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Impact of the COVID-19 pandemic on publication rate in periodontology and implantology in Turkey

Impacto da pandemia de COVID-19 na taxa de publicação em periodontia e implantodontia na Turquia

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ABSTRACT

Objective: The aim of the present study was to evaluate the impact of the COVID-19 pandemic on the number of publications in the field of periodontology and implantology in Turkey. **Material and Methods**: A sensitive search strategy was developed to identify relevant articles, focusing on the periodontology and implantology research fields published two years before and after the declaration of the pandemic (March 2020). The search was performed through Web of Science, Medline, SCOPUS and CENTRAL databases. A three-stage screening (titles, abstract, full-text) was carried out in duplicate and independently by two reviewers. **Results**: A total of 382 studies were identified before the pandemic and 307 studies during the pandemic. While there was a downward trend in the number of observational studies (185 vs 168), the number of clinical trials (CCT/RCT) slightly increased compared to the pre-pandemic period (72 vs 74). **Conclusion**: Limited to the selected period of time (two years) and field, publication rate on periodontology and implantology in Turkey was decreased during the pandemic. Although the present research highlights current trends, large-scale investigations are needed to probe consequences of COVID-19 pandemic on research activities in the long-run.

KEYWORDS

COVID-19; Implantology; Periodontology; Publication; Sars-CoV-2; Pandemic.

RESUMO

Objetivo: O objetivo do presente estudo foi avaliar o impacto da pandemia de COVID-19 no número de publicações na área de periodontia e implantodontia na Turquia. **Material e Métodos:** Foi desenvolvida uma estratégia de busca sensível para identificar artigos relevantes, com foco nas áreas de pesquisa em periodontia e implantodontia publicados dois anos antes e depois da declaração da pandemia (março de 2020). A busca foi realizada nas bases de dados Web of Science, Medline, SCOPUS e CENTRAL. Uma triagem de três etapas (títulos, resumo, texto completo) foi realizada em duplicata e de forma independente por dois revisores. **Resultados:** Foram identificados 382 estudos antes da pandemia e 307 estudos durante a pandemia. Embora tenha havido uma tendência de queda no número de estudos observacionais (185 vs 168), o número de ensaios clínicos (CCT/RCT) aumentou ligeiramente em comparação com o período pré-pandêmico (72 vs 74). **Conclusão:** Limitada ao período de tempo selecionado (dois anos) e área, a taxa de publicação em periodontia e implantodontia na Turquia diminuiu durante a pandemia. Embora a presente pesquisa destaque as tendências atuais, são necessárias investigações em larga escala para investigar as consequências da pandemia de COVID-19 nas atividades de pesquisa a longo prazo.

PALAVRAS-CHAVE

COVID-19; Implantodontia; Periodontologia; Publicação; Sars-CoV-2; Pandemia.

INTRODUCTION

Coronavirus Disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), had a global influence since the beginning of 2020, being declared a pandemic by the World Health Organization (WHO) [1]. Since the outbreak of COVID-19 pandemic, Republic of Turkey, Ministry of Health as well as Turkish Dental Association have released guidelines for the best clinical practice and safety for dental care providers and patients. Briefly, guidelines included disinfection and treatment protocols, anamnesis and consent forms and safety recommendations for the patients, dentists and auxiliary staff [2]. However, there was no restriction for Nationwide research activities.

The impact of COVID-19 on dentistry has been evaluated in different aspects including economical [3], periodontal practice management [4] and patient perspectives [5]. Likewise, globally, researchers drew attention to the consequences of the pandemic on research activities. Accordingly, they have stated that in addition to travel and social restrictions, research staff, resources and research fundings have been mostly allocated to the the COVID-19 related purposes [6]. Basic science as well as non-COVID related clinical research activities such as patient enrollment and data entry were suspended related to the above mentioned reasons [7,8]. Due to the suspension of routine works of universities, research centers and even private practices, researchers had faced difficulties in conducting their research or continuing their planned work-flows that is required to publish their data [9]. Rapid dissemination of data is an important concern for the research community as well. Therefore, we have formulated the research question: Has the COVID-19 pandemic presented an academic challenge in terms of publication rate for Nationwide researchers? The aim of the present study was to evaluate the impact of the COVID-19 pandemic on the number of publications two years before and during the pandemic, considering March 2020 as a reference date in the field of periodontology and implantology in Turkey.

MATERIAL AND METHODS

Focused question

In the present research, the following question was addressed:

Is there a difference between publication rate before and during the COVID-19 pandemic outbreak?

