

Student participation in dental scientific journals in Latin America and the Caribbean.

Participación estudiantil en revistas científicas odontológicas a nivel de América Latina y El Caribe.

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Abstract: The participation of students in scientific articles represents a bibliometric indicator that describes the scientific production of a University. Objective: to describe the scientific production of articles with student presence in dental journals indexed in the SciELO database around Latin America and the Caribbean Region. Method: Bibliometric study that analyzed the scientific articles of 20 dental scientific journals from 2005 to 2017. The articles with student authorship and/or co-authorship were evaluated according to university affiliation, subject of the article, type of article and citation index. Results: Out of a total of 8747 articles, 2.09% (183) presented the participation of dentistry students. About half (50.3%) were from Brazil, and 78.1% corresponded to original articles. The main theme of the studies was related to cariology (12.6%). The journal with the highest student participation was the *Journal of Applied Oral Science* (32.2%) Conclusions: Student scientific production in dental journals in Latin America and the Caribbean is low, with the countries with the greatest participation being Brazil, Colombia and Chile.

Keywords: Publishing; Students; Dental; Latin America; Caribbean Region; Bibliometrics.

Resumen: La participación de estudiantes en los artículos científicos representa un indicador bibliométrico que describe la producción científica estudiantil de una Universidad. Objetivo. Describir la producción científica de los artículos con presencia estudiantil en revistas odontológicas indizadas en la base de datos SciELO a nivel de América Latina y El Caribe. Métodos: Estudio bibliométrico que analizó los artículos científicos de 20 revistas científicas odontológicas desde el año 2005 hasta el 2017. Los artículos con autoría y/o coautoría estudiantil fueron evaluados según su universidad de origen, temática del artículo, tipo de artículo e índice de citación. Resultados: De un total de 8747 artículos, el 2.09% (183) presentaron participación de estudiantes de Odontología. El 50.3% provinieron de Brasil. El 78.1% correspondieron a artículos originales. La principal temática de los estudios se relacionó con cariólogía (12.6%). La revista con mayor participación estudiantil fue el *Journal of Applied Oral Science* (32.2%) Conclusiones: La producción científica estudiantil en las revistas odontológicas de Latinoamérica y El Caribe es baja siendo los países con mayor participación Brasil, Colombia y Chile.

Palabras Clave: Publicaciones de Divulgación Científica; Estudiantes de Odontología; América latina; Región del Caribe; Bibliometría.

INTRODUCTION.

Scientific production (SP) among university students involves mainly working on monographs, theses, scientific papers, participating in study groups and producing student scientific journals.

Student scientific production related to Health Sciences is reported to be low, which contradicts one of the key functions of a university, concerning the concept of knowledge society.¹ In a knowledge-based society, universities become a key element for the generation of such knowledge.²

Student scientific production in journals is generally scarce; with reported frequencies of 11%³ for medical students in Colombia, 10% in Chile⁴ and 10% for dental students in Peru.⁵ Regarding indexed journals, only 4.5% of articles published had the participation of at least one student.^{6,7} This reflects a problem in undergraduate scientific production, mainly due to a negative perception of research.

Learning about students' SP allows researchers to understand the context of scientific activity in higher education. Thus, enabling not only to build up a picture of the state of student scientific production but also to establish or to reorient university policies on research issues.⁸ SP indicators make it possible for a faculty to assess the quantity and quality of publications written by undergraduate students. This knowledge contributes to the stimulation or modification of scientific research processes within faculty in order for indicators of quality to increase, redirecting efforts to the thematic areas and lines of research that have less impact.

Even when students' SP frequencies are not high, there are some who have managed to publish or participate in the authorship of scientific articles. They have demonstrated interest in scientific research and production activities and have become a seedbed of future researchers within the university postgraduate programs.

Consequently, the aim of the present study was to describe university students' SP in dental scientific journals indexed in the SciELO database in Latin America and the Caribbean. The bibliometric indicators obtained will facilitate assessing the efforts of each country and universities to improve student scientific activities.

MATERIALS AND METHODS.

