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Level of evidence and geographic origin of articles published in Chilean dental journals.

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Abstract: The aim of this study is to determine the geographic origin and level of evidence (LE) of articles published in Chilean dental journals during 2012. The target population for the bibliometric study was articles published in exclusively-scientific Chilean dental journals. These variables were analyzed: journal, area, language, country, region, design, scenario, and LE. A total of 120 articles were published in four journals: *International Journal of Odontostomatology* (IJOS=59), *Revista Clínica de Periodoncia, Implantología y Rehabilitación Oral* (PIRO=28), *Journal of Oral Research* (JOR=18), and *Revista Dental de Chile* (RDC=15). From the total, 80.83% were published in Spanish and 70% had a Chilean affiliation. Most publications corresponded to areas of pathology (21) others (20) and prosthodontics (20). None of the articles was Level 1 Evidence, 6.49% was 2b, 14.29% was 2c, 63.64% was 4, and 15.58% was 5. Chilean dental journals mainly publish articles of domestic origin and low LE.

Keywords: "Bibliometrics" [MeSH], "Evidence-based Dentistry" [MeSH], "Organizational affiliation" [MeSH], "Chile" [MeSH].

Nivel de evidencia y origen geográfico de los artículos publicados en revistas odontológicas chilenas.

Resumen: El objetivo de esta investigación es determinar el origen y nivel de evidencia (NE) de los artículos publicados en las revistas odontológicas chilenas durante el año 2012. Estudio bibliométrico, la población objetivo fueron todos los artículos publicados en revistas dentales chilenas de orientación exclusivamente científica. Se analizaron variables: Revista, Área, Idioma, País, Región, Diseño, Escenario y NE. Se hallaron 120 artículos publicados en cuatro revistas: *International Journal of Odontostomatology* (IJOS = 59), *Revista Clínica de Periodoncia, Implantología y Rehabilitación Oral* (PIRO = 28), *Journal of Oral Research* (JOR = 18) y *Revista Dental de Chile* (RDC = 15). El 80.83% de los artículos fue publicado en español y el 70% corresponden a autores chilenos. La mayor cantidad de publicaciones correspondieron a las áreas de Patología (21), Otra (20) y Prosthodontia (20). No se hallaron artículos de NE 1, 6.49% fue 2b, 14.29% fue 2c, 63.64% fue 4 y 15.58% fue 5. Las revistas odontológicas chilenas publican principalmente artículos de origen nacional y con un bajo NE. **Palabras clave:** Bibliometría, Odontología basada en la evidencia, Afiliación Organizacional, Chile.

Introduction.

In recent years, several papers aimed at describing dental scientific productivity in Chile have been published. They include general descriptions of ISI articles (1) correlated with the increasing number of dental schools (2), specially some particular ones (3); all they using the Science Citation Index Expanded database from Web of Science (commonly known as ISI). Furthermore, participation in IADR worldwide meetings⁴ has also been assessed lately. In general terms, these studies reveal that Chilean productivity lags far behind the main scientific powers and is concentrated only in a few universities; actually, only in a small number of researchers.^{1,4}

However, these bibliometric evaluations represent only a quantitative assessment of the scientific endeavor, ignoring the essential qualitative aspect. In this regard, Aravena *et al.*⁵ recently published an analysis on the level of evidence and methodological quality of articles regarding oral and maxillofacial surgery by Chilean

authors. According to his results, they exhibit low levels of evidence and quality which are mainly associated with anecdotal research, such as clinical cases, or analytical studies, with some methodological and report deficiencies.

Besides researchers publishing in ISI journals, other instances of expression and materialization for the Chilean dental scientific community, such as peer reviewed journals, must be considered. Recently, this has taken on greater importance since two dental journals were indexed in SciELO Chile⁶. Also, there is a lack of published bibliometric evaluations in order to qualitatively and quantitatively assess the role these two journals indexed in SciELO are playing in dental research publication so far.

The objective of this study is to determine the geographic origin and level of evidence of articles published in Chilean dental journals during 2012.

Materials and methods.

A bibliometric study was performed. It was focused

on determining the level of evidence of articles issued in Chilean dental journals, which are exclusively scientific orientated and indexed in Latindex, notwithstanding their inclusion in other databases.

