Scientific production in Endodontics at the Meeting of the Brazilian Society for Dental Research: bibliometric analysis from 2010 to 2018

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ABSTRACT

The annual meeting of the Brazilian Society of Dental Research (*Sociedade Brasileira de Pesquisa Odontológica* - SBPqO) is an important event of dental scientific production in the country. The evaluation of the profile of the presented research can identify characteristics and the evolution of Endodontics research. Through retrospective bibliometric analysis, meeting supplements from 2010 to 2018 were investigated to determine the scientific production in the area of Endodontics in SBPqO. The supplements were accessed online, via the institution's website, and the abstracts were analyzed according to region of origin: North, Northeast, Midwest, South and Southeast; and thematic categories: Therapeutics, Anatomy, Biosafety, Microbiology, Cytology/Genetics, Diagnosis, Epidemiology, Materials, Techniques, Instruments, Trauma and Clinical Outcome. Of the 22,310 abstracts published in the period, 2516 were selected from the Endodontics area. In 2010 there was the largest number of published abstracts (n = 375). Prevailed the research focused on the analysis of materials (27.1%) and techniques (20.6%). The Southeast and South regions presented summary frequencies with values of 65.5% and 17.2%, respectively, while the lowest participation was from the North region (2.5%). The frequency of Endodontic research published in SBPqO supplement remained balanced over the analyzed period, with emphasis on objectives focused on materials and techniques, and higher productivity in the Southeast and South.

Descriptors: Research. Dentistry. Endodontics.

1 INTRODUCTION

Research is a central and indispensable component for improving health and reducing inequities[1], especially in developing countries, such as Brazil[2].

Worldwide investments in health scientific research amount to billions of dollars, with the largest shares allocated for developed countries[3,4]. The United States, the United Kingdom, and Japan are the leading countries in scientific and technological production[5]. There are entities like the Global Forum for Health Research that advocate for greater research investment by richer countries in less favorable countries[4].

Notwithstanding the scarceness of the country's financial resources for health research and development[6], there is an advance in terms of dental productivity from the 21st century[7,8]. Data from the National Council for Scientific and Technological Development (*Conselho Nacional de Desenvolvimento Científico e Tecnológico - CNPq*)[9] show that in the Health Sciences area accounted for 5.7% of Brazilian research in 2000. During the turn of the century, the lines of research in Dentistry totaled 892, and it increased to 2,029[9] in 2010.

Jara-Tracchia *et al.*[10], in a study on the publication rate - ratio between abstracts contained in the International Association for Dental Research (IADR) annals and subsequent publications of full papers - from Latin American countries, Brazil is almost eight times ahead of Argentina, with a ratio of one publication for every three surveys presented.

The National Curriculum Guidelines for Dentistry courses include a provision regarding the incentive given for the development of research. Article 5 states that "participate in scientific research on diseases and health be prepared to apply research results for health care"[11]

Scientific events aid researchers in the composition of their curricula. These events also serve as a way of disseminating what is produced, increase educational institutions' visibility, and act as a parameter to verify acceptance among peers[12]. Worth noting is the Annual Meeting of SBPqO. Founded in 1983, it is the Brazilian division of IADR (www.sbpqo.org.br). In this event, there are presentations of researches covering several specialties. Studies are being devoted to the investigation of what are being published in the event's supplements, with emphasis on Collective Oral Health[13], Ethics and Bioethics[14], active teaching methodologies[15], Pediatric Dentistry[16], qualitative analysis of what is produced,[17] and even geographical comparisons[16,18].

In the field of Endodontics, little is known about its scientific production at SBPqO meetings. This scarcity motivated this research by evaluating the summaries found in supplements published between 2010 and 2018.

2 METHODOLOGY

With retrospective observational design, this bibliometric analysis was performed through access to supplements from the Brazilian Oral Research journal, in which the annals of SBPqO Annual Meetings, available at http://www.sbpqo.org.br, are published.

Two trained and calibrated researchers (kappa = 0.89) collected data. Initially, only the summaries of the research referring to the panels of the beginner, aspirant, and effective categories from 2010 to 2018, except 2012, were selected, since the IADR meeting took place this year. This led to a universe of 22,310 published abstracts. Titles were then read to identify endodontic-themed abstracts. In cases where there was doubt, a third evaluator was consulted for the tiebreaker. A total of 2,516

abstracts were read in full. Review summaries were excluded since only primary research, and intracanal pins studies were in line with the Prosthesis and/or Dental Materials areas. Primary teeth studies were more aligned with Pediatric Dentistry despite endodontic involvement.

