

SCIENTIFIC METHODS IN DENTAL RESEARCH: CRITICAL ANALYSIS OF THE LITERATURE AND EXPERT OPINION ON THE MATTER

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To the Editor,

Recently, dentistry topics have been well reported in the scientific literature (1), however, the general impact and presence of dentistry within top-class scientific journals is still weak. Typically, the scientific dental community is quite heterogeneous: in fact, it involves dentists, academics, scientists and students. On the contrary, the number of dental journals is scarce, as is their impact factor.

Researchers certainly know that the Impact Factor (IF) is one of the most influential indicators: recently, a worldwide debated topic was related to the aim of describing the overall quality of a scientific journal and whether the IF unquestionably defines the scientific reputation of a journal within the scientific community.

Currently, the highest impact factor reported in the ISI-category of ‘Dentistry’ has been attributed to the journal “Periodontology 2000” with IF 6.22. On the other hand, in the ISI-category of ‘Oncology’, the IF reaches higher values: for example, the journal “CA Cancer J Clin” reaches an IF 244.59. In this context, do we really assume that oncology-related topics are

somewhat 30 times more interesting than dentistry?

Of course, different disciplines may have different ways to communicate, publish and share their topics; moreover, high-impact journals are more likely to be cited by several scientists in different fields. The interest in dentistry-related publications strongly depends on the quality of the data obtained, and on the potential clinical applications of such data; in this light, dentistry urges to link its topics to biosciences, to general medicine, and even to basic research (2).

In the present study, we searched the key word “dentistry” on PubMed, to assess whether the selected articles were related to dental sciences or to different matters.

MATERIALS AND METHODS

Searching strategy

We analyzed the impact of the key word “dentistry” in the title, in the abstract, and in the main text of articles published in top-journals previously selected: the main aim was to evaluate whether the topic discussed in these articles was relevant or not to dental fields. Searching for

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the key word “dentistry” and “journal name” [journal] in PubMed, we analyzed all the items reported. Eight highly-impacted journals were considered in our research, as they represent a balanced selection of high-impact journals and those most recognized worldwide. We first debated to include top dental journals such as “Journal of Dental Research”, “Dental Materials” and so on; however, we felt that those journals are certainly committed and well focused on dentistry. Thus, we decided only to investigate the following journals:

- JADA (Journal of the American Dental Association) ISSN: 0002-8177
- PLOS One (Public Library of Science) ISSN: 1932-6203
- Nature ISSN: 1476-4687
- Science ISSN: 1095-9203
- JAMA (Journal Of The American Medical Association) ISSN: 0002-9955
- PLOS Medicine ISSN: 1549-1277
- JCI (Journal Clinical Investigation) ISSN: 0021-9738
- Scientific Reports ISSN:2045-2322

The time frame of the selected articles ranged from 1973 to 2018.

The main criterium for selecting a scientific journal was its impact factor, and its overall impact to the scientific community: the 2017 Journal Citation Report (JCR) total Impact Factor of the journals selected in this investigation was 164.9.

RESULTS

The analysis of the 8 selected journals showed that the key word “Dentistry” was reported in 13,473

articles, however, only 767 articles reported such key word in the title and only 232 articles reported it in the abstract (Table I).

With the aim of understanding the overall impact of the dental sciences in the journal “Nature”, we searched for the key word “dentistry” AND “Nature” [journal] on PubMed: 101 items were reported. Surprisingly, after a brief reading of the titles and the abstracts related to these 101 selected articles, we found that none of them really focused on dentistry until 1986.

The same research was carried out for the journal “JAMA” which reported the word “dentistry” in 225 published articles, only 5 of which reported such word in the title.

Our further analyses showed that the highest percentage of articles reporting the key word “Dentistry” belonged to the journal “JADA”, undoubtedly one of the most important journals typically focused on dentistry; JADA reported 9,562 articles and 743 titles containing the key word “Dentistry”.

The data obtained from the journal “PLOS One” were particularly suggestive about the substantiation of our starting hypothesis; in fact, we found 2,365 articles, but only six titles contained the key word “Dentistry”.

We found extremely interesting the analysis made on the key word “dentistry” AND “Science” [journal] in PubMed: in fact, only 118 items were reported, and after a brief reading of the titles and the abstracts of these 118 selected articles, we deduced that none of them were really related to dentistry

Table I. The key word “Dentistry” has been reported in the main text, in the title or in the abstract of scientific publications of the journals selected for this research.

| Journals | Dentistry - main text | Dentistry - title | Dentistry - abstract |
|---------------------------|-----------------------|-------------------|----------------------|
| JADA | 9562 | 743 | 218 |
| PLOS ONE | 2365 | 6 | 12 |
| NATURE | 101 | 1 | 1 |
| SCIENCE | 118 | 12 | 0 |
| JAMA | 225 | 5 | 1 |
| PLOS MEDICINE | 35 | 0 | 0 |
| JCI | 145 | 0 | 0 |
| SCIENTIFIC REPORTS | 922 | 0 | 0 |

until the year 2012. In this case, the articles were mainly focused on molecular biology or forensic medicine, even to paleontology, but relatively few were closely related to dental fields.

Finally, no article and no title containing the key word “Dentistry” was found in the journals “JCI”, “PLOS Medicine” and “Scientific Reports”.