Inclusion criteria

Considering the hierarchy of evidence, systematic reviews or/and meta-analyses, randomized controlled clinical trials/prospective controlled clinical trials (CCTs), cohort studies, observational studies, case series, case reports as well as editorial letters and opinion articles were included.

Exclusion criteria

In vitro studies and pre-clinical studies were excluded.

Data sources and search strategy

A structured literature search was conducted between 16.03.2018 - 12.03.2020 and 12.03.2020 - 07.03.2022 in Web of Science (WoS), Pubmed / Medline, SCOPUS and Cochrane Library databases. The following keywords were selected for the database search: "*periimplantitis*", "*peri-implantitis*", "*periimplant disease*", "*peri-implant disease*", "*periodontology*", "*periodontal therapy*", "*periodontal treatment*", "*dental implants*", "*implantology*", "*periodontal regeneration*", "*guided tissue regeneration*", "*guided bone regeneration*", "*periodontal disease*", "*intrabony defects*", "*infrabony defects*", "*periodontitis*", "*gingivitis*". The final search strategy is determined by the characteristics of each particular database in order to obtain as many suitable results as possible (Table S1).

Study selection and data extraction

All data for the relevant years were exported in text or BibTeX format from separately searched databases and duplicated articles were separated in the Mendeley program. Available bibliographic features of all selected articles, such as authors' names and links, publication year, abstract, publication name, document type, language, keywords or DOI, were automatically extracted by the author MEA and saved in a custom-created spreadsheet (Microsoft Excel).

Data were extracted according to the article type, research category and geographical distribution (affiliation of the corresponding article was accepted) of articles between the

defined periods. The selection of the studies included in the present analysis was decided by two independent experienced periodontists (MSY and AA) who scanned the titles, abstracts and full texts of all articles identified in the electronic literature review. Any disagreement was solved through discussion, if not resolved a third review author was consulted (HE). In case of missing or incomplete data (two weeks' response time was set) and absence of further clarification by study authors the study was excluded from the analysis. Studies that did not meet the inclusion criteria were excluded from the analysis as well. Author MEA performed the subsequent analysis of the articles three times in order to ensure the validity and reliability of the study. Analyses were cross-checked by two authors (MSY and HE). VOSviewer software version 1.6.18 was used to visualize data, cluster and define reference networks, as well as create bibliometric maps [10].

RESULTS

In the present study, between the periods 16.03.2018 and 12.03.2020 (before the pandemic), we reached 10,284 (WoS), 20,429 (SCOPUS), 8,456 (Pubmed/Medline) and 4,556 (Cochrane Library) records from the searched databases. Following removal of duplicate articles, a total of 382 studies were identified published from Turkey. Between 12.03.2020 and 07.03.2022 (after pandemic), from the relevant databases; 11,654 (WoS), 18,583 (SCOPUS), 10,045 (Pubmed / Medline) and 2,972 (Cochrane Library) published articles were reached. The total number of studies published in Turkey between selected dates was 307. The flow chart for the selection process of the articles is provided in Figure 1. Distribution of the studies according to the selected period and article type published in the relevant databases are shown in Table I and Table II.

Among the 382 studies published in Turkey between the period 2018-2020, 72 were clinical trials (CCT/RCT), 45 were reviews/systematic reviews/meta-analyses, 185 were observational studies and 39 were case reports. Among 307 studies published between 2020-2022, 74 were clinical trials (CCT/RCT), 22 were reviews/systematic reviews/meta-analyses, 168 were observational studies, and 20 were case reports. The distribution of the study type by years is shown in Table II. Compared to the pre-pandemic period, there was a trend of decrease in the number of clinical trials and case reports in the post-pandemic period. On the other hand, an increase was observed in observational study category (cohort or case-control studies).

From the analyzed data set, a total number of 2809 authors were identified from the published articles before the pandemic and 2688 authors after

