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Dental Suction Aerosol: Bibliometric Analysis

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A B S T R A C T

The rapid spread of the coronavirus had a bad impact on many things, especially on the medical sector. Medical personnel especially dentists are one of the sectors most exposed to the coronavirus because dental procedures produce aerosols and splashes that are contaminated with saliva and blood. This study aimed to investigate the development of research related to dental aerosol suction through the distribution of bibliometrics maps and research trends using VOSViewer. Bibliometric mapping shows the types of publications, publication authors, and publishers of scientific articles. In this study, data collection was carried out from the dimensions.ai site which provides a dataset of scientific articles that have been published in international journals under open source. The keyword was "Dental Suction Aerosol" with the publication year of 2017-2021. Based on studies that have been carried out, the trend of dental suction aerosol research increased during the covid 19 pandemic, the research increase was 31.7% in 2020 and increased by 0.12% in 2021. Based on the publisher's analysis article, the British Dental Journal is the publisher with the most publications on Dental Suction Aerosol research with 88 publications. The publisher has the most citations in The International Journal Of Environmental Research And Public Health with 628 citations. while based on keyword analysis, keywords related to dental aerosol suction research appeared a lot in 2020, and the most popped-up keywords were "COVID", "Dentist", and "Aerosol".

A R T I C L E I N F O

1. INTRODUCTION

The disease caused by COVID-19 is a pandemic that made trouble around the world (Meng *et al.*, 2020). The rapid spread of the coronavirus has had a bad impact on many things, including education, government, the economy, and especially on the medical sector (Lima *et al.*, 2020).

Medical personnel especially dentists are one of the sectors most exposed to the coronavirus because dental procedures produce aerosols and splashes that are contaminated with saliva and blood (Ahmed *et al.*, 2020). The potential for barely perceptible aerosol spread and virus spread is very high (Matys & Lesniak, 2020); thus, dentists must recognize situations or even eliminate these risks in all clinical settings, when patients are in incubation, unaware that they are infected, or opt for their disease.

Researchers have made many efforts that can be useful in controlling and reducing the risk of COVID-19 transmission (Holliday *et al.*, 2021). One of the efforts to reduce the risk of spreading Covid in dental treatment is to use dental suction. Dental suction works by sucking up saliva splashes, tooth debris, and blood resulting from dental treatment (Chavis *et al.*, 2021).

This study aimed to investigate the development of research related to dental aerosol suction through the distribution of bibliometrics maps and research trends using VOSViewer. Bibliometric mapping shows the types of publications, publication authors, and publishers of scientific articles (Mulyawati & Ramadhan, 2021).

2. METHODS

Bibliometric examination, better known as scientometrics, can be a refinement of the meta-analysis investigative strategy (Nandiyanto *et al.*, 2020). In general, the process of bibliometric research is shown in **Figure 1**.

In this study, data collection was carried out from the dimensions.ai site which provides a dataset of scientific articles that have been published in international journals under open source. The keyword we used to collect metadata in this study was "Dental Suction Aerosol" with the publication year of 2017-2021.

The Articles that have been collected and meet the requirements for analysis in this study are saved in comma-separated values (*.csv) Format. At that point the dataset is opened utilizing the Vosviewer program, the Vosviewer program will show the dataset into a mapping visualization for examination.

After the dataset was saved and visualized by VOSviewer, in this study we analyzed the correlation of the Dental Suction Aerosol research trend with COVID-19. Research trends analyzed include the author and the country of origin of the author, article publisher, and research keywords dental aerosol suction during the pandemic.

3. RESULTS AND DISCUSSION

The dataset in this study uses a span of the year the articles were published from 2017 to 2021. The tracing is shown in **Figure 2**.

Based on **Figure 2**, the trend of Dental Suction Aerosol research from 2017 to 2018 decreased by 4.76%, then from 2018 to 2019, it decreased by 2.43%. whereas from 2019 to 2020 the research trend of Dental Suction Aerosol increased by 31.7% and from 2020 to 2021 it increased by 0.12%. This increase is due to the COVID-19 pandemic condition which increases the risk of transmission to dentists, thus requiring Dental Suction Aerosol devices.

