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Dental publications Saudi Arabia: A PubMed-indexed bibliometric study from 2014 to 2021

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Abstract---Bibliometric studies have been used to measure the progress of medical or non-medical disciplines. In addition, by applying bibliometric studies, it might be possible to evaluate the research institutions and support decision making at these institutions. An electronic affiliation search using PubMed was conducted for all clinical and non-clinical studies that were published by any Saudi Dental institution from January 2014 to December 2021. Two authors independently screened the title and affiliations of the identified articles in the MEDLINE database. The extracted data included the title, year of publication, type of study, and specialty. A total of 13,904 studies were screened initially in the MEDLINE database. A thousand and eighty-nine articles were included in the final analysis of this study. Review articles were the number one top-published type of study compared to original articles for the entire period. Out of 1089 included studies, 699 were review articles. Oral pathology topped the list with 218 published research papers. Periodontics came second with 147 published research papers over 8 years. Saudi dental publications in the PubMed-indexed database were promising and a progressive increase of research output can be noticed in the recent years.

Keywords---bibliometric analysis, dental publication, Saudi Arabia.

Introduction

Bibliometrics is defined as the science of measuring research success. (1) It is based on a set of methods, which can be utilized to investigate academic literature statistics and its changes over time. (2) It is intended to study academic

literature that share particular features. It discusses sequential development in different aspects of literature including the subject field, trends in publication, authors' productivity, research utility and occasionally helps in predicting future outlines of the literature. (3-4) It has been growing over time due to the evolving of eminent research databases and networking processes like Research Gate and Google scholar. (5) Areas of bibliometrics including topics, study design, and evidence-based medicine level of the top cited papers that could impact future research trends and clinical practice in the given field. (6-7)

Multiple papers related to bibliometrics have been documented in specialized dental journals. (8-9) There is sufficient evidence on bibliometric implemented in the medical literature. (10-11) However, it is confined to only few subjects in dentistry. (9) The specialty of dentistry is broad and includes a range of topics. This results in plentiful number of dental publications in the literature. (3) Some of the reported bibliometric studies related to dental field held consciously on specific countries or regions. (12-14) While others conducted on specific databases like International Scientific Indexing (ISI), Scopus or PubMed. (15,16)

Saudi Arabia has been evolving remarkably in the field of scientific research and knowledge development, particularly in the last decade. There are diligent governmental efforts to take research to higher levels through provision of adequate education funds and establishing recognized academic settings (17, 18). In 2019, the Times Higher Education released the international ranking of universities belonging to 86 countries. Saudi Arabia was included in this list with six universities (19). It is essential to study the productivity and research output of a nation to investigate institutions' performances. The aim of the present study is to evaluate the quantity and pattern of research designs of PubMed-indexed published dental studies in Saudi Arabia.

Material and Methods

A comprehensive affiliation search using PubMed was conducted for all clinical and non-clinical studies that were published by any Saudi Dental institution from January 2014 to December 2021. The inclusion criterion was any published study in the MEDLINE database that had at least one affiliation to a Saudi Dental institution. The terms used in the electronic search were "Saudi [ad] and Arabia [ad]." Two authors independently screened the title and affiliations of the identified articles in the MEDLINE database. The articles that did not meet our inclusion criterion were discarded immediately. In case of unclear relevance, the full text was retrieved for further analysis. Agreement was assessed by the two reviewers using the Cohen kappa test. Any disagreement was resolved by discussion.

Relevant clinical and non-clinical studies were initially retrieved, including systematic reviews, meta-analysis, randomized controlled trials, prospective/retrospective clinical studies, literature reviews, case reports, case series, and cross-sectional studies. The two authors independently reviewed the abstract and material and methods for all retrieved studies. The extracted data included the title, year of publication, type of study, and specialty. The type of the study was

identified based on the author's word. Extracted data were interpreted and analyzed over 8 years, and then subdivided per individual year.

Result

A total of 13,904 studies were screened initially in the MEDLINE database. After screening the title and abstract, 1687 studies were considered and identified. The articles that did not have any affiliation to a Saudi Dental institution or had been published before 2014 were excluded. Interobserver agreement for study selection was 0.87. A total of 1089 articles were included in the final analysis of this study.

Descriptive analysis

Over the period of 8 years, 1089 studies were identified. Starting from 2014, 62 studies were published in PubMed with affiliation to a Saudi Dental institution. The number went up to 97 published studies in 2015 with 56% growth. The total number of published studies remained the same in 2016, whereas in 2017 increased 38% to 134 studies. The published studies continued to increase to 171 and 175 studies with growth rate 28% and 2% in 2018 and 2019, respectively. Surprisingly, the total number of published studies dropped significantly (-33%) to 117 in 2020. However, in 2021 it went back up exponentially to 236 published studies with 102% growth rate. Figure.1a and b demonstrate the total number and the growth rate of dental publication for each year.

