



Top 50 covid and oral health articles: A 2021 altmetric analysis

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ABSTRACT

Objectives: There is a world of information at our disposal, and it is increasingly difficult to transform this dull amount of data into knowledge. How to be constantly actualized? This study aims to create an altmetric list of the top 50 articles related to COVID-19 and oral health.

Methods: Research of terms COVID-19 and oral health was done using Dimensions app. Results were ranked in altmetric citations and analyzed through Microsoft Excel. Some tables and graphics were created. Graphical illustration of keywords was created using VOSviewer.

Results: Some interesting facts can be seen, like growing interest in dental aerosols, perspectives, and virucidal activity of some mouthwashes.

Conclusions: Altmetric analysis is a helpful manner to scientific updates, supplementing bibliometric analysis. A terrific manner to see trends. The scientific community goes to great lengths to solve problems with dental aerosols, particularly to reduce contamination. Some adjustments to dental office and the use of barriers are recommended.

1. Introduction

One straightforward way of humanity's evolution is through science. Scientific article contributions can be measured by, among others, the number of citations. When researchers publish an outstanding scientific paper that could change or improve concepts, a long line of other researchers could use this paper as a basis for another research, all in benefit of science and, of course, humanity at all.

COVID-19 pandemics have caused significant changes in the way of life. Information transmission that already fast became necessary at previously unimaginable speeds and scientific publications needed to keep up with these changes.

A bibliometric analysis is a field of library sciences and information technology that applies methods, statistical and mathematical, to analyze and build indicators to inspect books, articles, and other publications. Altmetric analysis is alternative metrics, web-based, as an essential data source, besides scientific article publishing.¹ Altmetrics has been gaining space in science using statistics from social media.² In summary, altmetrics is a speedy manner to get informed with valuable information.

This study aims to discuss Altmetrics on COVID-19 and relation with oral health. To create a list of top 50 articles about this relation and the

importance and relevance of reading these papers.

2. Material and methods

A bibliographic search was done through the Dimensions app on March 26, 2021, using strategy (covid AND (dental OR "oral health")) in the "Title and Abstract" option, resulting in 1325 articles. Articles were ordered in altmetric citations (Altmetric LLP, London, UK), and data were tabled and analyzed by Microsoft Office Excel 2010 using descriptive statistics and charts. Articles with no relation to COVID-19 were excluded manually, as so articles about oral or dental health. Any article from the same study center and the same subject was excluded. All preprints were excluded too.

Data were analyzed to output the most relevant and up-to-date scientific papers about COVID-19 and oral health according to the Altmetric Attention Score (AAS). AAS extracts data from some web-based sources like Twitter, Facebook, or Mendeley readers. For each different indicator, AAS uses a different weight (Table 1 and Fig. 1).

The top 50 articles are based on the Altmetric score. For each article included, we extracted: Altmetric Attention Scores, number of scientific citations, journal title, country of origin (corresponding author), and subject categories. In some articles, the corresponding author is a private

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Table 1
Altmetric attention score weight.

Data resources	Weight
News	8
Blog	5
Policy document (per source)	3
Patent	
Wikipedia	
Peer review (Publons, PubPeer)	1
Weibo	
Google +	
F1000	
Open Syllabus	
Linkedin	0,5
Twitter	0,25
Facebook	
Reddit	
Pinterest	
Q&A	
YouTube	

Source: <https://help.altmetric.com/support/solutions/articles/6000233311-how-is-the-altmetric-attention-score-calculated>

practice, no relation to any institution; in these cases, the country selected is from the corresponding author. Involved institutions were not related because a massive number of articles are multicenter studies. Some tables and graphs were created in order to facilitate data visualization through Microsoft Office Excel.

VOS-Viewer free software (Leiden University, The Netherlands) was used to create a graphical illustration of keywords and authors, a visual form of bibliometric analysis. A Pearson correlation test was performed in Microsoft Excel to evaluate the statistical relationship between AAS and number of citations.

