authorships along the period analyzed.
- Type of graph: it was classified as undirected in the present study because the order of authorship of the studies was not considered.
- Edge weight: frequency of co-authorship between two authors reflecting the intensity of the academic collaboration.

The utilization of this approach allows a structured analysis of the collaborative dynamics of the journal's scientific production. Based on the graphs theory, the following metrics have been calculated for the authors in the present study:

- Number of publications (Pub): the absolute number of the author's publications, regardless of its ordinal position in relation to co-authors.
- Degree: the number of distinct collaborations established by the author indicating the extent of its co-authorship network[14].
- Betweenness centrality (BC): evaluates the author's relevance as a strategic link among different research groups reflecting its role in knowledge dissemination[15].
- PageRank (PR): metrics originally developed by Google to measure the importance of web pages. It was utilized herein to quantify the role of leadership and influence of an author in the co-authorship network[16,17].
- Community (Com): the Louvain method was utilized to detect co-authorship communities that identified cohesive collaboration groups within the network. The number assigned to the community reflects its relative size, being Community 1 the most numerous followed by Community 2 and henceforward[18].

Additionally, the authors affiliation institution was extracted from the professional address registered in their Lattes curricula. Whether this information was unavailable, the institutional affiliation was identified from the data found in the author most recent article.

Review by the Ethics Committee was waived because only secondary, unidentified and free-access data have been utilized in compliance with Directive 510/16[19] of the National Health Council.

RESULTS

Table 1 lists the authors who accumulated ten or more publications by RBC. Two authors with nine publications and degree greater than 30 have also been included. This selection criteria allowed to identify 40 researchers and institutions with high scientific production, accounting for 0.7% of the total of 5,777 authors identified in the volumes available at the journal online repository.

Further to the authors ranked, the following distribution of publications was found: other 13 authors with nine articles, 69 authors between six and eight articles, 317 between three and five publications, 533 with two and 4,805 with only one publication. These data indicate that nearly 83% of the authors published only once in the journal, showing a dispersion pattern of scientific production. The group of the most productive 40 authors and institutions contributed with a total of 650 articles, corresponding to more than 26% of the 2,445 publications available, highlighting the relevance of the names ranked for the history of the journal. The table is organized in descending order according to the metrics of number of publications, degree, betweenness centrality and PageRank, in addition to authorship communities and affiliation institutions of each researcher.

Figure 1 portrays the full network of authors and respective collaborations based on the volumes analyzed. The nine main communities of co-authorship were highlighted in different colors and the authors with more publications are shown by circles of larger dimensions, facilitating the identification of their co-authorship networks.

DISCUSSION

The discussion highlights the three authors with the highest values of each metric evaluated. Given the number of publications in the 70 volumes of RBC, there is a notable contribution of INCA, ranked first with 67 publications and predominantly inserted in special sections as Notes, Conducts of INCA and Norms

Table 1. Ranking of the 40 main authors of *Revista Brasileira de Cancerologia* (1947-2024)

