Bibliometric Analysis of the Revista Colombiana de Radiología

Análisis bibliométrico de la Revista Colombiana de Radiología

Summary

Objective: Describe bibliometric indicators of the Revista Colombiana de Radiología from its first issue in 1989 to the last one of 2018. Materials and methods: A database was created in the JabRef reference software with all the publications found. Each reference has information about the authors, volume, number, year of publication and abstract, as well as data such as institutional affiliation of the authors, geographical location, type of publication, type of study and topic. Through a simple statistical analysis, the main variables, production and bibliometric indicators were analyzed, such as the number of publications by number, year, author, institutional affiliation, location, topic and type of publication. For the impact indicators the citations of the entire journal production were searched in different databases and search engines with posterior analysis. Results: In total there were 902 publications. The year with more publications was 2011 and the most frequent type of publication was case report. The areas with the most publications were body image and neuroradiology. The cities in Colombia with the highest number of publications were Bogotá and Medellín. The institutions that published the most were the Hospital Universitario San Ignacio - Pontificia Universidad Javeriana and Fundación Santa Fe de Bogotá - Universidad del Bosque. Conclusions: The Revista Colombiana de Radiología is the leading journal on radiology in the country. This journal has a considerable amount of publications of different types and topics. This bibliometric review can serve as an input to make decisions regarding the future of the journal.

1. Introduction

In 1988 the Revista Colombiana de Radiología (RCR) was created, the official organ of the Colombian Association of Radiology (ACR), for the popularization of science and the publication of scientific works. The first issue of volume 1 was published with the date May-August 1989 (1). Since then, it has been published continuously, to date with more than 85 issues, 500 articles and editorials (2,3). Since 2009, the RCR has been included in the Publindex National Bibliographic Index of Colciencias, in the 2014 classification and in force until 2017 in the C category (4). This Index classifies national scientific journals according to scientific quality, editorial quality, stability and visibility, as well as national and international recognition in four categories in descending order -A1, A2, B and C- (5). The Revista is not in the...
latest classification of the 2016 which runs from 2017 to 2019 (4). At the international level, it is indexed in the Latin American and Caribbean Literature database. Caribbean in Health Sciences (LILACS) Latin American and Caribbean Literature in Health Sciences) and in Regional Online Information System for Scientific Journals of Latin America, the Caribbean, Spain and Portugal (Latindex). The Revista is not indexed in the database of the National Library of United States Medicine (Medline) or the Scopus database of Elsevier. However, the Revista has become the leading scientist journal in diagnostic imaging and radiology publications and related specialities in Colombia (3).

Given the scientific production of the Revista, the advances in the specialty and the old and new gaps in radiology knowledge, it is necessary to have a detailed quantitative and qualitative analysis of the scientific production of the RCR. This is achieved with a bibliometric analysis of all publications throughout the history of the Revista.

In 1969, Pritchard defined the term bibliometry as the application of mathematical and statistical methods dedicated to the quantitative analysis of the scientific activity published by scientific societies and journals, and by countries (6).

In general, bibliometric indicators measure productivity, quantity, quality and connections between authors, groups of authors, journals and publications. There are several types of indicators, which can be divided into those that analyse authors or journals (7). With respect to the valuation of authors some parameters are quantity of publications, number of citations, h-Index, hc-Index g-Index, i-10 (i-n) Index, etc. On the other hand, in order to evaluate the journals there is the impact, Eigenfactor, influence score of an article, the Rank SCImago, among others (7).

The impact factor consists of all the indexed citations of a magazine among the number of articles published by the same magazine in a certain period. By convention, the time measured is 2 or Five years. The usefulness of this last parameter is that it allows to measure the importance of a magazine and compare it with others in the same field. The h-Index is the least malleable, because it is a metric system which quantifies an author’s publication and citation count, given a number that represents the quantity, quality and impact of academic publications (7).