3. Results

We have found 1325 articles relating to COVID-19 and oral health. This number can be different; at PubMed, on the same date, exact bibliographic search has achieved 1676 articles. The list of top 50 COVID-19 and oral health with the highest AAS is provided in Table 2.

Mean AAS was 65,56, ranging from 27 to 2149. Periodics are very

widespread, but the British Dental Journal, JDR Clinical & Translational Research, and Journal of Dental Research have four articles (8%).

USA (16) and UK (13) are the countries with the most top articles. The other papers are widespread from Asia: China (6), Malaysia (2), Hong Kong, India, Qatar (1); Americas: Canada (3), Brazil and Peru (1); Europe: Italy, Netherlands, Russia, and Spain (1); Africa: Mauritius (1). Only Oceania has no representative.

Articles were divided into the following subject categories: dental aerosol, perspectives, virucidal activity, dental office adaptations, modes of transmission, oral manifestations, periodontal disease, children care, essentials about oral health care, dentists contamination, diagnostic criteria, medication, protective barriers.

The most frequent keywords in this list of top 50 most-mentioned were “humans”, “covid-19”, “sars-cov-2”, “pandemics” and “pneumonia, viral”. In Fig. 2 is possible to see a graphical representation of keywords in a network visualization made through free software VOSviewer (Leiden University, Netherlands). VOSviewer is a tool helpful to construct and visualize bibliometric networks. The size of the circles is

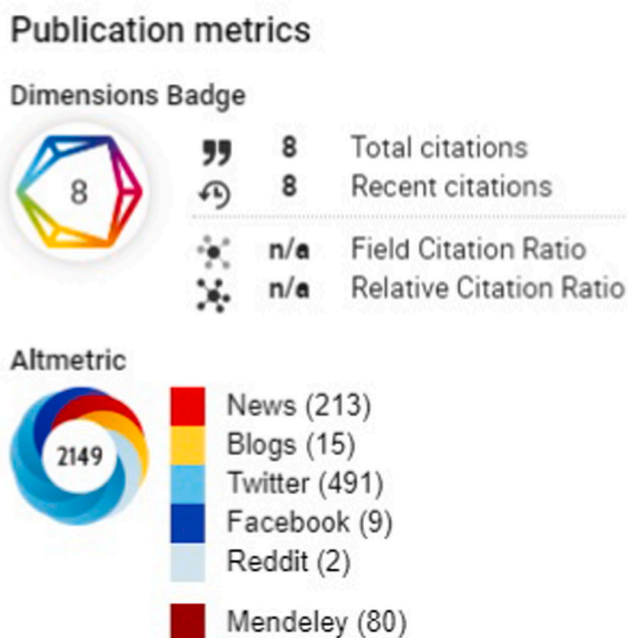


Fig. 1. Example of Altmetric score in Dimensions app.

Table 2
COVID-19 and oral health articles classified in AAS ranking.