Rank	Author	Pub	Degree	BC	PR	Com	Inst
1	Instituto Nacional de Câncer	67	2	0.000000	0.000178	451	INCA
2	Luiz Claudio Santos Thuler	57	125	0.019602	0.002759	1	INCA
3	Anke Bergmann	44	129	0.027942	0.003261	1	INCA
4	Mario Jorge Sobreira da Silva	23	48	0.004228	0.001413	1	INCA
5	Jacob Kligerman	22	8	0.000378	0.000359	4	INCA
6	Maria Inez Pordeus Gadelha	21	31	0.004425	0.001064	19	INCA
7	Teresa Caldas Camargo	21	15	0.000997	0.000404	5	INCA
8	Revista Brasileira de Cancerologia	19	0	0.000000	0.000027	830	INCA
9	Ronaldo Corrêa Ferreira da Silva	17	8	0.000016	0.000307	25	INCA
10	Livia Costa de Oliveira	16	41	0.005139	0.001072	8	INCA
11	Luiz Eduardo Bermudez	16	21	0.001279	0.000705	21	INCA
12	Jorge Wanderley	15	0	0.000000	0.000027	767	INCA
13	Darcy da Silva Guimarães	14	27	0.007829	0.000959	2	INCA
14	Mário Kroeff	14	2	0.000189	0.000146	2	INCA
15	Eduardo Linhares Riello de Mello	13	41	0.005363	0.000978	3	INCA
16	Fernando Lopes Tavares de Lima	13	22	0.002477	0.000652	5	INCA
17	Márcia Maria Fontão Zago	13	19	0.000031	0.000751	11	USP
18	Jeane Glaucia Tomazelli	13	16	0.001004	0.000645	12	INCA
19	Simone Garruth dos Santos Machado Sampaio	12	29	0.001725	0.000765	8	INCA
20	Letícia Casado	12	26	0.002957	0.000824	1	INCA
21	Eraldo Vidal	12	17	0.000331	0.000604	21	INCA
22	Marcos Fernando de Oliveira Moraes	12	1	0.000000	0.000178	560	INCA
23	Taís Facina	12	0	0.000000	0.000027	855	INCA
24	Simone Yuriko Kameo	11	29	0.000041	0.000859	11	UFS
25	Pedro Luiz Fernandes	11	13	0.000624	0.000482	5	INCA
26	Fermin Roland Schramm	11	9	0.000907	0.000302	19	Fiocruz
27	Egberto Moreira Penido Burnier	11	1	0.000000	0.000178	664	INCA
28	Sima Esther Ferman	10	41	0.006442	0.000985	14	INCA
29	Inês Echenique Mattos	10	37	0.009152	0.000826	2	Fiocruz
30	Raphael Mendonça Guimarães	10	33	0.003198	0.000904	4	Fiocruz
31	Namie Okino Sawada	10	28	0.000085	0.000800	11	USP
32	Andréia Cristina de Melo	10	26	0.004507	0.000587	16	INCA
33	Maria do Socorro Pombo de Oliveira	10	26	0.001255	0.000713	13	INCA
34	Hiram Silveira Lucas	10	19	0.000141	0.000440	6	INCA
35	Maria Beatriz Kneipp Dias	10	17	0.001771	0.000631	12	INCA
36	Onofre Ferreira de Castro	10	15	0.000694	0.000501	31	UFF
37	Adriana Tavares de Moraes Atty	10	12	0.001013	0.000480	12	INCA
38	Serviço Nacional de Câncer	10	0	0.000000	0.000027	846	INCA
39	Erica Alves Nogueira Fabro	9	38	0.000534	0.000800	1	INCA
40	Fernanda Ferreira da Silva Lima	9	33	0.001477	0.000853	14	INCA