The aim of our study is to describe the statistics, production indicators and bibliometrics of the CCR from its first issue in 1989 to the last issue in 2018. Without a doubt, a bibliometric analysis with the standards mentioned above would be a determining factor for the editors and future authors interested in publishing in the Revista since it would a guide to take into account with regard to the issues that can be addressed, what methodology used and the type of publication to have the greatest impact.

2. Materials and Methods
All the issues of the Revista in the period between 1989 and 2018 were reviewed, both the physical issues in different libraries in Bogotá and the ACR, as well as the issues available in electronic format from 2011 on the RCR website. A database was created in the JabRef reference software with all the publications found. Each reference included variables such as title, authors, volume, number, year of publication, institutional affiliation of the first author, geographic location and type of publication.

The database created with the JabRef software was exported in a format readable by Microsoft Excel 2017, in which by means of a simple statistical analysis the bibliometric production indicators were analyzed. These include publications by number, year, author, institutional affiliation, geographic location, topic and type of publication. The tools found on the website www.vosviewer.com and at www.openheatmap.com were also used for the qualitative visual analysis of the production indicators. For the bibliometric indicators of visibility, the citations about the production of the Revista were searched in databases and search engines such as Medline, Scopus, ISI Web of Science, Google Scholar and Microsoft Academic.

3. Results
A total of 902 references between 1989 and 2018 were included in the analysis. No issue of the Revista was published during 1995. Number 3, volume 8 of 1997, numbers 3 and 4 of volume 13 of 2002, number 1 of volume 15 of 2004, number 4 of volume 18 of 2007 and number 3 of volume 20 of 2009, for a total of 6 issues of the Revista were not available in physical or digital version, which corresponds to a total of 49 references that could not included in the bibliometric analysis performed.

![Figure 1. Distribution of publications by year. Source: Own elaboration.](image-url)
The trend in documentary production shows an upward growth in annualized trend analyses, as shown in Figure 1.

The production analysis on the typology of references shows that the highest percentage of documents are oriented towards the presentation of cases (445), followed by review articles and originals with 25%, as shown in table 1.

With regard to the distribution of publications by year according to typology, Figure 2 shows how case presentations lead the trend, followed by original and review articles in most years.

The distribution of publications by area shows that body image is the most published topic, followed by neuroradiology, chest, pediatric and musculoskeletal radiology and that, among all these, they account for more than 50% of publications, as evidence table 2.

The publication sub-areas by keywords of the different references showed a network of co-occurrences illustrated in figure 3. The main authors of the references showed the following association clusters visualized in figure 4.

The distribution of production by city showed that the main city with 61% of production is Bogotá, followed by Medellín with 20%. Between these two cities, they account for 80% of the Magazine. Table 3 and Figure 5 show the distribution. The The Not Applicable box applies to editorials and editor’s notes.

Figure 2. Distribution of publications by year according to type. Source: Own elaboration.

Figure 3. Network of co-occurrences based on publication sub-areas. The colours represent the number of productions. Source: Own elaboration.
Figure 4. Co-authorship structure in production. Colours indicate the association cluster. Source: Own elaboration.

Figure 5. Production represented on the map of Colombia. Source: Own elaboration.
Table 1. Distribution of article types

| Type                | Number | Percentage (%) |
|---------------------|--------|----------------|
| Presentation of case| 403    | 44.7           |
| Original article    | 127    | 14.1           |
| Revision article    | 101    | 11.2           |
| Editorial           | 65     | 7.2            |
| No data             | 49     | 5.4            |
| Review of theme     | 48     | 5.3            |
| Update              | 31     | 3.4            |
| Editor’s note       | 25     | 2.8            |
| Historical note     | 12     | 1.3            |
| Research article    | 12     | 1.3            |
| Education article   | 10     | 1.1            |
| Miscellaneous       | 7      | 0.8            |
| Resident’s page     | 4      | 0.4            |
| Additional items    | 4      | 0.4            |
| Letter to the Editor| 2      | 0.2            |
| In memoriam         | 1      | 0.1            |
| Opinion column      | 1      | 0.1            |
| Total               | 902    | 100            |