rank		citations	AAS	
1	Meyers et al., 2021 ³	8	2149	Journal of Medical Virology
2	Xu et al., 2020 ⁴	935	950	International Journal of Oral Science
3	Peng et al., 2020 ⁵	664	715	International Journal of Oral Science
4	O'Donnell et al., 2020 ⁶	38	695	Function
5	Marouf et al., 2021 ⁷	1	669	Journal of Clinical Periodontology
6	Fontes et al., 2020 ⁸	4	526	Physics of Fluids
7	Estrich et al., 2020 ⁹	26	439	The Journal of the American Dental Association
8	Meng et al., 2020 ¹⁰	574	424	Journal of Dental Research
9	Jackson et al., 2020 ¹¹	13	378	BMJ Open Respiratory Research
10	Sampson et al., 2020 ¹²	20	308	British Dental Journal
11	Bidra et al., 2020 ¹³	53	303	Journal of Prosthodontics
12	Xu et al., 2020 ¹⁴	117	248	International Journal of Oral Science
13	Shah et al., 2020 ¹⁵	5	212	British Dental Journal
14	Plog et al., 2020 ¹⁶	6	182	Physics of Fluids
15	Sergis et al., 2020 ¹⁷	2	163	Journal of Dental Research
16	Block, Rowan, 2020 ¹⁸	10	131	Journal of Oral and Maxillofacial Surgery
17	Vergara-Buenaventura, Castro-Ruiz, 2020 ¹⁹	21	127	British Journal of Oral and Maxillofacial Surgery
18	Istrate et al., 2021 ²⁰	0	125	Journal of Dental Education
19	Pitones-Rubio et al., 2020 ²¹	12	107	Medical Hypotheses
20	Holliday et al., 2021 ²²	4	102	Journal of Dentistry
21	Passarelli et al., 2020 ²³	12	99	Experimental Biology and Medicine
22	Amorim dos Santos et al., 2020 ²⁴	30	99	International Journal of Infectious Diseases
23	Brian, Weintraub, 2020 ²⁵	7	94	Preventing Chronic Disease
24	Ather et al., 2020 ²⁶	220	72	Journal of Endodontics
25	Coulthard, 2020 ²⁷	121	71	British Dental Journal
26	Herrera et al., 2020 ²⁸	30	68	Clinical Oral Investigations
27	Botros et al., 2020 ²⁹	8	67	Biomedical Journal
28	Chanpong et al., 2020 ³⁰	13	67	Anesthesia Progress
29	Hopkins, Kelly, 2021 ³¹	0	75	BDJ In Practice
30	Larvin et al., 2020 ³²	2	63	Frontiers in Medicine
31	Karia et al., 2020 ³³	10	59	SN Comprehensive Clinical Medicine
32	Nagraj et al., 2020 ³⁴	15	55	Cochrane Database of Systematic Reviews
33	Zemouri et al., 2020 ³⁵	11	56	Journal of Dental Research
34	Epstein et al., 2021 ³⁶	12	54	The Lancet Infectious Diseases
35	Mallineni et al., 2020 ³⁷	50	43	International Journal of Paediatric Dentistry
36	Brondani, Donnelly, 2020 ³⁸	1	53	JDR Clinical & Translational Research
37	García et al., 2021 ³⁹	0	53	JDR Clinical & Translational Research
38	Hassandarvish et al., 2020 ⁴⁰	2	44	British Dental Journal
39	Westgart, 2020 ⁴¹	11	45	BDJ In Practice
40	Okike et al., 2021 ⁴²	0	42	BMJ Paediatrics Open
41	Ren et al., 2020 ⁴³	37	41	JDR Clinical & Translational Research
42	O'Donovan et al., 2020 ⁴⁴	3	39	Haemophilia
43	Samaranayake et al., 2020 ⁴⁵	1	37	Acta Odontologica Scandinavica
44	Ge et al., 2020 ⁴⁶	145	35	Journal of Zhejiang University

Table 2 (continued)

rank		citations	AAS	
45	Burton et al., 2020 ⁴⁷	3	35	Cochrane Database of Systematic Reviews
46	Innes et al., 2020 ⁴⁸	6	32	Journal of Dentistry
47	Benzian et al., 2020 ⁴⁹	1	30	Journal of Dental Research
48	Sarapultseva et al., 2021 ⁵⁰	0	28	JDR Clinical & Translational Research
49	Kalash, 2020 ⁵¹	2	27	The Journal of the American Dental Association
50	Bao et al., 2020 ⁵²	12	27	Frontiers in Microbiology

related to the number of citations using the determined keyword. In Fig. 3 is possible to see a bibliometric analysis but with cited authors instead of keywords.

Bibliometrics analysis is not precise,⁵³ with a Pearson's correlation coefficient (r) of 0,35442, between citations and altmetrics, what is considered medium (Fig. 4). Both tools are useful as a free bibliometric analysis, a helpful manner to read, study and cite an article. There are some variations of several citations among different bibliographic platforms due to some journals' indexing on specific platforms and not others.

4. Discussion

Nowadays, we have a world of information at our disposal, and it is increasingly difficult to transform this dull amount of data into knowledge. Due to the high impact of the internet on our lives, health professionals cannot let data coming from online social media out of discussion.⁵⁴ The use of a tool that could guide the scientific community on the most searched and commented data is of great value, which is the importance of altmetric analysis. Scientific information of relevance is found with greater availability and, because of so much availability, AAS can be a precious guide to filter matters of greater pertinence.