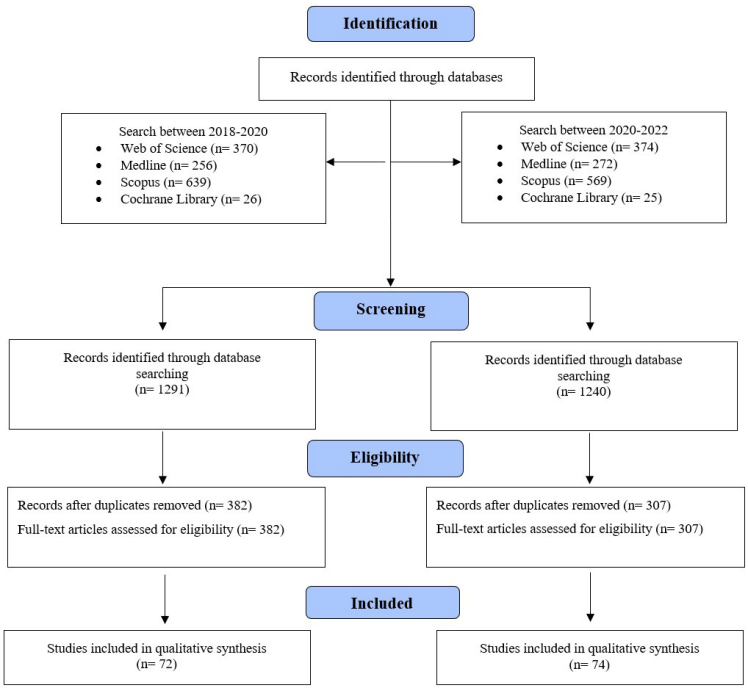

Figure 1 - Flow diagram of the study search and identification. n = number of studies.

Table I - Distribution of articles published in different databases before and during pandemic

Database	2018-2020 (n=8.456)	2020-2022 (n=10.045)
Pubmed / Medline		
Review, Systematic Review, and Meta-analysis, n	1627	2165
Clinical Trials, n	577	544
Observational study, n	89	76
Case reports, n	495	535
Editorial, n	33	46
Other, n	5635	6679
Database	**2018-2020 (n=10.284)**	**2020-2022 (n=11.654)**
Web of Science		
Review, Systematic Review, and Meta-analysis, n	2249	2468
Clinical Trials, n	1087	1175
Observational study, n	160	228
Case reports, n	841	911
Editorial, n	186	58
Other, n	5781	6814
Database	**2018-2020 (n=21.429)**	**2020-2022 (n=18.583)**
SCOPUS		
Review, Systematic Review, and Meta-analysis, n	3592	3585
Clinical Trials, n	1834	1656
Observational study, n	911	946
Case reports, n	1597	1308
Editorial, n	186	147
Other, n	13858	11502
Database	**2018-2020 (n=4.556)**	**2020-2022 (n=2.972)**
Cochrane Library		
Clinical Trials, n	4556	2972

n = number of articles.

Table II - Distribution of study types published before and during pandemic

Type of study	2018-2020 (n=382)	2020-2022 (n=307)
Review, Systematic Review, and Meta-analysis, n (%)	45 (12)	22 (7)
Clinical Trials, n (%)	72 (19)	74 (24)
Observational study (Cohort, Case-control), n (%)	185 (48)	168 (55)
Case reports, n (%)	39 (10)	20 (7)
Other, n (%)	41 (11)	23 (7)

n = number of articles.

Table III - Study characteristics of included clinical trials

	2018-2020 (n=72)	2020-2022 (n=74)
Study design (CCT/RCT), n	28/44	23/51
Intervention type (Surgical/Non-Surgical Periodontal treatment), n	33/39	36/38
Setting (University/Private), n	72/0	69/5
Funding (University/Company/Self-funded), n	38/4/30	50/2/22
Included patients (total number), n	2664	2928

n = number of articles.

the pandemic. The frequency and surnames of the authors by years are visualized in Figure 2 (2018-2020) and in Figure 3 (2020-2022). In the titles and abstracts of the manuscripts, 7582 Keyword Plus was determined in the pre-pandemic period and 7525 in the post-pandemic period. The most frequently used 10 keywords by the authors were determined as: "*fluid*", "*model*", "*canal*", "*analyzing subgingival plaque*", "*loss*", "*bioactive hybrid material*", "*bone implant contact*", "*biochemical efficacy*", "*bone implant connection*", "*bifid mandibular canals*". Overview of the authors' keywords describing their dental research, related vocabulary areas, and their frequency of occurrence presented in Figure 4 and Figure 5.

Study characteristics

Additional details pertaining to design of clinical trial, intervention type limited to periodontal treatment, setting, funding and study population are presented in Table III. Among 72 studies published before pandemic, all studies were conducted in universities, whereas 5 studies out of 74 studies were performed in private practice setting during the pandemic. Origin of funding were mostly obtained from universities within the selected dates. The number of studies comparing both non-surgical and surgical treatment modalities were approximated before and during the pandemic. The number of randomized controlled clinical trials were increased by 7 studies during the pandemic.