Captions: Rank: Position; Pub: Publications; BC: Betweenness Centrality; PR: PageRank; Com: Community; Inst: Institution.
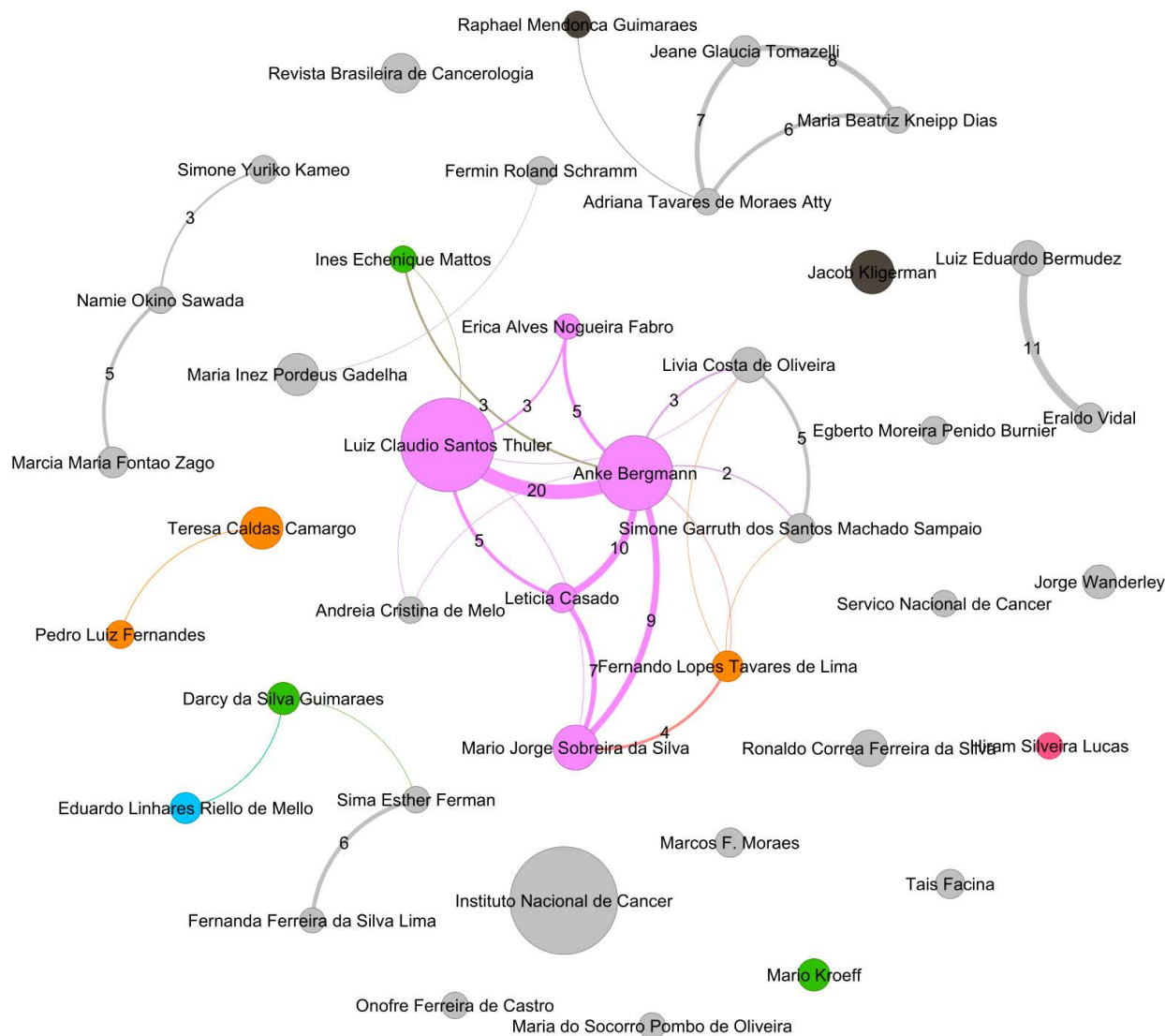
Figure 1. Collaboration network of the 40 authors of the ranking

and Recommendations, clearly demonstrating its key role while disseminating oncology public policies and guidelines. In addition, Luiz Claudio Santos Thuler (rank = 2) and Anke Bergmann (rank = 3) stand out, both connected to the Clinical Epidemiology Program of INCA with 57 and 44 publications, respectively. The expressive productivity of these authors reflects their relevance in the national oncologic research and consolidation of collaborative networks focused to the study of cancer epidemiology.

Metrics of degrees are essential to evaluate the capacity of a researcher to establish scientific collaborations, reflecting their role in knowledge dissemination and construction of academic networks, standing out Anke Bergmann (rank = 3) who published with other 129 different authors, Luiz Claudio Santos Thuler (rank = 2) who published with 125 coauthors and Mario

Jorge Sobreira da Silva (rank = 4) of INCA Educational Coordination with 48 coauthors, emphasizing the number of coauthors in the publications.