There are 34 periodicals on the top 50 articles, a very global list. This list counts with dentistry periodicals and anesthetics, biomedical, pneumology, pediatrics, microbiology, hematology, infectology, and even physics. Two articles from Physics of Fluids are about dental aerosols.^{8,16} A slight predominance of three journals with four articles each: British Dental Journal, JDR Clinical & Translational Research and Journal of Dental Research, all dentistry, oral and craniofacial journals.

Four continents are represented on this list, and only Oceania has no article. The origin of these top 50 articles is from different 15 countries—a considerable predominance of USA (16) and UK (13) on this list. China has the third position with six articles; some articles from China were excluded because of duplicates. Below a world map graphic, list these 15 countries (Fig. 5).

There is a great interest in some different fields of subjects, especially dental aerosols (10) and perspectives on the future of dentistry professionals and dental offices (8). Virucidal activity of some mouthwashes (6) and dental office adaptations to prevent COVID-19 spreading (5) are among the primary interests too. Among subjects that may attract the specific attention of students and professionals can be mentioned oral manifestations of COVID-19 (4), periodontal disease (4), children care (3), dentists contamination (1), medication (1), and protective barriers (1) (Fig. 6). Twenty-one articles of this list are open access, which means they are open to anyone interested in reading it, researcher or not, without any charges.

An increase in concern about dental aerosols and dental office adaptations is evident as some articles have related dental aerosols could be a contamination factor. Although dental aerosols could be detectable after 10 min of use, some simple procedures could help solve this, like dental suction and ventilation; contamination would be minimal in open-plan clinics.²² Some researchers are developing a way to alter the

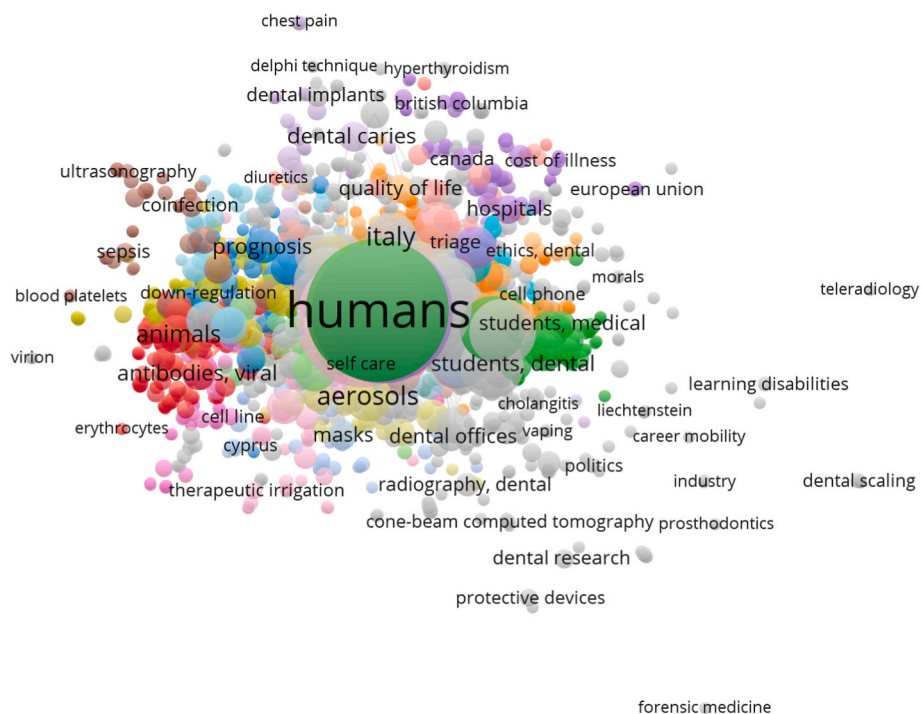


Fig. 2. Network analysis of Keywords from (covid AND (dental OR “oral health”)) bibliographic search through VOSviewer.

