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. Altmetrics has been gaining space in science using statistics from social media. 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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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

Table 1

| Data resources | Weight |
|----------------|--------|
| News           | 8      |
| Blog           | 5      |
| Policy document (per source) | 3 |
| Patent         | 3      |
| Wikipedia      | 1      |
| Peer review (Publons, PubPeer) | 1 |
| Weibo          | 1      |
| Google +       | 1      |
| F1000          | 1      |
| Open Syllabus  | 0.5    |
| 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
Table 2
COVID-19 and oral health articles classified in AAS ranking.

| rank | citations | AAS |
|------|-----------|-----|
| 1    | Meyers et al., 2021 | 8 | 2149 |
| 2    | Xu et al., 2020 | 935 | 950 |
| 3    | Peng et al., 2020 | 664 | 715 |
| 4    | O’Donnell et al., 2020 | 38 | 695 |
| 5    | Marouf et al., 2021 | 1 | 669 |
| 6    | Fontes et al., 2020 | 4 | 526 |
| 7    | Estrich et al., 2020 | 26 | 439 |
| 8    | Meng et al., 2020 | 574 | 424 |
| 9    | Jackson et al., 2020 | 13 | 378 |
| 10   | Sampson et al., 2020 | 20 | 308 |
| 11   | Bidra et al., 2020 | 53 | 303 |
| 12   | Xu et al., 2020 | 117 | 248 |
| 13   | Shah et al., 2020 | 5 | 212 |
| 14   | Plog et al., 2020 | 6 | 182 |
| 15   | Sergis et al., 2020 | 2 | 163 |
| 16   | Block, Rowan, 2020 | 10 | 131 |
| 17   | Vergara-Buenaventura, Castro-Ruiz, 2020 | 21 | 127 |
| 18   | Istrate et al., 2021 | 0 | 125 |
| 19   | Pitones-Rubio et al., 2020 | 12 | 107 |
| 20   | Holliday et al., 2021 | 4 | 102 |
| 21   | Passarelli et al., 2021 | 12 | 99 |
| 22   | Amorim dos Santos et al., 2020 | 30 | 99 |
| 23   | Brian, Weintraub, 2020 | 7 | 94 |
| 24   | Ather et al., 2020 | 220 | 72 |
| 25   | Coulthard, 2020 | 121 | 71 |
| 26   | Herrera et al., 2020 | 30 | 68 |
| 27   | Botros et al., 2020 | 8 | 67 |
| 28   | Chong et al., 2020 | 13 | 67 |
| 29   | Hopkins, Kelly, 2021 | 0 | 75 |
| 30   | Larvin et al., 2020 | 2 | 63 |
| 31   | Kalia et al., 2020 | 10 | 59 |
| 32   | Lagrav et al., 2020 | 15 | 55 |
| 33   | Zemouri et al., 2020 | 11 | 56 |
| 34   | Epstein et al., 2021 | 12 | 54 |
| 35   | Mallieni et al., 2020 | 50 | 43 |
| 36   | Brondani, Donnelly, 2020 | 1 | 53 |
| 37   | García et al., 2021 | 0 | 53 |
| 38   | Hassanarvish et al., 2020 | 2 | 44 |
| 39   | Westgar, 2020 | 11 | 45 |
| 40   | Okike et al., 2021 | 0 | 42 |
| 41   | Ren et al., 2020 | 37 | 41 |
| 42   | O’Donovan et al., 2020 | 3 | 39 |
| 43   | Samaranyakhe et al., 2020 | 1 | 37 |
| 44   | Ge et al., 2020 | 145 | 35 |

Table 2 (continued)

| rank | citations | AAS |
|------|-----------|-----|
| 45   | Burton et al., 2020 | 3 | 35 |
| 46   | Innes et al., 2020 | 6 | 32 |
| 47   | Benjiz et al., 2020 | 1 | 30 |
| 48   | Sarapultseva et al., 2021 | 0 | 28 |
| 49   | Kalash, 2020 | 2 | 27 |
| 50   | Bao et al., 2020 | 12 | 27 |

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, 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. 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 periodics on the top 50 articles, a very global list. This list counts with dentistry periodics and anesthetics, biomedical, pulmonary, pediatrics, microbiology, hematology, infectology, and even physics. Two articles from Physics of Fluids are about dental aerosols, which is 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 mouthwash 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. Some researchers are developing a way to alter the...
physical response to water and ultrasonic force and significantly decrease dental office contamination.\textsuperscript{16}

On the other hand, there is sensible worry about an efficient antivirucidal substance, especially povidone-iodine and hypochlorous acid.\textsuperscript{18} According to these studies, povidone-iodine has a rapid inactivation of the SARS-CoV 2 virus.\textsuperscript{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.\textsuperscript{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.\textsuperscript{5,14} Studies reporting the very high relationship between periodontal disease and Intensive Care Unit admission risk are very sharp,\textsuperscript{7} but the majority are only suppositions.\textsuperscript{12,21,29,32} Patients with periodontal disease have an imbalance in the oral microbiome\textsuperscript{12,21,29}; they need assisted ventilation, have a high death rate\textsuperscript{32} with increased blood levels of biomarkers linked to worse outcomes.\textsuperscript{7} There are some studies linking COVID-19 to a lot of oral manifestations, a reasonably common injury is herpes simplex.\textsuperscript{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
Social distancing and wearing surgical masks, besides other physical barriers, are very efficient in preventing COVID-19 widespread. The over-extended use of surgical masks compromises their effectiveness.

Altmetrics and bibliometrics analysis are not the same, but they correlate; some studies relate a strong correlation, some, weak. It is possible to see this correlation in the present study but not so strong, articles with no citation or few citations 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. Furthermore, even articles with many citations could be more widespread when social media are used, especially Twitter and Facebook.

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.

Altmetrics could solve one ancient and persistent dentistry problem, slow recognition of new dental or medical technologies by students and graduates. 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 altmetrics 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...
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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Declaration of competing interest

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