The study used a descriptive, bibliometric design that analyzed the scientific articles of 20 odontostomatology journals in the SciELO database. The selected scientific journals encompassed the following countries: Brazil, Peru, Cuba, Costa Rica, Colombia, Argentina, Chile and Uruguay. (Table 1)

It included indexed journals in the SciELO database that allow undergraduate students' participation with or without current indexing validity and that present an active online platform where articles are available to be downloaded in PDF or HTML format.

In each scientific journal, scientific articles published from 2005 to 2017 (December) were analyzed, including articles such as: editorials, letters to the editor, original articles and review articles. The participation of at least one student within the authorship of each downloaded article was sought. To do this, the terms "estudiante", "alumno", "discente", "Sociedad Científica Estudiantil", "interno", "no graduado", "student" and "undergraduate" were searched. These terms allowed for the identification of articles with student participation.

After identifying the articles with at least one student within the authorship, the following variables were registered: language of publication (Spanish, English or Portuguese), type of article (editorial, letter to the editor, original article or review article), number of students per article, impact factor of the article (evaluated according to the citation index registered in the Google Scholar database), type of authorship (registered as "author" when the student was listed first, and "co-author" when the name was in a different place), affiliation (the university was registered according to the affiliation of the students), the university's country of origin and specialization area of the article (Basic Sciences, Orthodontics and Maxillary Orthopedics, Cariology, Endodontics, Oral and Maxillofacial Surgery, Implant Dentistry, Periodontics, Oral Rehabilitation, Imaging, Pediatric Dentistry, Forensic Odontology, Dental Education and Oral Medicine).

Each article was classified under one of the above-mentioned categories according to the key words used and the line of research of the main author.⁹ In those articles that included more than one area, the main

topic was selected by going through the global content of the article if necessary. The rest of the articles were classified according to their title and abstract. Articles that did not fit in any category were considered as non-classifiable and were left out of the study. The study did not require approval from an ethics committee, since the material used were published articles publicly available.

Collected data were tabulated in MS Excel 2003 (Microsoft Corporation, Redmond, USA) and analyzed with the statistical package SPSS 23. To analyze each category variable, frequency tables and distribution graphs were used. Numeric variables were analyzed through measures of central tendency and dispersion. Data were estimated by confidence interval at 95%.

Figure 1. Percentage of scientific production by country in Latin America and the Caribbean.