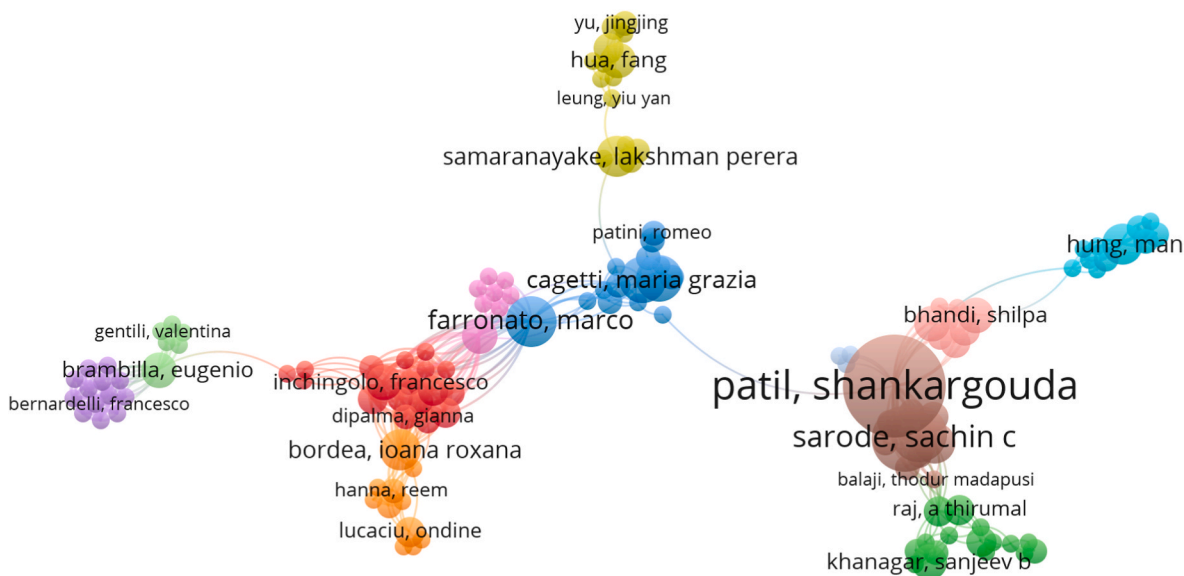


Fig. 3. Network analysis of Authors bibliographic search through VOSviewer.

physical response to water and ultrasonic force and significantly decrease dental office contamination.¹⁶

On the other hand, there is sensible worry about an efficient anti-virucidal substance, especially povidone-iodine and hypochlorous acid.¹⁸ According to these studies, povidone-iodine has a rapid inactivation of the SARS-CoV 2 virus.^{13,40} Some studies confirm chlorhexidine 0,2% and povidone-iodine 1% as effective preprocedural mouthwashes, but this is not recommended since studies available have not large samples yet.⁴⁷

When AAS is evaluated, it is possible to see a tremendous interest in oral manifestations and the relation between periodontal disease and COVID-19. Understanding the primary mechanism of oral infectious susceptibility, especially ACE2, could help a prevention strategy in

dental practice.^{4,14} Studies reporting the very high relationship between periodontal disease and Intensive Care Unit admission risk are very sharp,⁷ but the majority are only suppositions.^{12,21,29,32} Patients with periodontal disease have an imbalance in the oral microbiome^{12,21,29}; they need assisted ventilation, have a high death rate³² with increased blood levels of biomarkers linked to worse outcomes.⁷ There are some studies linking COVID-19 to a lot of oral manifestations, a reasonably common injury is herpes simplex.²⁴ This is not strongly confirmed, but the impact on oral health and COVID-19 will be tremendous if established.