DISCUSSION

During the last few years the COVID-19 pandemic has been the most important event of both the scientific community and general population. The WHO on March 2020 declared COVID-19 as a pandemic. The present study aimed to compare differences in the number of publications before and during the pandemic considering March 2020 as a reference date. A decline trend was observed in the number of studies published in pandemic compared to the pre-pandemic period. Among the study types only clinical trials had a trend of slight increase in the field of periodontology and implantology in Turkey. To evaluate the impact of the COVID-19 pandemic on periodontal practice, a questionnaire based study has been performed in United States and Brasil [11]. Accordingly, the enrolled 254 periodontists working in both private and academic environments described a negative impact of pandemic on mostly financial aspect as well as increased protective measures. Likewise, economical impact of the pandemic on

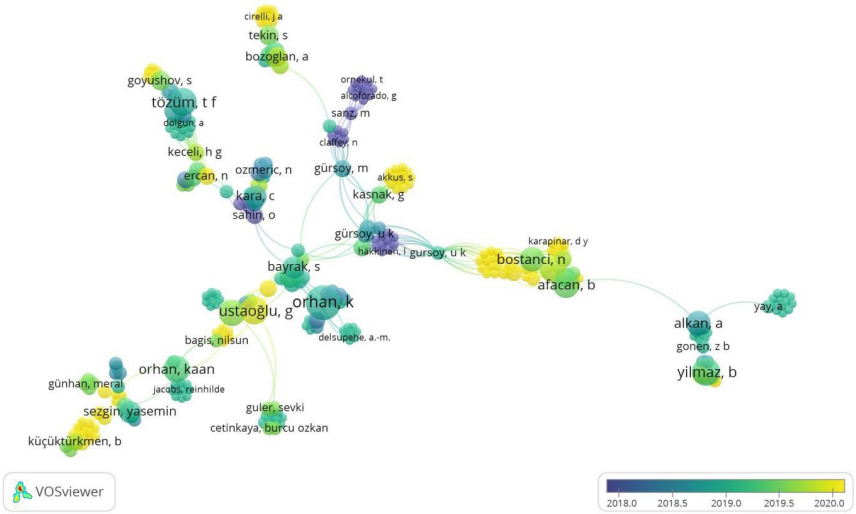

Figure 2 - Authors and frequencies of studies published before the pandemic.

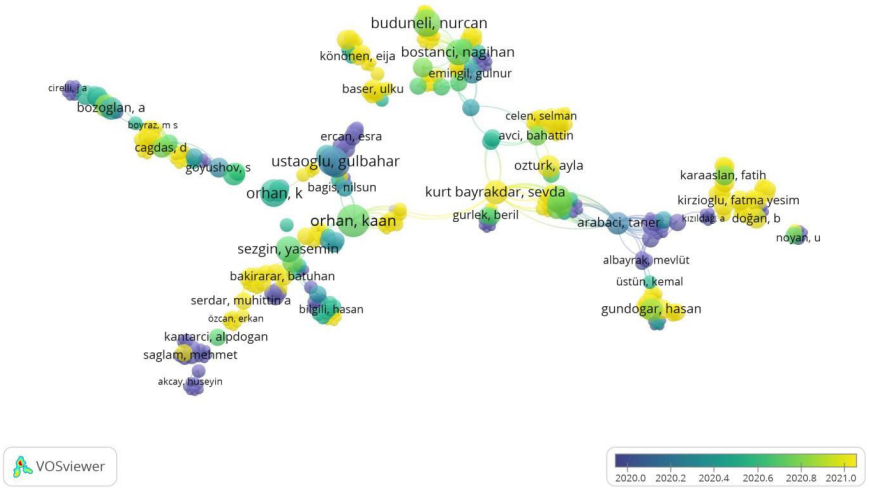

Figure 3 - Authors and frequencies of studies published during the pandemic.

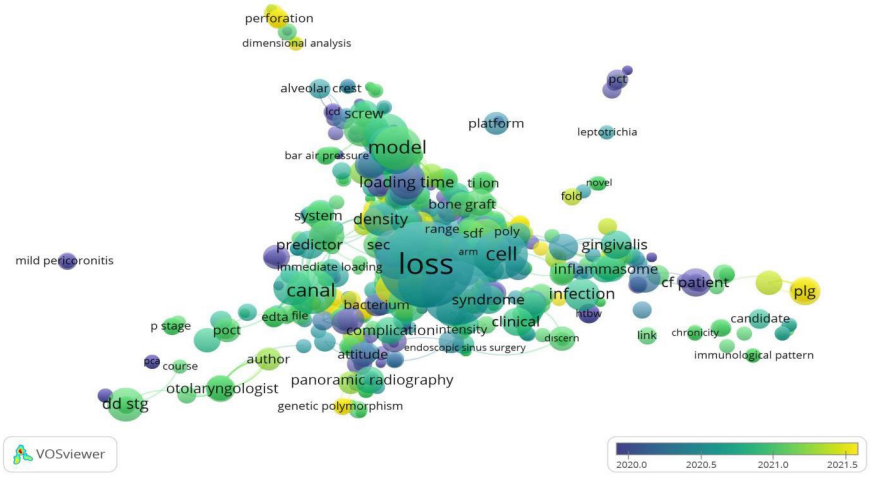

Figure 4 - Keywords and frequencies of studies published before the pandemic.