Specialty for published studies

There was a wide diversity of published articles from different specialties among national institutions. Oral pathology topped the list with 22% (n=221) of published research papers. Periodontics came second with 15% (n=151) of published research papers over 8 years. Restorative dentistry and implant research came next with 13% (n=135) and 10% (n=106), respectively. Few articles were categorized as multidisciplinary research with a total of only 23 articles. Published papers by specialty are demonstrated in figure 3.

The publication per year shows diversity among different specialties during the given period. Oral pathology had the maximum publications for the first 2 years. Then, periodontics topped the list for 2016 and 2017. However, oral pathology once again topped the list from 2018 to 2020. In 2021, most of the publications were in restorative dentistry. In 2020 there is generalized drop of the number of publications in almost all dental specialties. Figure 4.

Level of evidence

The included studies were 381 literature reviews (35%), 318 systematic reviews (29.2%), 170 case report/series (15.6%), 109 randomized controlled clinical (10%), 60 retrospective/prospective clinical studies (5.5%), 35 cross-sectional (3.2 %) and 16 experimental studies (1.5 %) [Figure 5a and b]. From those included, only 102 studies were systematic reviews and meta-analyses. In addition, 47 were case reports with literature reviews. After subdividing the type of study per year, for 5 years, the highest number of studies published were literature reviews. Whereas

the highest number of systematic reviews were published in 2018, 2019, and 2021 [Figure 6a and b].

Discussion

To best of our knowledge, this bibliometric study is the first in identifying the dental publications in Saudi Arabia using Pubmed. It shows an interesting trend in the top-published type of studies and specialty for the last 8 years from Saudi dental institutions. Ikram Ul Haq. et al, used Scopus database and reported that the annual growth rate of dental research in Saudi Arabia is 17.97% from 1998 to 2017. (23)

The number of dental publications in Saudi Arabia has been increasing during the last two decades for many reasons. First, the higher education institutions have multiplied in their numbers. Specifically, the number of public dental colleges in the kingdom have jumped from 3 in 2000 to 17 colleges in 2017 with a growth of 567%. (20, 21) Secondly, the documented number of licensed dentists by the end of 2016 was 16,887 compared to 12,785 dentists in 2014 and 786 dentists back in 1987. (22)

Review articles were the number one top-published type of study compared to original articles for the entire period. Out of 1089 included studies, 699 were review articles (64%). Systematic reviews and meta-analyses had the highest quality of evidence (24); however, they constituted less than half of the included published reviews. The second highest type of study was case report and case series, which is considered as low level of evidence (25). Both literature reviews and case studies are not high quality of evidence, but their unique role in developing procedures and improving clinician knowledge cannot be denied. Sophisticated clinical studies for all diseases were started as an observation and reported in a case study format first (26).

The comprehensive affiliation search for institutions was conducted from January 2014 to December 2021 because the search engine was changed by PubMed in 2014 to include multiple author affiliations for the same article. Our study was only limited to the MEDLINE database because it is the primary medical information resource for any clinician and only lists reputed journals. A scientific journal has to undergo an assessment process to be an indexed journal in MEDLINE (27).

During the whole 8-year period, oral pathology had the top-published studies in the first 5 years. Followed by periodontics in the next 2 years and restorative dentistry in the final year. By in depth analysis for all pathology studies, review articles and case reports were the most type of published studies, which are considered low level of evidence. Our result was similar to a recent bibliometric study for publications of general surgery in which case reports and low-quality evidence represented the majority of study designs (28). A new approach and improvement in teaching research methodology at a postgraduate and undergraduate level would be necessary to enhance the level of evidence and research interest among dental students. More studies are needed to evaluate the quality and statistically analyze the published dental research.

When the World Health Organization declared the COVID-19 pandemic as a global emergency and encouraged scientists to address crucial dilemma, the rapid increase of COVID-19 studies and publications began. At the same time, there was a clear global drop in the non-COVID-19 publications (29). In our study, the national dental publications decreased dramatically to 117 articles (deceased 33% compared to the prior year). Another explanation for this is the national lockdown for schools and all dental institutions during 2020 which had a remarkable impact on dental publications.

The limitation of this study is using Pubmed as the only analyzed database for the dental publications in Saudi Arabia. Using multiple databases would provide more representation of the dental research in the Kingdom.

Conclusion

Saudi dental publications in PubMed-indexed database is promising and progressive increasing of research output can be noticed in the recent years. It would be advantageous to enhance the level of evidence and anchorage the research interest of dental students.

Acknowledgments

The authors declare no conflicts of interest related to this study.