After this preliminary screening, we investigated the presence of the key word “Dentistry” in the abstract of those articles reporting the key word “Dentistry” in their title. Following a careful analysis, we found 232 abstracts containing the key

word “Dentistry”, although we must report that some articles reported no available abstract on PubMed and PMC.

In a further step, we critically read the whole text of articles containing the key word “Dentistry” both in the title and in the abstract. The results clearly show that the highest percentage of these articles was focused on “new concepts in dentistry” and “innovative techniques and materials”, highlighting how the research and development (R&D) themes are undoubtedly the most appreciated by editors and readers.

Table II. Topics summarized in macro-categories.

| | JADA | PLOS ONE | NATURE | SCIENCE | JAMA | PLOS MED | JCI | SCI REP |
|--|------|-------------|--------|---------|------|----------|-----|------------|
| Evolution of dentistry | 25 | / | / | / | / | / | / | / |
| Women in dentistry | 6 | / | / | / | / | / | / | / |
| New concepts in dentistry | 123 | / | 1 | 9 | 2 | / | / | / |
| Guidelines in dentistry | 29 | 2 | / | / | / | / | / | / |
| Preventive and community dentistry | 47 | / | / | / | / | / | / | / |
| Oral diseases | 12 | / | / | / | 2 | / | / | / |
| Dentistry and systemic diseases | 39 | / | / | / | / | / | / | / |
| Innovative techniques and materials | 91 | / | / | 1 | 1 | / | / | / |
| Use of drugs in dentistry | 20 | / | / | / | / | / | / | / |
| Non-invasive dentistry | 5 | / | / | / | / | / | / | / |
| Aesthetic dentistry | 21 | / | / | / | / | / | / | / |
| International protocols | 52 | 1 | / | / | / | / | / | / |
| Adverse reactions and technical errors in dentistry | 7 | 2 | / | / | / | / | / | / |
| Dietology and dentistry | 4 | / | / | / | / | / | / | / |
| Anesthesiology | 12 | / | / | / | / | / | / | / |
| Clinical dentistry | 30 | / | / | / | / | / | / | / |
| Pediatric dentistry | 5 | 1 | / | / | / | / | / | / |
| Dentistry and laws | 14 | / | / | / | / | / | / | / |
| Ethics in dental research | 7 | / | / | / | / | / | / | / |
| Evolution of dental specialties | 37 | / | / | 1 | / | / | / | / |
| Public and private dentistry | 8 | / | / | / | / | / | / | / |
| Dentistry and social media | 29 | / | / | / | / | / | / | / |

Moderate interest has also been reported for articles dealing with the “evolution of dentistry”: these articles typically emphasize the history of dentistry and on the state of the art of the traditional techniques and technologies in the dental field.

Although we found that the topics related to “general dentistry” were mainly reported in JADA articles, we have tried to summarize the other topics most represented published in the selected journals. Table II shows the different topics distributed within the selected articles (Table II).

DISCUSSION

In our article, we have tried to understand whether dentistry-related topics are substantially represented in the top journals. For this purpose, we selected only articles reporting the key word “dentistry”. After a careful analysis, we assessed that these articles mainly focused on matters belonging to the categories of “Evolution of dentistry and general concepts” and “Innovative techniques and materials”. Such articles reported some interesting concepts related to innovation in dentistry, and the way in which dentistry has improved over past years thanks to the discovery of new biomaterials and novel techniques.

Few articles were focused on clinical research in dentistry, while several articles were focused on severe infections, bacteria superinfections, novel allergens, and acute respiratory diseases in dentistry, reporting authoritative considerations on air pollution and substances that daily pollute water and air.

The less-impacting articles were based on the use of 3D CAD/CAM-based digital technologies in implant dentistry (3).

We noticed that decayed teeth still represent a social and healthcare issue in many countries (4). We believe, on the other hand, that several impacting topics could be of interest for the general population, such as several diseases still frequently affecting oral health (5), or the use of stem cells for the growing branch of regenerative dentistry (6, 7). Of course, we do understand that dentistry is of interest mainly to dentists or to emerging dental journals (8), but the real challenge is to make dentistry attractive also with such closely related topics.

In our work, we have analyzed the prevalence and the overall coherence of the key word “dentistry” in some top-class journals. Nowadays, clinical dentistry is mainly focused on topics of general interest, such as bone scaffolds or osteonecrosis after oral surgery or the impact of syndromes on clinical management (9, 10). The interest of patients, on the other hand, is currently on aesthetic dentistry (11) and stem cells for biomedical applications (12).

A novel and safe evidence-based practice in dentistry would be the main and most reliable way for ensuring the scientific growth of this medical science in the near future. After our study, we provocatorily launched an overall alert on the scientific quality of dental research to the dental scientific community. In fact, despite dentistry being the subject for several research topics, it is possible that “dentistry-related” topics are still not interesting enough to reach a wider number of readers and to attract more attention from top-journals. Our opinion is that the truth is between the two: although the most debated topics in dentistry are still heavily related to clinical aspects, sometimes “exceptionally” overestimated and overestimated, it is equally true that some novel concepts, such as “regenerative dentistry” or “nanodentistry” have merits. Of course, we hope to see a general improvement of this trend in the near future.

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