The texts were cataloged in Excel® spreadsheets according to the thematic categories related to the terms found in the Health Sciences Descriptors (Descritores em Ciências da Saúde - DeCS - www.decs.bvs.br) according to frame 1. Classification according to Brazilian geographic regions (North, Northeast, Midwest, South and Southeast) was considered the institution of origin mentioned in the abstract.

Frame 1. Thematic categories used in the study

Systemic medication: anti-inflammatory, anesthetic - dosage, complications, adverse effects, pain control - preoperative and postoperative.
Anatomy: methods, tomography, ultrasound, microtomography, microscopy, magnetic resonance imaging, diaphanization, analog radiography, digital radiography.
Biosafety: methods, sterilization, disinfection.
Microbiology.
Cytology / histology / genetics: apical sealing, repair, angiogenesis / revascularization, stem cells, tissue engineering, polymorphism.
Diagnosis: comparison between diagnostic methods for pulp and periapical changes, oximetry, analog radiography, digital radiography, thermography, pulp sensitivity test.
Epidemiology: prevalence and incidence studies, epidemiological surveys.
Endodontic materials: evaluation of physicochemical properties, intracanal medication, irrigating solutions, endodontic cements, temporary restorers, obturator materials, surgical materials, internal whiteners.
Endodontic techniques: preparation techniques, odontometry, methods, irrigation techniques, obturation techniques, surgical techniques, internal whitening techniques, retreatment, laser therapy, photodynamic therapy.
Endodontic instruments: file and appliance performance in general.
Trauma: means of conservation, treatment.
Clinical outcome: infections, accidents, and complications.

Through the SPSS software, version 21.0, the univariate analysis was performed in order to know the data distribution. Subsequently, the Chi-square test was applied to search for possible associations ($\alpha = 5\%$) among the regions, the years, and the thematic categories of the research.

3 RESULTS

2,516 out of the 22,310 papers obtained in the analyzed period were from Endodontics area. These were selected to compose the sample, and identified according to the period under analysis, as shown in figure 1.

375 abstracts identified in the 2010 supplements were from the Endodontics area, totaling 13.4% which was the highest percentage (table 1).

Regarding the thematic categories addressed, there was greater emphasis on the analysis of the properties of materials (27.1%), research techniques (20.6%) and instruments (13.0%). Trivial percentages of studies on clinical outcome (1.0%), biosecurity (1.2%) and therapy (1.7%) were arrived at (table 2).

In the evaluation of the national distribution of the selected abstracts, the region of the country with the highest research concentration rates was the Southeast (65.5%), followed by the South (17.2%) and Midwest (6.8%) (table 3).

In the association analysis, a significant difference was found between region and year ($p = 0.006$), but not between region and thematic category ($p = 0.149$). Midwest region's participation in 2010 differed from the others except the Northeast. In 2015, this region presented different values from the Southeast region. In the other years, this behavior did not occur (table 4).