Tabla 2. Distribución de producción por áreas

| Area                | Number | Percentage (%) |
|---------------------|--------|----------------|
| Body image          | 198    | 23.1           |
| Miscellaneous*      | 147    | 17.3           |
| Neuroradiology      | 118    | 13.8           |
| Chest radiology     | 78     | 9.1            |
| Pediatric Radiology | 72     | 8.4            |
| Musculoskeletal     | 58     | 6.8            |
| No data             | 49     | 5.4            |
| Interventionism     | 46     | 5.4            |
| Breast image        | 44     | 5.1            |
| Head and Neck Radiology | 31 | 3.6          |
| OB/GYN Radiology    | 24     | 2.8            |
| Vascular image      | 18     | 2.1            |
| Neurointerventionism| 12     | 1.4            |
| Nuclear medicine    | 7      | 0.8            |
| Total               | 902    | 100            |

*Refers to article types as editorials, editor’s note, historical note, in memoriam, opinion column, letter to the editor, resident’s page, additional items and miscellaneous.

Tabla 3. Producción por ciudad

| City                | Number | Percentage (%) |
|---------------------|--------|----------------|
| Bogotá              | 554    | 61.5           |
| Medellín            | 170    | 18.8           |
| No data             | 48     | 5.4            |

The institutions with the most publications were the Hospital Universitario San Ignacio in association with the Pontifica Universidad Javeriana (11 %), followed by the Fundación Santa Fe de Bogotá in association with the Universidad del Bosque (10 %) and then the Hospital Universitario San Vicente de Paul in association with the Universidad de Antioquia (8 %). Table 4 below shows this data.
4. Discussion

An analysis of the global trend in the number of publications shows a progressive increase in the number of publications, from the first to the current volume, as has occurred in other journals (7, 8) and in most fields of medical research (9-11).

This study shows that historically the presentation of cases is the most frequent type of publication in the CCR. When compared with journals with high visibility in the scientific community and in publications in other developing countries, it is found that the main type of publication is the original research article, as is the case in the New England Journal of Medicine and in journals such as the Journal of Infection and Public Health (7, 8). Despite the fact that original articles are often the second type of publication in the CCR, they represent 14% of the sample evaluated. This result is of great importance taking into account that among the requirements in the main international and national databases one of the factors with the greatest weight corresponds to the number of original articles published. It can be highlighted that in the period 2000 to 2008 review articles and original articles for some years exceeded the number of case presentations published per volume, but subsequently their trend was oscillating. The RCR should stimulate more original research article type publications which could improve its impact factor and be included in databases such as Medline or Scopus.

In terms of the subspecialty field of study, body imaging, neuroradiology and chest radiology were the areas with the highest scientific production, a result similar to that obtained in a bibliometric study in Radiology and in the American Journal of Roentgenology (12). However, in contrast to this study, pediatric radiology articles had greater weight in CCR and interventionist articles are more numerous in the North American publications (13).

Taking into account the key words used in the different articles, the term human beings stands out. Similarly, diagnostic imaging modalities such as magnetic resonance, ultrasonography and computerized tomography were frequently used as key words.

This research allowed us to recognize the leading authors in our country, to evaluate the leading research groups and their co-authorship network. This factor is important because it influences the potential