The study considered two stages: first, the total production of the journals was described. Second, only those articles with feasible level of evidence allocation were analyzed.

Inclusion criteria were defined: electronically available articles published in 2012. Exclusion criteria for the second stage of the study included: editorials, letters to the editor, in vitro studies, bibliometric research, and ex vivo or of any nature which were impossible to assign a level of evidence.

The search for the collection of journals indexed in SciELO was performed directly on its website and on the institutional ones of those that were not. Each article was reviewed in its original HTML or PDF version; "in press" or "early publication" was not considered. The analysis of the articles was performed by a single evaluator who had previous experience in these types of studies⁴.

Bibliometric source variables were analyzed: journal, area (specialty), language, and country and region (only Chilean publications). In all cases, the first author's primary affiliation and only those specialties listed by the American Dental Association were considered. Implantology and "others", for those which could not be classified in the previous categories, were added.

The second group of variables regarding level of evidence included: design, scenario and level of evidence. These last two were according to the Oxford Center for Evidence- Based Medicine ranking (OCEBM)⁷.

Data were tabulated in a spreadsheet MS Excel 2003 (Microsoft Corporation, Redmond, USA) and analyzed with the statistical package STATA 10/SE (STATA Corporation, Texas, USA). Descriptive statistics, displayed in distribution tables for each of the analyzed variables, was generated. Statistically significant differences were assessed with chi-square test, with a significance level of $p < 0.05$.

Results.

For the year 2012, a total of 120 scientific articles were found in four dental journals: International Journal of Odontostomatology (IJOS=59), Revista Clinica de Periodoncia, Implantologia y Rehabilitacion Oral (PIRO=28), Journal of Oral Research (JOR=18) and Revista Dental de Chile (RDC=15). From the total, 80.83% was in Spanish and the remaining 19.17% in English. Articles by authors with national affiliation corresponded to 70%. Table 1 displays distribution by country of origin and regions of Chile. It shows IJOS

Country	Articles (N)	Articles (%)
Brazil	17	14.17
Colombia	4	3.33
India	4	3.33
Argentina	3	2.50
Mexico	2	1.67
Morocco	2	1.67
Germany	1	0.83
Perú	1	0.83
Puerto Rico	1	0.83
Spain	1	0.83
Chile	84	70.00
Santiago	28	23.33
Concepción	25	20.83
Temuco	15	12.50
Valdivia	8	6.67
Valparaíso	4	3.33
Talca	4	3.33
Total	120	100.00

Table 1. Geographical origin distribution of articles published in Chilean dental journals, 2012.

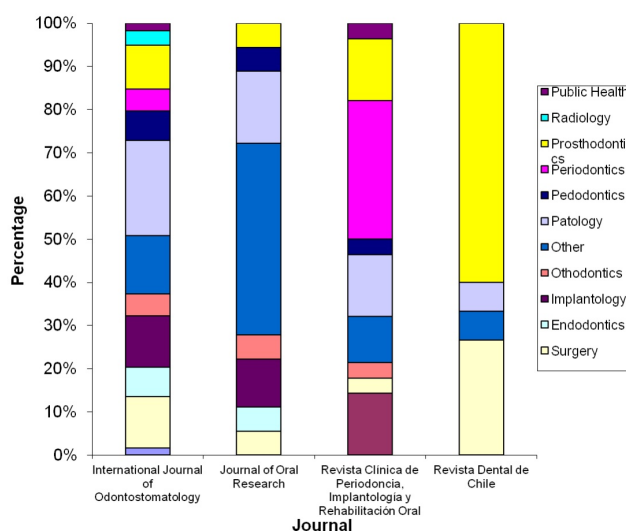


Figure 1. Percentage distribution of articles according to area and journal, 2012.

Journal	Level of Evidence (%)			
	2b	2c	4	5
International Journal of Odontostomatology	8.89	17.78	57.78	15.56
Journal of Oral Research	0.00	11.11	77.78	11.11
Revista Clínica de Periodoncia, Implantología y Rehabilitación Oral	0.00	14.29	64.29	21.43
Revista Dental de Chile	11.11	0.00	77.78	11.11
General	6.49	14.29	63.64	15.58

Table 2. Distribution of level of evidence according to journal, 2012.