In this study, the data to be analyzed was filtered from 2017-2021, only during the COVID-19 pandemic situation in 2019-2021.
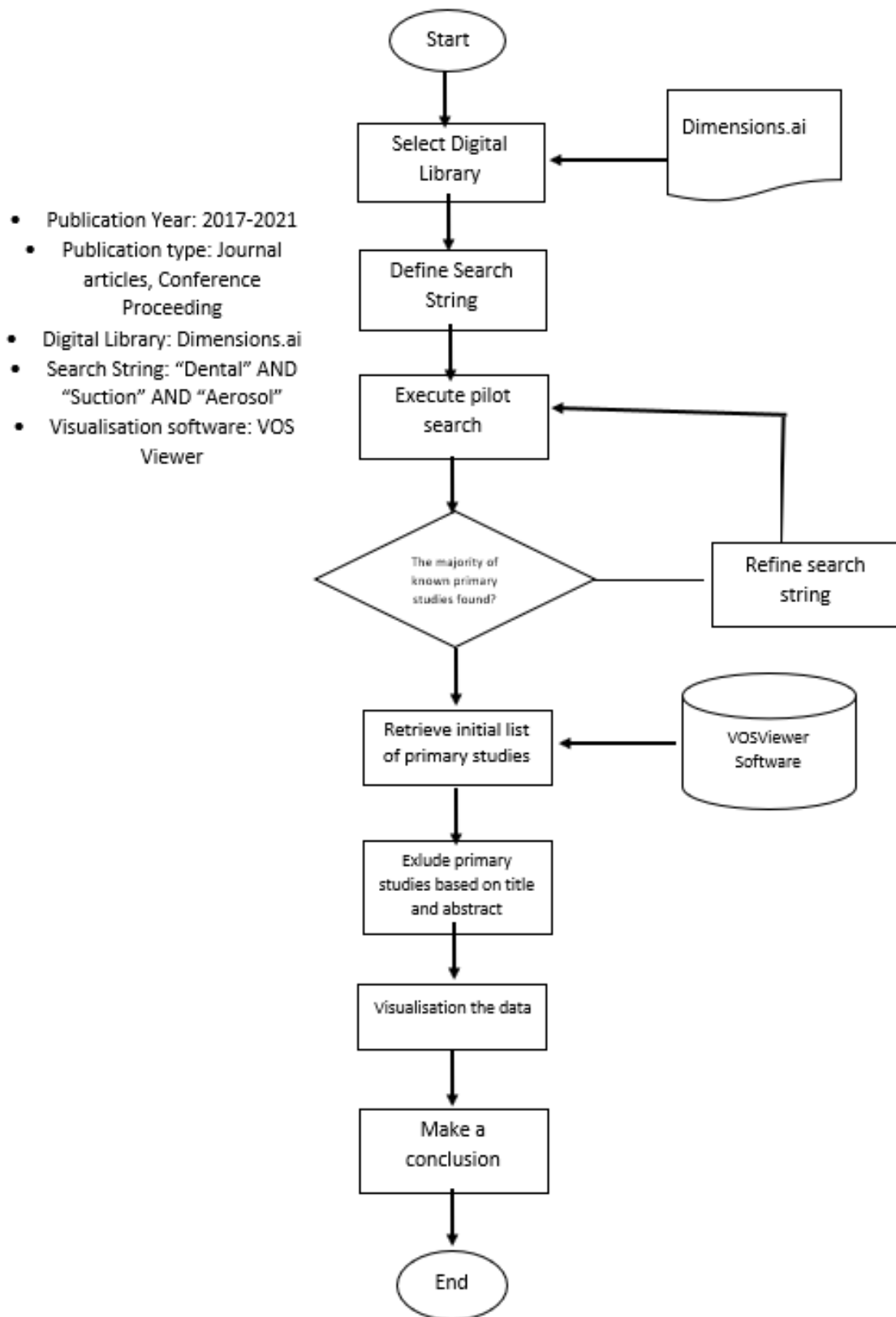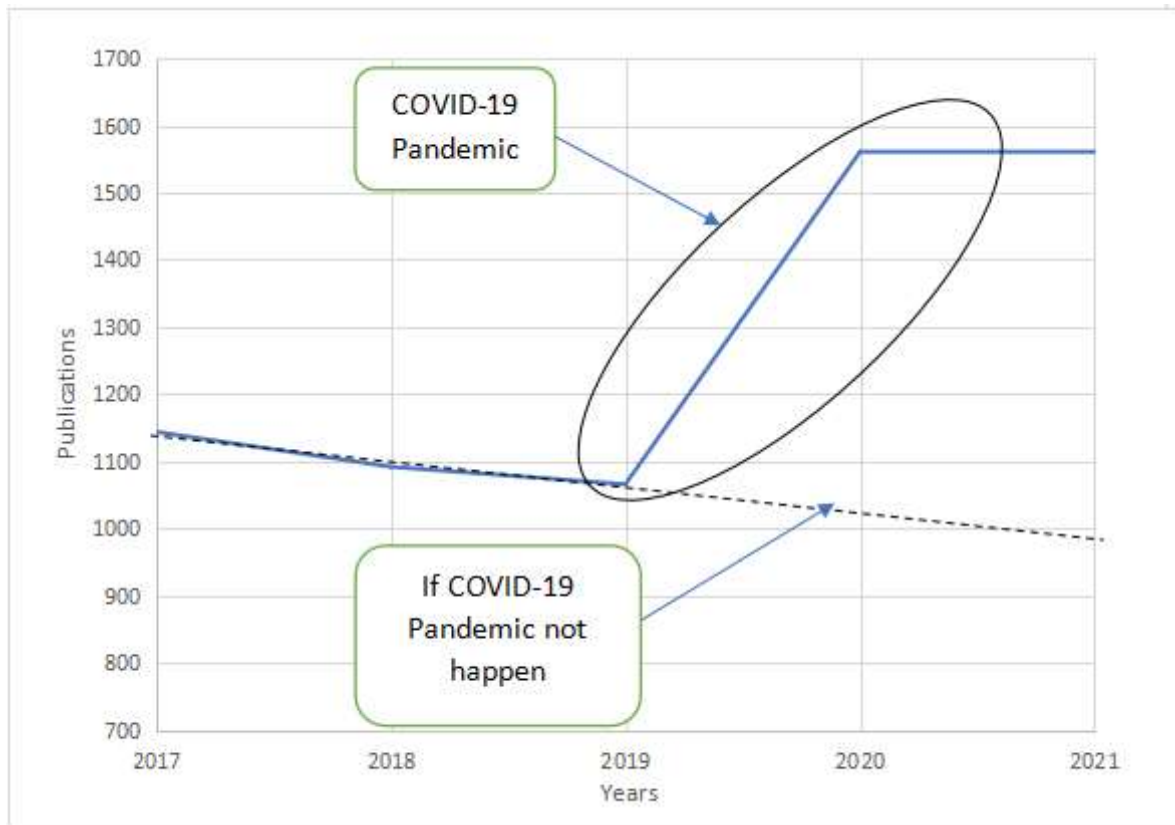