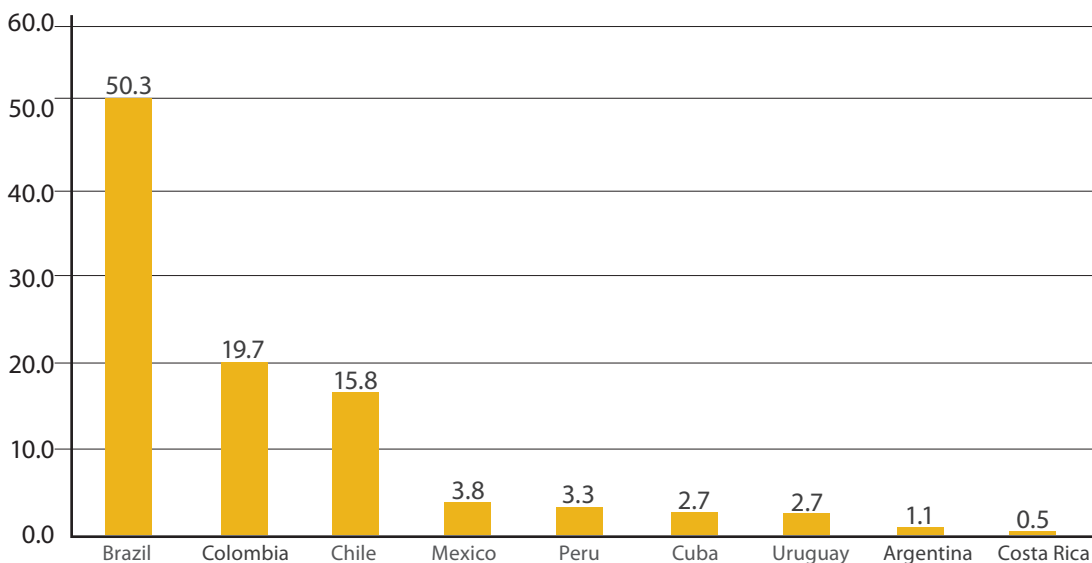
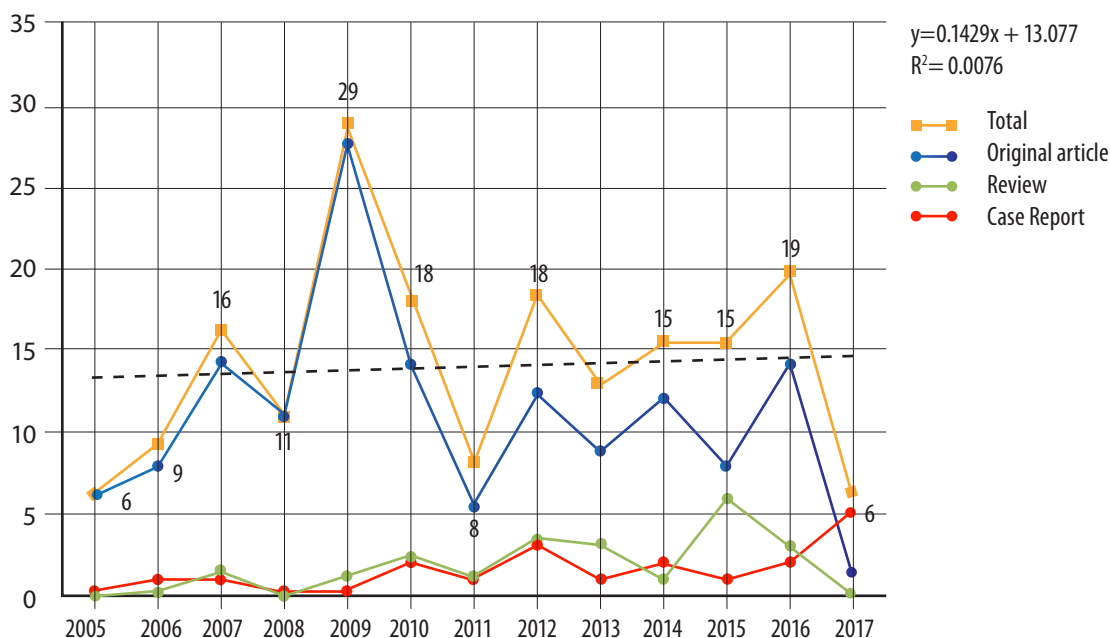
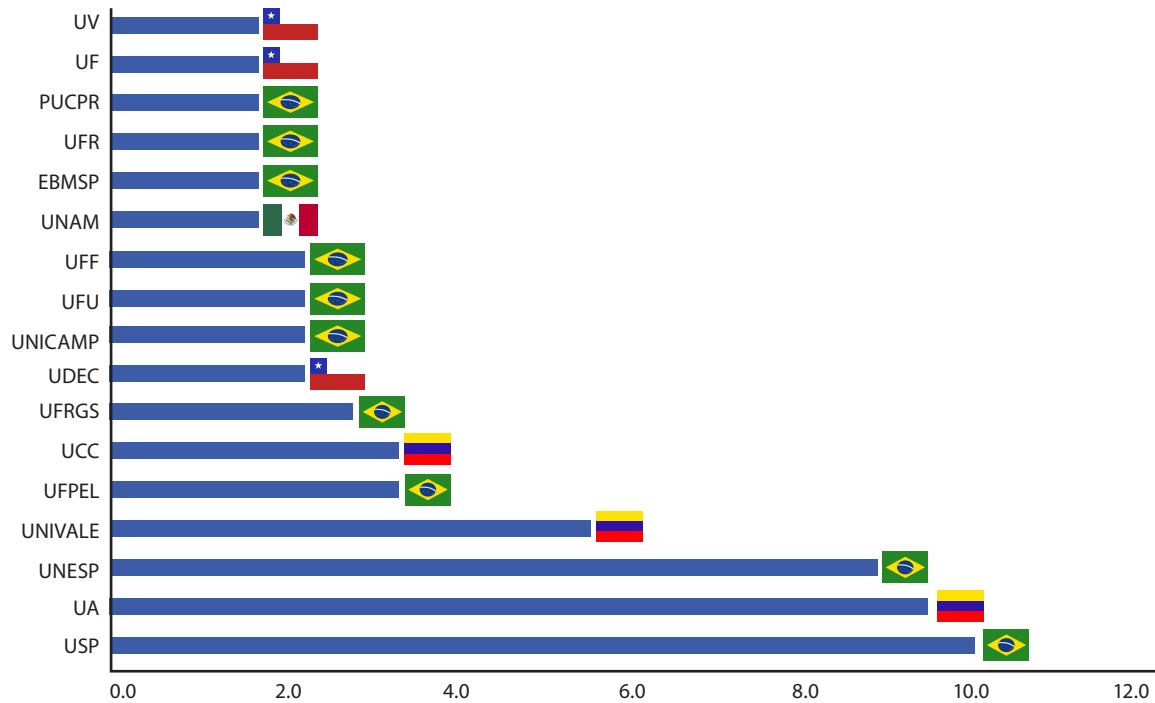