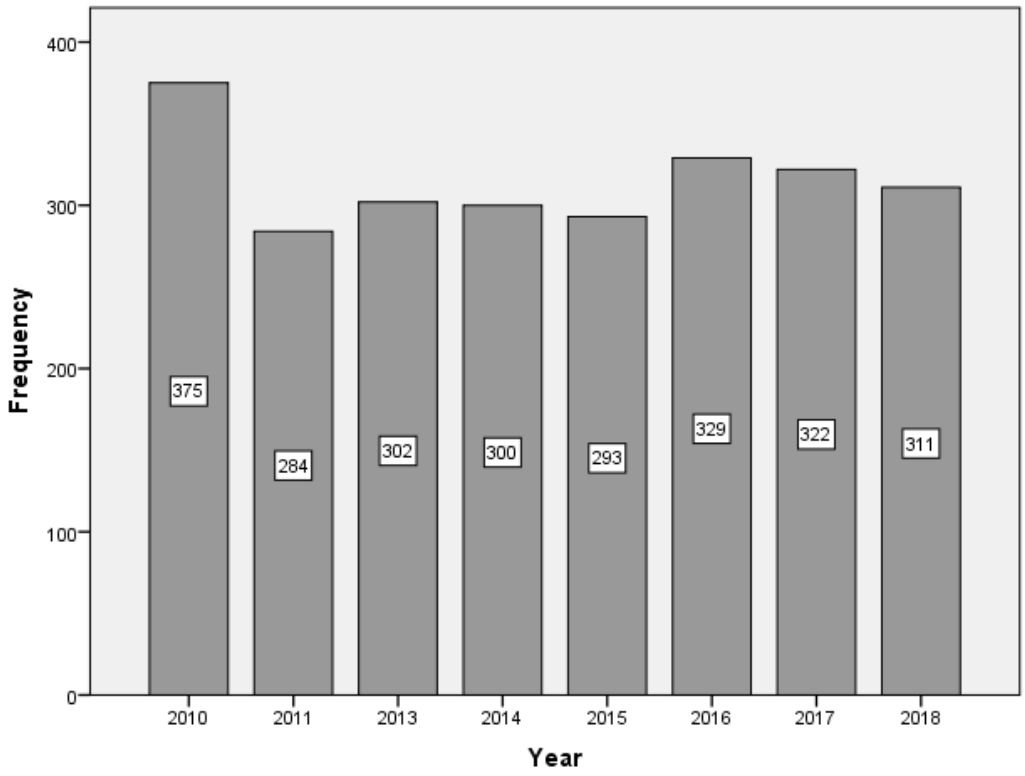

Figure 1. Distribution of endodontic abstracts published in SBPqO meeting supplements from 2010 to 2018 (n = 2516)

Table 1. Distribution of abstracts identified in SBPqO meeting supplements that met the inclusion criteria from 2010 to 2018

Year	Total	Endodontics n (%)
2010	2801	375 (13.4)
2011	2546	284 (11.1)
2013	2505	302 (12.1)
2014	2490	300 (12.1)
2015	2598	293 (11.3)
2016	3044	329 (10.8)
2017	3125	322 (12.8)
2018	3201	311 (12.4)

Table 2. Distribution of the thematic categories of endodontic abstracts published in SBPqO Meeting Proceedings from 2010 to 2018

Thematic category	n (%)
Systemic medication	43 (1.7)
Anatomy	154 (6.1)
Biosafety	30 (1.2)
Microbiology	236 (9.4)
Citology / histology / genetics	261 (10.4)
Diagnosis	120 (4.8)
Epidemiology	62 (2.5)
Endodontic materials	682 (27.1)
Endodontic techniques	518 (20.6)
Endodontic instruments	328 (13.0)
Trauma	57 (2.3)
Clinical outcome	25 (1.0)
Total	**2516 (100.0)**

Table 3. Distribution of Endodontic abstracts published in SBPqO Meeting Proceedings by Region from 2010 to 2018

Region	n (%)
Southeast	1648 (65.5)
South	433 (17.2)
Midwest	170 (6.8)
Northeast	201 (8.0)
North	64 (2.5)
Total	**2516 (100.0)**

Table 4. Results of year-by-region association of abstracts published in SBPqO Meeting Proceedings from 2010 to 2018

Year	Region					Total
	Southeast	South	Midwest	Northeast	North	
2010	263a	61a	10b	37a	4a, b	375
	16.0%	14.1%	5.9%	18.4%	6.3%	14.9%
2011	188a	51a	16a	21a	8a	284
	11.4%	11.8%	9.4%	10.4%	12.5%	11.3%
2013	189a	58a	31a	18a	6a	302
	11.5%	13.4%	18.2%	9.0%	9.4%	12.0%
2014	194a	52a	26a	21a	7a	300
	11.8%	12.0%	15.3%	10.4%	10.9%	11.9%
2015	179a	53a, b	32b	21a, b	8a, b	293
	10.9%	12.2%	18.8%	10.4%	12.5%	11.6%
2016	207a	64a	16a	28a	14a	329
	12.6%	14.8%	9.4%	13.9%	21.9%	13.1%
2017	214a	45a	19a	35a	9a	322
	13.0%	10.4%	11.2%	17.4%	14.1%	12.8%
2018	214a	49a	20a	20a	8a	311
	13.0%	11.3%	11.8%	10.0%	12.5%	12.4%

Note: Different letters indicate statistically significant difference. Chi-square test ($p < 0.05$)

4 DISCUSSION

Health research is fundamental to a country's development[1,2]. In Brazil, the provision of resources for this purpose is discreet. This distances the country from reaching higher levels already achieved by several countries as evidenced by their high citation rates[19]. The Brazilian field of dentistry has been experiencing an increase in scientific productivity from the 21st century onwards[7-9]. This has encouraged several national assessments[13,17-23].

Outputs of scientific productivity can be promoted through their dissemination during scientific events[12]. One of these events is the SBPqO Annual Meeting, which is mentioned because of its importance and representativeness as an entity that broadly disseminates the research developed. Based on data provided by SBPqO, several studies have evaluated the Brazilian publication profile in other areas using the same bibliometric method employed in this research[13-16]. Others assessed the areas of knowledge of CNPq; region and state of the country; institution; type of study and funding received[18,24]; and funding and analysis categories (biological, material, technical and / or social studies)[17].