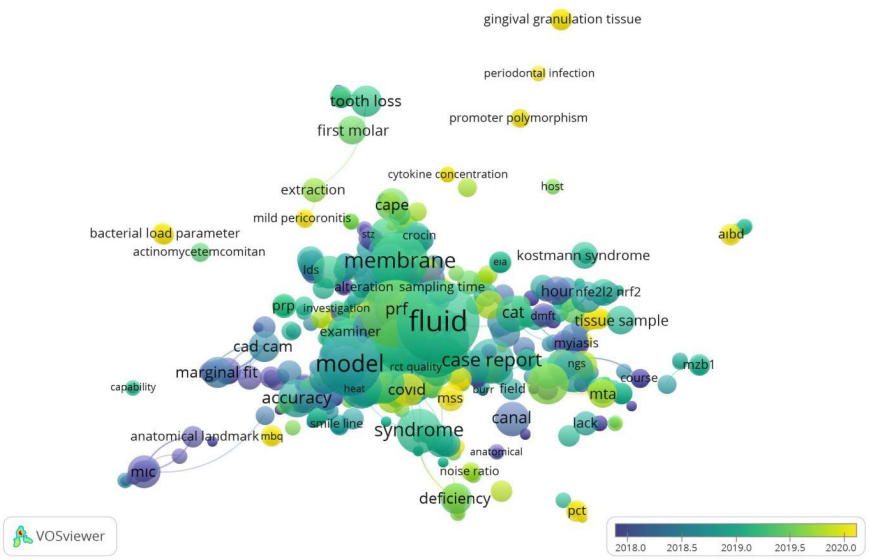

Figure 5 - Keywords and frequencies of studies published during the pandemic.

dental practices in Germany has been modelled and analyzed recently and remarkable financial stresses/pressure on dental practices with financial constaints has been reported [3]. Based on a questionnaire survey, data obtained from periodontists practicing in United Kindom were in line with reported financial concerns as well as quality of dental services [4]. All those concerns and limitations also likely had an influence on research activities. Still it is hard to measure challenges in healthcare research occurring during the pandemic period due to the differences in government based restrictions (self isolations, lockdowns), regulations, individual attitute and behaviours (hesitations to be in contact with people) [12].

Based on the present data there was a remarkable downside in the number of publications in the field of periodontology and implantology. Considering research category, while the number of clinical trials almost similar, the trend was downward in observational trials. This decrease could be interpreted as a possible shift in research grant on COVID-19 related areas. Although the scientific publication speed of COVID-19 related topics seem to be reduced [13] excess numbers of submissions on COVID-19 with a low level of evidence limits other research fields [14]. Present descriptive data did not evaluate quality and missing data (missing visits) which are important issues to record. Therefore, it is not possible to comment if operational and/or safety challenges influenced research activities during the pandemic. Future studies are needed probing the number of research projects that were halted or suspended earlier than the intendend time-point of evaluation or if there were changes in data collection methods and measured outcomes. Moreover, global data is still needed to compare current national status with different countries and trended research topics as well as quality of conducted research during and post-pandemic period.

CONCLUSION

There was a decrease in the number of publications during the pandemic in Turkey limited to two years period following declaration of pandemic. The present study highlighted the impact of the COVID-19 pandemic on publication rate in periodontology and implantology fields in Turkey. As the COVID-19 pandemic is not over, institutions and governments should prepare a guideline for researchers and policy makers that will guide researchers to correctly/timely decide to continue or suspend clinical trials while ensuring scientific progress safely and efficiently.

Author's Contributions

AA: Conceptualization, Methodology, Writing – Original Draft Preparation, Writing – Review & Editing, Supervision. MSY: Methodology, Validation, Investigation, Data Curation, Review & Editing. MEA: Data preperation, Statistical Analysis, Resources. HE: Conceptualization, Methodology, Review & Editing, Supervision.

Conflict of Interest

The authors have no proprietary, financial, or other personal interest of any nature or kind in any product, service, and/or company that is presented in this article.

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Regulatory Statement

This research did not involve any human and-or animal participants, therefore no ethical approval is needed.

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Supplementary files

Supplementary material accompanies this paper.

Table S1 - Search strategy for Web of Science, MEDLINE, Cochrane Library and SCOPUS

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