Despite being ranked first, INCA rarely publishes in co-authorship, only two coauthors have been registered among all the publications so far, revealing a distinct pattern of scientific production, characterized by institutional publications frequently associated with normalization and dissemination of guidelines in contrast with the collaborative dynamics that predominates among individual researchers.

The metric of betweenness centrality indicates authors who are relevant in communicating among different research groups, integrating several research communities in the context of RBC. It highlights the importance of the following authors: Anke Bergmann (rank = 3), Luiz Claudio Santos Thuler

(rank = 2) and Inês Echenique Mattos (rank = 29), the later connected to "*Fundação Oswaldo Cruz (Fiocruz)*". Although with less publications than the other two authors, Inês Echenique Mattos stands out for establishing connections among different research groups, expanding knowledge dissemination and strengthening the cohesiveness of the scientific network. This outcome emphasizes that the researcher influence on the academic community goes beyond its absolute productivity, it reaches her ability to articulate strategic interactions among different nuclei of scientific production.
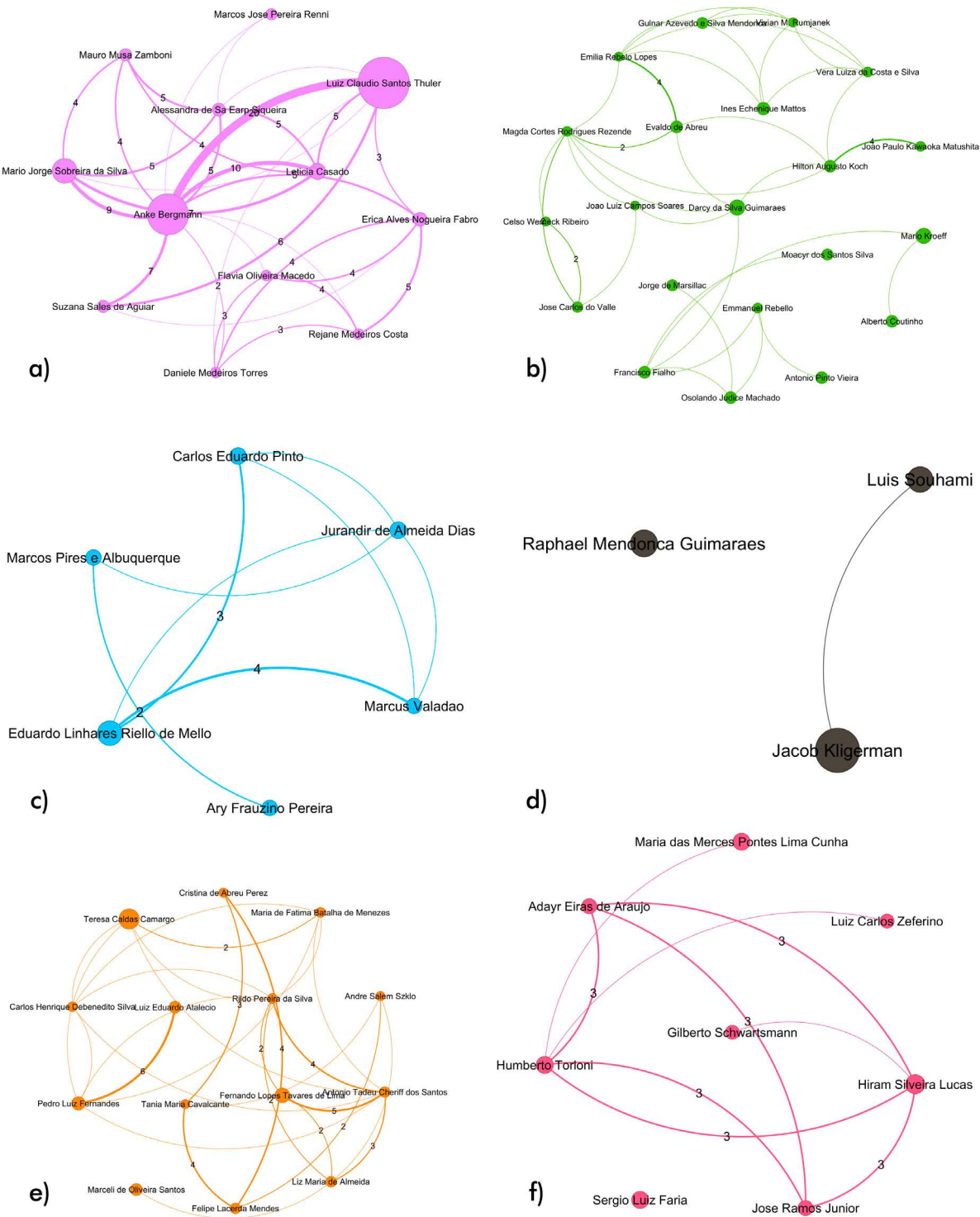