Origin	Level of Evidence (%)			
	2b	2c	4	5
International	6.90	13.79	68.97	10.34
National	6.25	14.58	60.42	18.75
Santiago	0.00	12.50	62.50	25.00
Concepción	13.33	13.33	53.33	20.00
Temuco	10.00	10.00	60.00	20.00
Valdivia	0.00	0.00	100.00	0.00
Valparaiso	0.00	50.00	50.00	0.00
Talca	0.00	0.00	100.00	0.00
General	6.49	14.29	63.64	15.58

Table 3. Level of evidence percentage distribution according to geographical origin.

had the highest percentage of foreign articles (49.15%), followed by PIRO (14.29%), JOR (11.11%), and finally, RDC (6.67%).

Most publications corresponded to pathology (21), prosthodontics (20) and others (20). Figure 1 presents distribution by area and journal.

A total of 43 articles were excluded from the analysis. Most of them were in vitro (17), reviews (6) and other studies (4). Distribution of scenario and level of evidence is shown as OCEBM ranking in Figure 2.

Table 2 shows distribution of the level of evidence according to journal. Statistically significant differences ($p=0.810$) were not found.

Table 3 shows distribution by source. No significant differences were found between domestic and foreign items ($p=0.790$), nor by region for nationally affiliated articles ($p=0.844$).

Discussion.

Results confirm the diagnosis regarding the production of dental publications with a low level of evidence. This has been demonstrated worldwide in specialties such as maxillofacial surgery⁸⁻¹⁰ and ratified in Chile for the same specialty by Aravena *et al.*⁵. As cited by Lau and Samman⁸, there are no level 1 publications in Chilean journals and only one out of five is level 2. However, research in this area is scarce, so it cannot be estimated with certainty what the situation is in other specialties or journals included in more selective indexes such as Thomson-Reuters (generally known as ISI). Nevertheless, a major proportion of high-level of evidence studies can be anticipated, measured indirectly by the relationship between methodological quality and ISI impact factor, which has been described in the surgical field¹¹. In any case, it should be ascertained in future studies.

By analyzing distribution of LE according to different variables, it is seen neither magazine nor country or region of origin are associated. In very general terms, it is concluded that the low-LE is a transverse issue and that more responsibility is probably not at the stage of journal peer review and publication but in the previous phase of research generation in our region. It is not the purpose of this paper to analyze the causes of this phenomenon, but it is important to mention some measures to address this problem. Aravena *et al.*⁵ summarized them in advanced human capital training, use of guidelines, more demanding academic requirements for professors and students, and together with the necessary, but not essential, resource allocation.

An interesting aspect of the low-LE is that foreign publications, representing one third of the total, do not provide a higher LE for Chilean magazines. This somehow discredits the relevance and requirements made for internationalization, contradicting the evidence in favor of international cooperation for conducting dental research. However, this is clearly an opinion that requires further investigation in this area to be confirmed¹².

Despite this, it is important to note that one of the magazines, IJOS, has the largest number and proportion of foreign articles without affecting LE when compared with others. This would grant IJOS a comparative advantage, allowing it to increase its selectivity towards higher LE studies and maintain a similar amount of publications as other journals. This opens the discussion concerning the quality versus quantity dilemma.

Concerning research topics, a similar distribution to Chilean participation in IADR global meetings is observed⁴. The highlighted specialties are periodontics, prosthodontics and pathology. However, it differs in the area of public health where Chilean dentistry journals publish a lower proportion of research.

Some limitations of this study should be taken into consideration. Firstly, only the year 2012 was analyzed because in some cases, it was difficult to access articles from other dates. In any respect, it is difficult to believe that the situation would have been different by including a broader interval analysis. Secondly, only four magazines, less than those in Latindex¹³, were evaluated. This was because only those four have a clear scientific orientation publishing only research papers, while

others play magazine roles for their scientific societies and universities. Thirdly, the level of evidence is just one method to recognize quality of research, which can be supplemented with other tools, for instance, the methodological quality^{5, 11}.

It is concluded that Chilean dental journals mainly publish domestic and low-LE articles. Research is still required in this area not only to diagnose, but also propose and evaluate measures to face this problem.

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