Figure 2. Student scientific production from 2005 to 2017.



The dotted line represents trend and prediction equation.

Figure 3. Universities with higher student participation in the analyzed articles.



USP: Universidad de Sao Paulo. UA: Universidad de Antioquia. UNESP: Universidad Estatal Paulista. UNIVALLE: Universidad del Valle. UFPEL: Universidad Federal de Pelotas. UCC: Universidad Cooperativa de Colombia. UFRGS: Universidade Federal do Rio Grande do Sul. UDEC: Universidad de Concepción. UNICAMP: Universidad Estatal Campinas. UFU: Universidad Federal de Uberlandia. UFF: Universidad Federal Fluminense. UNAM: Universidad Nacional Autónoma de México. EBMSP: Escola Bahiana de Medicina e Saúde Pública. UFP: Universidad Federal de Pará. PUCPR: Pontificia Universidad Católica de Paraná. UFRO: Universidad de la Frontera. UV: Universidad de Valparaíso.

Table 1. Scientific journals in the SciELO database included in the study.

| No. | Country | Journals |
|-----|------------|--|
| 1. | Brazil | Journal of Applied Oral Science |
| 2. | | Revista Gaucha de Odontologia* |
| 3. | | Brazilian Journal of Oral Sciences |
| 4. | | Brazilian Oral Research* |
| 5. | | Revista Dental Press de Ortodontia e Ortopedia facial |
| 6. | | Revista Odonto Ciencia* |
| 7. | | Brazilian Dental Journal* |
| 8. | | Revista de Odontología de la UNESP |
| 9. | México | Revista Odontológica Mexicana |
| 10. | Chile | Revista Clínica de Periodoncia, Implantología y Rehabilitación Oral |
| 11. | | International Journal of Odontostomatology |
| 12. | Uruguay | Odontoestomatología |
| 13. | Costa Rica | Odontología Vital |
| 14. | | International Journal of Dental Sciences* |
| 15. | Colombia | Revista de la Universidad Industrial de Santander. |
| 16. | | Revista de la Facultad de Odontología de la Universidad de Antioquia |
| 17. | | CES Odontología |
| 18. | Argentina | Acta Odontológica Latinoamericana |
| 19. | Perú | Revista Estomatológica Peruana |
| 20. | Cuba | Revista Cubana de Estomatología |

*: Journals excluded from the analysis for not having student presence between 2005 and 2017.