Figure 2. Six larger communities of collaboration containing only the authors with five or more publications

Finally, the metric PageRank reveals the leading authors within RBC network, likely the result of their activities as mentors of new researchers in that area. These authors are Anke Bergmann (rank = 3), Luiz Claudio Santos Thuler (rank = 2) and Mario Jorge Sobreira da Silva (rank = 4).

The co-authorship communities have different sizes and levels of representativeness in the ranking. The largest (Com = 1), highlighted in lilac in Figure 1, is formed by 212 members, five of which are ranked. The second largest (Com = 2), depicted in green, gathers 167 members and is represented by three authors in the ranking. The third largest (Com = 3), identified in blue, counts with 106 members and one representative in the ranking. The fourth community with 100 members and portrayed in dark gray has two members in the ranking. The fifth largest community, also with 100 members, is depicted in orange and has three members in the ranking. Finally, the sixth largest in magenta has 98 members and one representative in the ranking. It is noteworthy that a high number of communities was found for members with few or no collaboration at all, for example, the National Cancer Institute (rank = 1), whose collaboration degree is 2 and is associated with the 451st most numerous community.

Researchers affiliated to INCA predominate in 33 of the 40 positions in the ranking. Contributions generated by the Institute, by the National Health Service and RBC have also been considered as affiliated to INCA. However, other institutions also appear in the ranking as Fiocruz, with three authors, the *Universidade de São Paulo (USP)* with two and two other institutions with only one author: *Universidade Federal Fluminense (UFF)* and *Universidade Federal de Sergipe (UFS)*.

The analysis of the most frequent collaborations portrayed in Figure 1 shows the strong academic interaction between Luiz Claudio Santos Thuler (rank = 2) and Anke Bergmann (rank = 3) who share 20 publications in RBC. In addition to this outstanding partnership, Anke Bergmann has also established significant collaborations with Letícia Casado (rank = 20), totaling ten joint publications and with Mario Jorge Sobreira da Silva (rank = 4), with whom she has published nine articles. Another important connection identified was between Luiz Eduardo Bermudez (rank = 11) and Eraldo Vidal (rank = 21), both associated with INCA who shared 11 collaborations. These collaboration patterns reinforce the relevance of co-authorship networks for oncologic research in Brazil, reflecting the organizational structure and institutional dynamics which foster the scientific production in the area.

Figure 2 presents a detailed analysis of the six largest co-authorship networks consolidated along the history of RBC. As these communities have 100 members in average,

it was decided to highlight only the authors with five or more publications, allowing a more accurate analysis of the nuclei of each community.

The nucleus of the largest co-authorship community as shown in Figure 2a is formed predominantly by authors connected to INCA's Educational Coordination and associate-editors of RBC. Figure 2b shows the second largest community where the main authors are mostly affiliated to INCA Coordination of Cancer Control Programs and/or with the National Campaign of Cancer Fight. The third largest community concentrates researchers of oncologic surgery portrayed in Figure 2c.