Figure 1. Bibliometric analysis process flow chart.

Figure 2. Several Dental Suction Aerosol Devices research publications from 2017 to 2021.

3.1. Articles Author Analysis

The most relevant authors based on the number of citations and publications are shown in **Table 1**. Authors from various universities in the world are working hard to research the Dental Suction Aerosol sub-fields of each researcher.

Table 1. Names of the top 10 ranking authors who publish Dental Suction Aerosol field articles based on the number of citations and the number of articles.

No	Author's Name	Affiliations	Publications	Citations
1	Richard S Holliday	Newcastle University, United Kingdom	6	113
2	James R Allison	Newcastle University, United Kingdom	6	113
3	Nicholas Stephen Jakubovics	Newcastle University, United Kingdom	5	112
4	Justin Durham	Newcastle University, United Kingdom	5	112
5	Eugenio Brambilla	University of Milan, Italy	5	42
6	Purnima S Kumar	Ohio State University, United State of America	4	56
7	Lakshman Perera Samaranayake	University of Hong Kong, Hong Kong	4	83
8	Giulia Brunello	University of Padua, Italy	4	21
9	Anuraj Singh Kochhar	Max Healthcare, India	4	41
10	Christian De Muizon	Newcastle Dental Hospital, United Kingdom	4	108

Table 1 moreover appears the relationship between the foremost beneficial creators in terms of the number of articles and the foremost cited creators. This study took the top 10 rankings, authors who published on Dental Suction Aerosol research during the COVID-19 Pandemic (2019-2021).