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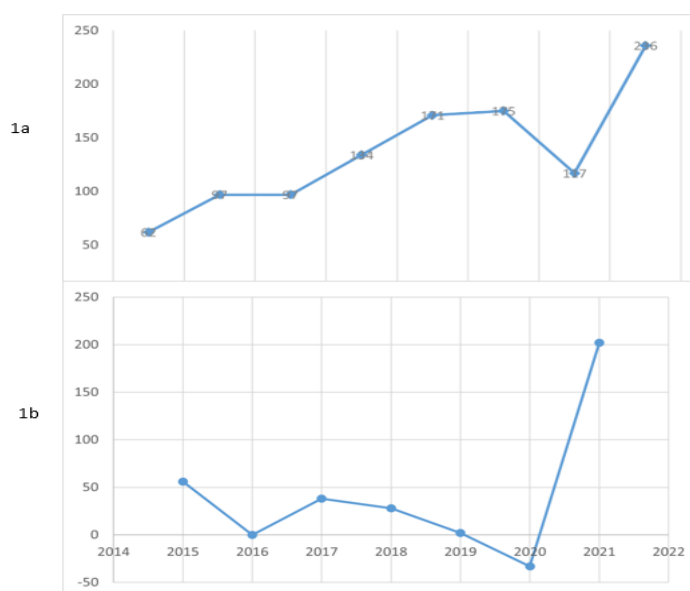


Figure 1a: This line chart demonstrate the total number of dental publications for each year and in Figure 1b : it demonstrate the growth rate of dental publication for the same time period.

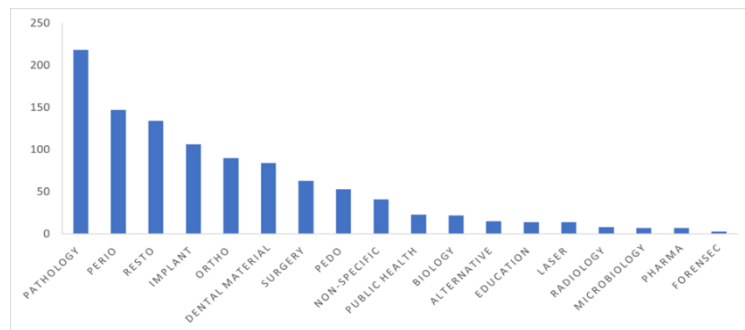


Figure 3: This bar chart demonstrates the included published articles by specialty

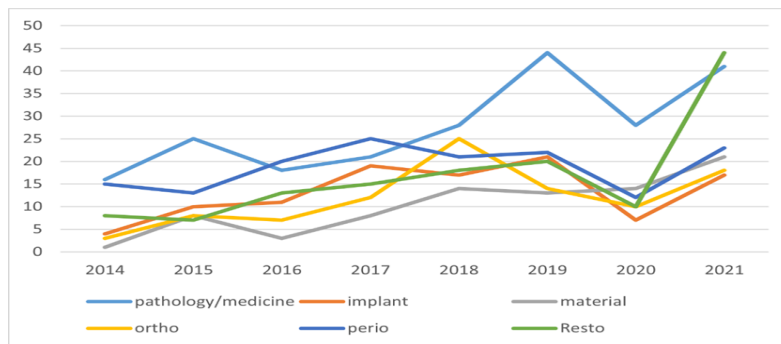
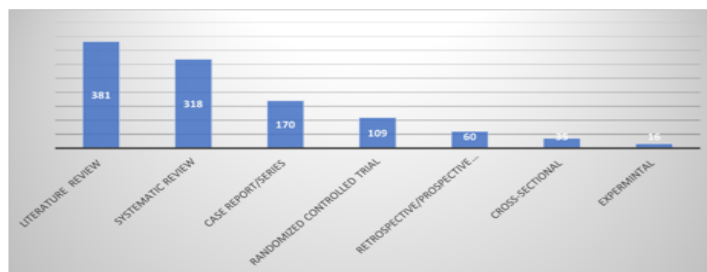


Figure 4: This line chart demonstrates the top published specialty during the whole 8-year period

5a



5b

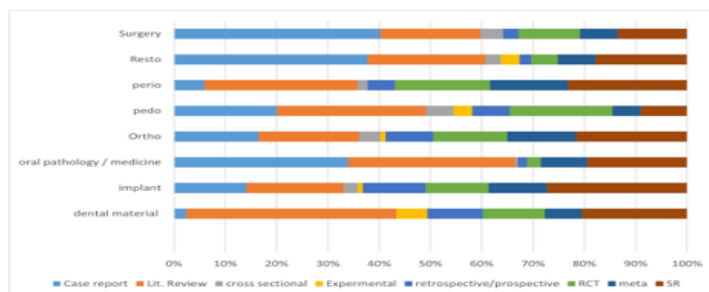


Figure 5a: This bar chart demonstrates the study design of all included studies.

Figure 5b: This stacked bar chart shows the percentage of each specific study design in comparison to the total.



Figure 6a: This line chart demonstrates the study design of all included studies during the first 4-year period whereas in Figure 6b, it shows the last 4-year.