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**Tabla 4. Producción por institución**

| Institution                           | #   | %   |
|---------------------------------------|-----|-----|
| Hospital Universitario San Ignacio    | 97  | 10,8|
| Fundación Santa Fe de Bogotá          | 91  | 10,1|
| Universidad de Antioquia              | 38  | 4,2 |
| Hospital Universitario San Vicente de Paul | 37  | 4,1 |
| Hospital de San José                  | 31  | 3,4 |
| Universidad CES                       | 30  | 3,3 |
| Instituto Nacional de Cancerología    | 25  | 2,8 |
| Instituto de Alta Tecnología Médica de Antioquia | 24 | 2,7 |
| Universidad Nacional de Colombia      | 23  | 2,5 |
| Hospital Pablo Tobón Uribe           | 20  | 2,2 |
| Hospital Militar Central              | 19  | 2,1 |
| Fundación Cardiopediatría             | 19  | 2,1 |
| Fundación Valle del Líl                | 17  | 1,9 |
| Hospital Universitario de la Samaritana | 16  | 1,8 |
| Clínica Universitaria Colombia        | 15  | 1,7 |
| Centro Avanzado de Diagnóstico Médico (Cedimed) | 14 | 1,6 |
| Fundación Hospital de La Misericordia | 14  | 1,6 |
| Clínica Reina Sofia                   | 11  | 1,2 |
| Universidad del Norte                 | 10  | 1,1 |
| Hospital San Juan de Dios             | 9   | 1,0 |
| Clínica de Marly                      | 9   | 1,0 |
| Clínica del Country                   | 9   | 1,0 |
| Instituto de Ciencias de la Salud (CES) | 7   | 0,8 |
| Clínica Infantil Colsubsidio          | 7   | 0,8 |
| Hospital Universitario del Valle      | 6   | 0,7 |
| Hospital Universitario Mayor Méderi   | 6   | 0,7 |
| Instituto Neurológico de Colombia     | 6   | 0,7 |
| Universidad Pedagógica y Tecnológica de Colombia | 6 | 0,7 |
| Universidad de Cartagena              | 5   | 0,6 |
| Centro de diagnóstico ultrasonográfico e imágenes (Cediel) | 5 | 0,6 |
| Universidad de la Sabana              | 4   | 0,4 |
| Clínica del Niño Jorge Bejarano        | 4   | 0,4 |
| Centro de Diagnóstico Uribe Uribe     | 4   | 0,4 |
| Clínica Carlos Ardila Luile            | 4   | 0,4 |
| Idime                                  | 4   | 0,4 |
| Clínica Colsanitas                    | 3   | 0,3 |
| Clínica Las Américas                  | 3   | 0,3 |
| Clínica Palermo                       | 3   | 0,3 |
| Clínica Foscal                        | 3   | 0,3 |
| Fundación Universitaria Sanitas       | 3   | 0,3 |
| Hospital Central de la Policía Nacional | 3   | 0,3 |

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**Tabla 4. Producción por institución**

| Institution                          | #   | %   |
|--------------------------------------|-----|-----|
| Instituto Materno-Infantil           | 3   | 0,3 |
| Universidad Autónoma de Bucaramanga (UNAB) | 3 | 0,3 |
| Universidad de los Andes             | 3   | 0,3 |
| Pontificia Universidad Católica de Chile | 3  | 0,3 |
| University of North Carolina (UNC)   | 3   | 0,3 |
| Clínica Cardiovascular Santamaria    | 2   | 0,2 |
| Clínica Santa Bibiana                | 2   | 0,2 |
| Clínica Shaio                        | 2   | 0,2 |
| Instituciones con 2 publicaciones     | 10  | 2,2 |
| Instituciones con 1 publicación       | 59  | 6,6 |
| No aplica                            | 89  | 9,9 |
| Sin datos                            | 49  | 5,4 |
| Total                                | 902 | 100%|
Bibliometric Analysis of the Revista Colombiana de Radiología. Moreno M., Reyes P., Vasco V., Aroca A., Herrera N.

References
1. Asociación Colombiana de Radiología. Historia de la radiología en Colombia [Internet]. 2017 [citado 15 jul. 2019]. Disponible en: https://www.acronline.org/Acerca-de-nosotros/Historia-de-la-Radiología
2. Meneses N, Ayala A, Céspedes N. Calidad científica, temáticas e impacto nacional de las publicaciones radiológicas en Colombia (2005-2013). Nova. 2015;13(23).