The use of barriers by professionals to prevent self-contamination attract public attention on social media. Dentists are known for preoccupation with infection control practices. In response to COVID-19

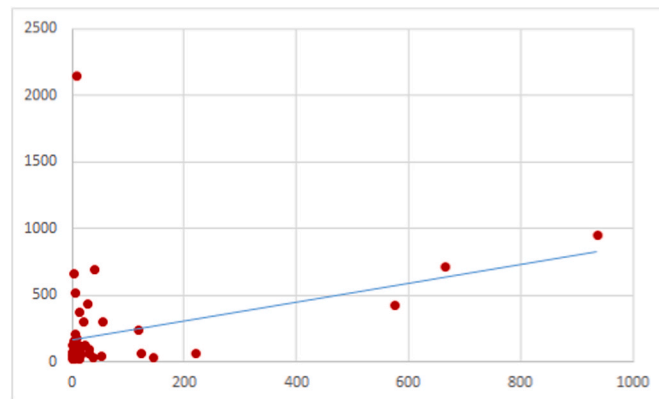


Fig. 4. A positive medium Pearson correlation graphic between citations and altmetrics.

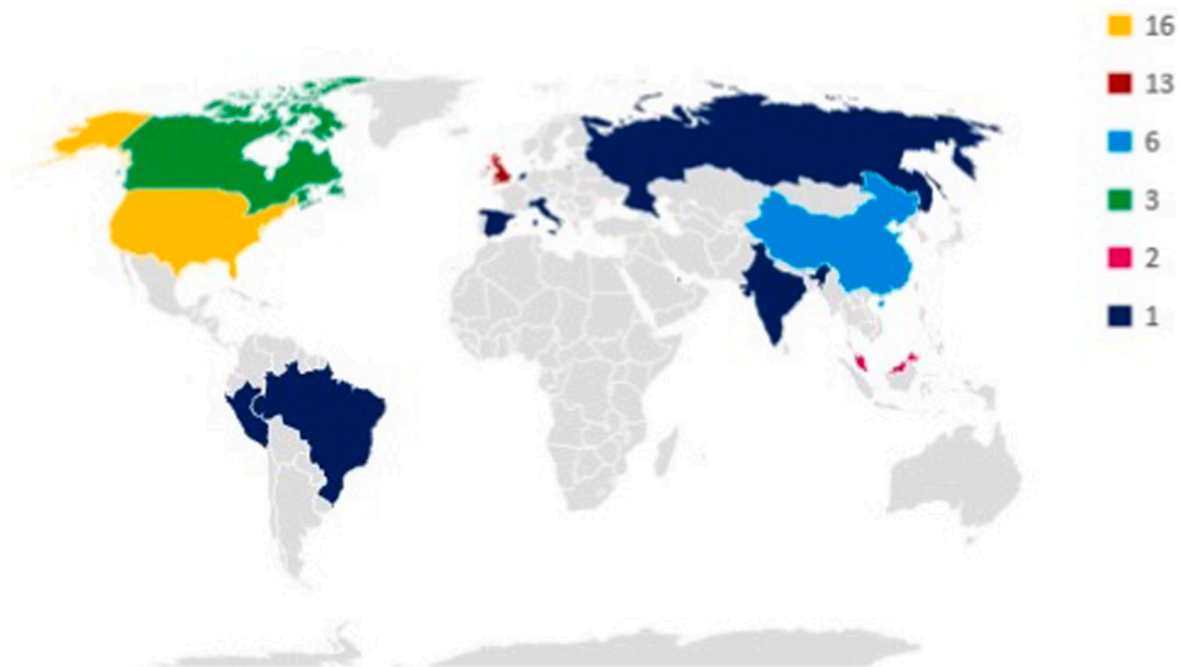


Fig. 5. World map of top 50 articles. Legend represents the number of articles.

pandemics, their enhanced response to the use of protective equipment was of excellent availability.⁹ Social distancing and wearing surgical masks, besides other physical barriers, are very efficient in preventing COVID-19 widespread.^{9,45} The over-extended use of surgical masks compromises their effectiveness.⁴⁵

Altmetrics and bibliometrics analysis are not the same, but they correlate; some studies relate a strong correlation, some, weak.⁵⁴ It is possible to see this correlation in the present study but not so strong, articles with no citation^{20,31,39,50} or few citations^{3,6–8,18,19} but with a high AAS score; the article has not been cited, or few cited to another article, but it is widespread worldwide social media. Articles with a strong correlation between citations and web-based references ^{5,10,14}. Furthermore, even articles with many citations could be more widespread when social media are used, especially Twitter and Facebook.^{26,27}