The fourth largest community (Figure 2d) has only three authors with five or more publications affiliated to Fiocruz, to INCA's Head and Neck Surgery Service and Radiotherapy Service. The fifth largest community (Figure 2e) is mostly formed by researchers of INCA's Nucleus of Research and Qualitative Studies. The sixth largest community (Figure 2f) is formed by researchers associated with the National Cancer Department of the Ministry of Health.

All the data produced by the present study, including high resolution images of the main co-authorship communities, according to the guidelines of open science, are publicly available at the repository GitHub[20].

CONCLUSION

All the publications of the nearly octogenarian history of RBC (1947-2024) have been analyzed, encompassing 70 volumes, 2,455 articles from 5,777 different researchers and respective co-authors. Based on metrics of number of publications, degree of collaboration, betweenness centrality and PageRank, a ranking with the main 40 authors was constructed in addition to their institutional affiliations. INCA produced the greatest number of contributions to the journal as the analysis revealed. Additionally, Luiz Claudio Santos Thuler and Anke Bergmann stood out as the most influential authors according to all the metrics applied. In addition, nearly 83% of all the authors published only once at the journal. The six largest communities of co-authorship were also presented with their main members.

These results provide a quantitative overview of all the publications up to the seventieth volume of RBC, identifying the main authors, co-authorship communities and institutions that contributed to the journal along its trajectory of nearly 80 years, allowing to recognize patterns of collaboration and scientific production which shaped this history.

However, in despite of the limitations, as missed old records of institutional affiliation that hampered

the trackability of the scientific production in certain periods, the recent utilization of the Open Researcher and Contributor ID (ORCID) by RBC is one of the positive aspects. This decision is a significant advance because contributes for the disambiguation of names and will facilitate considerably future bibliographic analyzes focused to authorship, collaboration and scientific impact.

Thematic and longitudinal analyzes investigating the evolution of the themes addressed by the journal and adhesion to national health priorities is what is suggested for the upcoming years. Also, it would be pertinent to examine the participation of foreign authors and evaluate strategies of internationalization of the RBC.

Finally, it is anticipated that this article contributes to institutional reflections about how to strengthen the continuity of the collaborations, promote broader institutional diversity and foster editorial practices that expand the visibility and impact of the journal.

CONTRIBUTIONS

All the authors contributed substantially to the study design, acquisition, analysis and interpretation of the data, writing and critical review. They approved the final version for publication.

DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interests to declare.

FUNDING SOURCES

None.

REFERENCES

1. Casado L, Dantas A, Bergmann A, et al. Os 75 anos da RBC e o desafio da ciência aberta. Rev Bras Cancerol. 2022;68(4):e-003575.doi: https://doi.org/10.32635/2176-9745.RBC.2022v68n4.3575

2. Manoj Kumar L, George RJ, Anisha PS. Bibliometric analysis for medical research. Indian J Psychol Med. 2022;45(3):277-82. doi: https://doi.org/10.1177/02537176221103617

3. Camargo SS, Grimaldi HC. 65 anos dos Arquivos Catarinenses de Medicina: quem escreveu esta história? Arq Catarin Med. 2023;52(4):14-29. doi: https://orcid.org/0000-0001-8871-3950

4. Pacheco Aispuro G, Rojas Jácome IB, Martínez Zamora CA, et al. Bibliometric analysis: six decades of scientific production from a nationwide institution: Instituto de Seguridad y Servicios Sociales de los Trabajadores del Estado (ISSSTE) from Mexico. Healthcare. 2023;11(12):1725. doi: https://doi.org/10.3390/healthcare11121725

5. Alhajj MN, Al-Sanabani FA, Alkheraif AA, et al. Bibliometric analysis and evaluation of The Journal of Prosthetic Dentistry from 1970 to 2019. J Prosthet Dent. 2023;129(2):323-40. doi: https://doi.org/10.1016/j.prosdent.2021.05.013

6. Li L, Wan N, He Y, et al. A global bibliometric and visualized analysis of the status and trends of bone metastasis in breast cancer research from 2002 to 2021. J Bone Oncol. 2023;42:100500. doi: https://doi.org/10.1016/j.jbo.2023.100500

7. Aydin O. R Web scraping quick start guide: techniques and tools to crawl and scrape data from websites. Birmingham: Packt Publishing; 2018.