Table 2. Specialization area of the articles with student participation.

| Specialization Area | Type of article | | | Total |
|------------------------------|------------------|-----------------|----------------------|-----------------|
| | Original Article | Review Article | Clinical Case Report | |
| Cariology | 21(11.5%) | 1(0.5%) | 1(0.5%) | 23(12.6%) |
| Orthodontics and Orthopedics | 19(10.4) | 1(0.5) | 1(0.5) | 21(11.5) |
| Oral Medicine | 11(6) | 6(3.3) | 4(2.2) | 21(11.5) |
| Basic Sciences | 18(9.8) | 2(1.1) | 0 | 20(10.9) |
| Pediatric Dentistry | 15(8.2) | 2(1.1) | 1(0.5) | 18(9.8) |
| Periodontics | 9(4.9) | 1(0.5) | 5(2.7) | 15(8.2) |
| Oral Rehabilitation | 12(6.6) | 1(0.5) | 2(1.1) | 15(8.2) |
| Endodontics | 13(7.1) | 0 | 0 | 13(7.1) |
| OMF Surgery | 4(2.2) | 2(1.1) | 4(2.2) | 10(5.5) |
| Oral Imaging | 9(4.9) | 1(0.5) | 0 | 10(5.5) |
| Other | 6(3.3) | 1(0.5) | 0 | 7(3.8) |
| Dental Education | 2(1.1) | 3(1.6) | 1(0.5) | 6(3.3) |
| Implant Dentistry | 3(1.6) | 0 | 0 | 3(1.6) |
| Forensic Odontology | 1(0.5) | 0 | 0 | 1(0.5) |
| Total | 143(78.1) | 21(11.5) | 19(10.4) | 183(100) |

Table 3. Scientific Journals with student participation in Latin America and the Caribbean.

| Journal | Type of article | | | Total |
|--|------------------|-----------------|-----------------------|-----------------|
| | Original Article | Review Article | Clinical Cases Report | |
| Journal of Applied Oral Science | 54(29.5%) | 3(1.6%) | 2(1.1%) | 59(32.2%) |
| Revista de la Facultad de Odontología de la Universidad de Antioquia | 20(10.9) | 0 | 3(1.6) | 23(12.6) |
| International Journal of Odontostomatology | 13(7.1) | 8(4.4) | 2(1.1) | 23(12.6) |
| Brazilian Oral Research | 18(9.8) | 0 | 0 | 18(9.8) |
| Revista Dental Press de Ortodontia e Ortopedia facial | 13(7.1) | 1(0.5) | 0 | 14(7.7) |
| CES Odontología | 9(4.9) | 3(1.6) | 0 | 12(6.6) |
| Revista Odontológica Mexicana | 4(2.2) | 0 | 3(1.6) | 7(3.8) |
| Revista Clínica de Periodoncia, Implantología y Rehabilitación Oral | 3(1.6) | 0 | 3(1.6) | 6(3.3) |
| Revista Estomatológica Peruana | 2(1.1) | 2(1.1) | 2(1.1) | 6(3.3) |
| Revista Cubana de Estomatología | 2(1.1) | 2(1.1) | 1(0.5) | 5(2.7) |
| Odontoestomatología | 2(1.1) | 1(0.5) | 2(1.1) | 5(2.7) |
| Acta Odontológica Latinoamericana | 2(1.1) | 0 | 0 | 2(1.1) |
| Revista de la Universidad Industrial de Santander | 1(0.5) | 0 | 0 | 1(0.5) |
| Odontología Vital | 0 | 0 | 1(0.5) | 1(0.5) |
| Brazilian Journal of Oral Sciences | 0 | 1(0.5) | 0 | 1(0.5) |
| Total | 143(78.1) | 21(11.5) | 19(10.4) | 183(100) |

RESULTS.

In the study, 20 scientific journals were analyzed. However, 5 journals did not have student participation and were excluded from the analysis. (Table 1) In total, 8747 scientific articles were analyzed, of which 183 (CI95%: 2.09±0.002) had undergraduate student

participation within the authorship. Out of the 183, 78.1% were original articles, 11.5% review articles and 10.4% reports of clinical cases. Editorials and letters to the editor were not found.

Out of the articles, 92 (50.3%) were from Brazil, 36 (19.7%) from Colombia and 29 (15.8%) from Chile.