AAS is a handy tool as a guide to our professional studies and helps health professionals know what patients are looking for. Altmetric analysis does not substitute traditional bibliometric analysis, which focuses on ranking classical articles, driving knowledge for academics,

researchers and updating interested individuals. The ideal would be a combination of these two analyses.^{2,55}

Altmetrics could solve one ancient and persistent dentistry problem, slow recognition of new dental or medical technologies by students and graduates.⁵⁶ This is of paramount importance in a pandemics situation where scientific information can change dramatically in a short period. Dental professionals, researchers, and journal editors ought to pay attention to altmetrics⁵⁶ and bibliometrics, but altmetrics could be more valuable than bibliometrics in emergencies.

Altmetrics is a new form of scientometrics and not yet as widespread as other classical forms such as bibliometrics. This is a clear limitation of our study. The authors hypothesize that in a few years this limitation will be less and the interest of Internet readers could be similar to that of academic readers.

5. Conclusions

An altmetric analysis is instrumental in seeing actual tendencies and interests about scientific articles that are being read and commented just

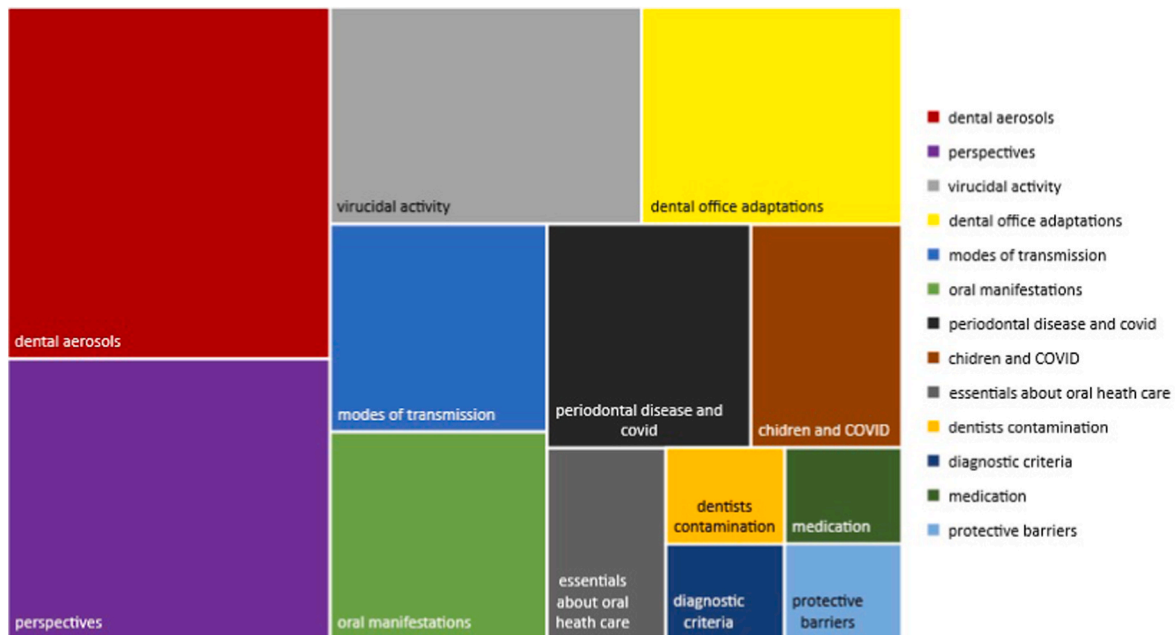


Fig. 6. Graphic area of topics of interest.

now, not cited by another paper but by web-based media, including social media. A list of articles in altmetrics order is an excellent manner to be actualized with relevant information. The scientific community goes to great lengths to solve some challenges with dental aerosols, particularly to diminish contamination.

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Ethical approval

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Patient consent

Not required.

Declaration of competing interest

The authors have no conflicts of interest to disclose.

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