Based on **Table 1**, Richard S Holliday and James R Allison are the authors with the most publications on Dental Suction Aerosol research during the COVID-19 Pandemic (2019-2021) with 6 articles, Richard S Holliday and James R Allison also are the authors with the most cited with 113 citations.

It can be seen that publications on Dental Suction Aerosols during COVID-19 Pandemic (2019-2021) were mostly carried out by authors from Europe, including the United Kingdom and Italy. In-Fact from the top ten authors list, five out of ten on the list are authors from the United Kingdom. All of the authors are from the United Kindom Affiliate in Newcastle. Asia has two countries in the top ten list including India and Hong Kong, then the United States of America has one author that is listed in the top ten.

3.2. Articles Publisher Analysis

Most Publishers based on the number of citations and publications are shown in **Table 2**. In this study, we took the top 10 rankings, Publishers who published on Dental Suction Aerosol research.

Table 2. Names of the top 10 ranking Publishers who publish Dental Suction Aerosol research articles based on the number of citations and the number of articles.

No.	Publishers	Publications	Citations	Q (Scimago)
1	British Dental Journal	58	139	Q3
2	International Journal of Environmental Research and Public Health	32	628	Q2
3	BDJ Team	49	7	-
4	The Journal of the American Dental Association	16	153	Q3
5	Clinical Oral Investigations	12	72	Q1
6	BMC Oral Health	10	183	Q1
7	International Dental Journal	9	25	Q1
8	Journal of Plastic Reconstructive & Aesthetic Surgery	9	8	Q1
9	International Journal of Applied Dental Sciences	9	3	-
10	Frontiers in Dental Medicine	39	68	-

3.3. Keyword Analysis

Catchphrases are exceptionally valuable in translating the scope of the investigate scope and the subjects (Mubaroq *et al*., 2020). The minimum number of conjunctions in the use of Vosviewer is 10 words. After being analyzed utilizing Vosviewer, there are 4 clusters (green, red, blue, and yellow), this appears the relationship between one point and another (Mulyawati & Ramadhan, 2021). Vosviewer provides three different mapping visualizations: network, overlay, and density (Husaeni & Nandiyanto, 2022). Keywords are labeled with a colored circle. The size of the circles shows a positive relationship between the occurrence of keywords in the title and the abstract. Therefore, the size of letters and circles is determined by the frequency with which they appear. The more often a keyword appears, the larger the font and circle size will be (Hamidah *et al*., 2020). The results of the VOSviewer keyword analysis are shown in **Figure 3**.

Figure 3. Visualization of keywords (keyword co-occurrence) with network.

Based on **Figure 3.** keywords related to dental aerosol suction research appeared a lot in 2020, and the most popped-up keywords were "COVID", "Dentist", "Aerosol", and "Personal protective equipment". it can be concluded that in 2020 dental aerosol suction is trending research, due to the COVID-19 pandemic.

This result also confirms the effectiveness of bibliometric analysis (Fauziah & Nandiyanto, 2022; Husaeni & Nandiyanto, 2022; Husaeni & Nandiyanto, 2023; Husaeni *et al.*, 2023; Nordin, 2022; Nugraha & Nandiyanto, 2022) to explore and visualize the current literature that can be used for deciding whether further research be done.

4. CONCLUSION

Based on studies that have been carried out, the trend of dental suction aerosol research increased during the covid 19 pandemic, the research increase was 31.7% in 2020 and increased by 0.12% in 2021. Based on the author's analysis article, Publications on Dental Suction Aerosols in COVID Pandemic were mostly carried out by authors from Europe, including the United Kingdom and Italy. In-Fact from the top ten authors list, five out of ten on the list are authors from the United Kingdom. All of the authors are from the United Kindom Affiliate in Newcastle. Asia has two countries in the top ten list including India and Hong Kong, and the United States of America has one author that is listed in the top ten.

Based on the publisher's analysis article, the British Dental Journal is the publisher with the most publications on Dental Suction Aerosol research with 58 publications. The publisher has the most citations in The International Journal of Environmental Research and Public Health with 628 citations. while based on keyword analysis, keywords related to dental aerosol suction research appeared a lot in 2020, and the most popped-up keywords were "COVID", "Dentist", and "Aerosol".

5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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