One of the areas with significant participation in this Meeting is Endodontics. During the evaluated period a balance was identified in terms of the number of abstracts published in the consulted supplements. Dias *et al*.[13] also reported a significant percentage of work in this area from 2001 to 2006.

Endodontics is strongly based on clinical aspects. It is somewhat dependent on research on materials and techniques, as evidenced by the results of the present research that when analyzing the thematic categories, the largest volume of studies involved the use of materials, techniques, and instruments. In the present study, only primary endodontic studies were included.

This possibly influenced the high concentration of drawings with emphasis on techniques, as observed in previous studies[13,17,18,24].

Although the present research was aimed exclusively at the area of Endodontics, a higher concentration of published abstracts from the Southeast and South regions of the country was found. These findings corroborate similar purpose studies of SBPqO data analysis, whose values for the first region mentioned reach 70.1%[16] and 76.4%[18]. This unequal distribution of scientific production in Brazil indicates that the most socioeconomically developed regions have better production indicators[18]. It is noted that this occurs in parallel with the greater development and number of educational centers in these same regions, in addition to the higher concentration of postgraduate programs which increase scientific productivity[19]. Values indicated by the CNPq censuses also substantiate this distribution[22].

The scientific productivity distribution of Brazil can be said to have been affirmed by ranking produced by the Center for Science and Technology Studies (CWTS) at the University of Leiden in the Netherlands. CWTS indicated in a ranking from 2006 to 2019 that Brazil's five best educational institutions are public, four of which are from the Southeast and one from the South. This classification considers the academic research produced by the institutions based on publications in the Web of Science database (https: // www. leidenranking.com/ranking/2019/list).

It should be emphasized that the Brazilian scientific-academic success must be based on a research agenda[25], as international organizations propose[1], as long as it is mainly supported by governmental incentive[7]. Many of the sources of this type of funding for dental research presented at SBPqO come from public agencies such as CNPq[18,24]. Internationally, declining investments in so-called dental institutions could negatively affect research[26], so special attention should be given to reductions and cuts in public budgets for science and technology. Research funding is considered fundamental for the preservation of the dental profession[27].

The results described here allowed us to portray the profile of recent scientific research in Endodontics at a relevant national scientific event, which in a way reflects the period of great technological advancement that the specialty has undergone in recent times.

Finally, as limitations of the present study, we can consider the non-extraction of data related to research funding sources and classification of public or private educational institutions, which could have allowed the expansion of other comparisons, which may be object of future studies.

5 CONCLUSION

Based on the present bibliometric analysis it can be stated that research in Endodontics has an emphasis on materials and techniques. During the period evaluated, most studies presented in this area were developed in the Southeast and South.

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RESUMO

Pesquisa científica em Endodontia apresentada na Reunião Anual da Sociedade Brasileira de Pesquisa Odontológica: análise bibliométrica de 2010 a 2018

A Reunião anual da Sociedade Brasileira de Pesquisa Odontológica (SBPqO) é um importante evento da produção científica odontológica no país. A avaliação do perfil dos trabalhos apresentados pode identificar características e a evolução da pesquisa em Endodontia. Por meio desta análise

bibliométrica retrospectiva buscou-se investigar a produção científica na área de Endodontia nos suplementos das reuniões da SBPqO, de 2010 a 2018. Os suplementos foram acessados *on-line*, no sítio *web* da instituição, e os resumos foram analisados de acordo com a região de origem: Norte, Nordeste, Centro-Oeste, Sul e Sudeste; e categorias temáticas: Terapêutica, Anatomia, Biossegurança, Microbiologia, Citologia/ Genética, Diagnóstico, Epidemiologia, Materiais, Técnicas, Instrumentos, Traumatismo e Desfecho clínico. Dos 22.310 resumos publicados no período, foram selecionados 2516 da área de Endodontia. No ano de 2010 houve o maior número de resumos publicados (n=375). Prevaleceram as pesquisas voltadas à análise de materiais (27,1%) e de técnicas (20,6%). As regiões Sudeste e Sul apresentaram frequências de resumos com valores de 65,5% e 17,2%, respectivamente, enquanto a menor participação foi da região Norte (2,5%). A frequência de pesquisas de Endodontia publicadas nos resumos dos suplementos da SBPqO se manteve equilibrada ao longo do período analisado, com destaque para objetivos focados em materiais e técnicas e maior produtividade das regiões Sudeste e Sul.

Descritores: Pesquisa. Odontologia. Endodontia.

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