These were the countries with most student participation in the analyzed sample. (Figure 1)

The largest number of articles with student participation were published in 2009 and the smallest amount in 2005 and 2017. An irregular tendency in the number of the published articles was observed over the years. Cariology was the area in which most student participation was observed with 12.6% of the articles, followed by Orthodontics and Maxillary Orthopedics (11.5%). (Table 2) Seventy-five universities were identified when analyzing by students' university of origin. The Universidad de São Paulo, Universidad de Antioquia and Universidad Estadual de São Paulo were the institutions with the highest student participation in the analyzed articles (Figure 3).

Regarding the number of articles, 32.2% were found in the *Journal of Applied Oral Science* (Brazil), 12.6% in the *Revista de la Facultad de Odontología de la Universidad de Antioquia* (Colombia) and the same percentage in the *International Journal of Odontostomatology* (Chile). (Table 3)

Fifty-three articles (29%) had a student as first author, whereas in 130 articles (71%) students were co-authors. The minimum number of students per articles was one, while the maximum was seven. The average of citations per article was 11.57 ± 14.6 ; ranging from a minimum of zero and a maximum of 69.

DISCUSSION.

The evaluation of scientific production is an indicator of scientific and technological development within a community, nation and professions. At a global level, the main leaders of scientific production are the United States, China and Great Britain. In Latin America, Brazil, Mexico and Argentina are at the top of the ranking. Scientific production in Latin America regarding odontology is low, with Brazil leading the group.^{10,11}

SP within a university is performed mainly by professors and research groups. Student participation is limited to assistance and collaboration. This situation is reflected in the low undergraduate students' SP of articles published in scientific journals. In a study held by Martínez,¹⁴ frequencies of 4%,¹² 11%¹³ and 10% concerning SP were reported. Researchers have even reported deficient scientific production (zero values).¹⁵

Svider *et al.*,¹⁶ reported that 9.2% of lead authors were

students in one medical journal and at least 19.2% of articles included at least one student; This study also encompassed the SciELO database. The frequency of SP in Latin America and the Caribbean was 2%, which can be considered low and could reflect the limitation to motivate students' participation in the process of scientific production in the university system.

According to UNESCO, a University is a place where scientific research is conducted, and knowledge transference is enhanced.^{17,18} Most student participation in published articles was "student co-authorship", an indicator that in some studies the lead author, a mentor, commonly plays a key role in encouraging student participation. Taype-Rondán *et al.*,¹⁹ point out that an appropriate interaction between students, teachers and reviewers favors student development. The implication is that the "leading role" of an mentor or professor that publishes scientific articles can stimulate students to carry on publishing their scientific studies.

Most student SP has been found in Brazilian, Colombian and Chilean journals. That kind of participation is praiseworthy. Nevertheless, this model of the student being researcher and producer of knowledge guided by the scientific method has not organically permeated the curricular design of health sciences programs in many countries. It is required to search for the causes of this situation and orienting actions towards the improvement of student scientific activity in higher medical education.²⁰ This situation, combined with poor instruction in article writing and publishing,¹¹ explains the low scientific production that affects the biomedical area in Latin America.

The trend found in the present study indicates that student SP will remain irregular and more prevalent in original articles. There is a need for a better understanding of why dental students are not so attracted to publishing or participating in the production of articles and research projects.²¹ Some students reported the existence of limitations that hamper the production of scientific research, such as the lack of updating of collections and databases in libraries and lack technological platforms. These two factors may directly affect the variety and types of sources consulted by thesis students at the time of conducting their research.²²

The main limitation of this study refers to the fact that many journals do not register the academic degree of the authors within the filiation. The absence of these data affects bibliometric studies, because it makes it difficult to determine whether the author is an undergraduate, a graduate student or a professional. As the SciELO database contains a small number of indexed dental journals, it is recommended to expand the search for articles in other databases as well as in non-indexed journals.

CONCLUSION.

Student scientific production in dental journals in Latin America and the Caribbean is low, with Brazil,

Colombia and Chile being the countries with the greatest participation. Most articles are original articles, in the area of cariology and in most cases, students are presented as co-authors.

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