8. Suelzer EM, Jackson JL. Measures of impact for journals, articles, and authors. J Gen Intern Med. 2022;37(7):1593-7. doi: https://doi.org/10.1007/s11606-022-07475-8

9. R Documentation [Internet]. Versão 3.6.2. [sem local]: [DataCamp]; [sem ano]. [Acesso em 2024 dez 28]. Disponível em: https://www.rdocumentation.org/packages/utils/versions/3.6.2/topics/adist

10. Isba R, Woolf K, Hanneman R. Social network analysis in medical education. Med Educ. 2017;51(1):81-8. doi: https://doi.org/10.1111/medu.13152

11. Grimaldi HC, Camargo SS. Anais brasileiros de dermatologia: who wrote this century-old history? An Bras Dermatol. 2025;100(2). doi: https://doi.org/10.1016/j.abd.2025.02.001

12. Gephi: The Open Graph Visualization Platform [Internet]. Versão 0.10. [sem local]: Gephi.org; ©2008-2022. [acesso 2024 dez 28]. Disponível em: https://gephi.org/

13. Gross JL, Yellen J. Graph theory and its applications. 3. ed. Boca Raton: Chapman and Hall; CRC; 2023.

14. Fonseca BPF, Sampaio RB, Araújo Fonseca MV, et al. Coauthorship network analysis in health research: method and potential use. Health Res Policy Syst. 2016;14(34):1-10. doi: https://doi.org/10.1186/s12961-016-0104-5

15. Fujita M, Ishido K, Inoue H, et al. Evaluating researchers through betweenness centrality measures of co-author networks from academic literature database: finding gatekeeper researchers in organizational research. In: 2018 IEEE International Conference on Big Data (Big Data); 2018. Seattle: IEEE; 2018. p. 4313-20. doi: https://doi.org/10.1109/BigData.2018.8622311

16. Fiala D, Tutoky G. PageRank-based prediction of award-winning researchers and the impact of citations. J Informetrics. 2017;11(4):1044-68. doi: https://doi.org/10.1016/j.joi.2017.09.008

17. Han L, Zang S, Zhao Y. A method of evaluation index of author's academic influence based on author citation network. In: 14 International Conference on Intelligent Human-Machine Systems and Cybernetics (IHMSC); 2022. Hangzhou; IEEE; 2022. p. 72-5. doi: https://doi.org/10.1109/IHMSC55436.2022.00026

18. Zuin G, Lomeu H, Barros G, et al. A modified Louvain approach for medical community detection using geographic data. In: 36 International Symposium on Computer-Based Medical Systems (CBMS); 2023. L'Aquila: IEEE; 2023. p. 143-8. doi: https://doi.org/10.1109/CBMS58004.2023.00206

19. Conselho Nacional de Saúde (BR). Resolução n° 510, de 7 de abril de 2016. Dispõe sobre as normas aplicáveis a pesquisas em Ciências Humanas e Sociais cujos procedimentos metodológicos envolvam a utilização de dados diretamente obtidos com os participantes ou de informações identificáveis ou que possam acarretar riscos maiores do que os existentes na vida cotidiana, na forma definida nesta Resolução [Internet]. Diário Oficial da União, Brasília, DF. 2016 maio 24 [acesso 2024 dez 7]; Seção 1:44. Disponível em: http://bvsms.saude.gov.br/bvs/saudelegis/cns/2016/res0510_07_04_2016.html

20. Camargo S. RBC25 repository [Internet]. [sem local]: GitHub; [sem dada]. [acesso 2024 dez 7]. Disponível em: https://github.com/Sandrocamargo/publications/tree/main/rbc25