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# SCOPUS citation analysis of publications from Saudi dental colleges

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**Title:** SCOPUS citation analysis of publications from Saudi dental colleges

**Running title:** SCOPUS citation analysis

## **ABSTRACT**

**Purpose:** Citation analysis is frequently employed to assess the research output of individuals, departments, and institutions. Intra-country institutional analysis of bibliometric analysis is needed to formulate appropriate research policies. To assess the research output of dental colleges in Saudi Arabia

**Research design:** An observational study was conducted for publications from Dental Colleges in Saudi Arabia using the SCOPUS database. The data for the years 2016-18 were retrieved for 18 dental colleges of the Kingdom of Saudi Arabia (KSA).

**Key findings:** The highest publication productivity was reported for King Abdulaziz University- Faculty of Dentistry (Jeddah). The highest number of publications in the years 2016-18 was from Jazan University- College of Dentistry. The highest h index for 2016-18 was 8 for Imam Abdulrahman Bin Faisal University- College of Dentistry. The journal in which the most articles were published was the Journal of Contemporary Dental Practice.

**Conclusions/Implications:** Jazan University- College of Dentistry, King Abdulaziz University- Faculty of Dentistry (Jeddah) and Imam Abdulrahman Bin Faisal University- College of Dentistry are the leading dental institutions in the KSA regarding the number of papers published, the number of citations and the h index. The increased focus on research in institutions in Saudi Arabia is evidenced by the steady rise in their number of publications.

**Keywords:** Citation analysis, Dental College, Publication, Research, Scopus

## **INTRODUCTION**

The Merriam-Webster dictionary defines research as an investigation or experimentation aimed at the discovery and interpretation of facts, the revision of accepted theories or laws in the light of new facts, or the practical application of such new or revised theories or laws. Creative work that is undertaken on a systematic basis with the purpose of increasing knowledge and to devise new applications is known as research (Hedge et al., 2017). The lack of research creates lacunae in education worldwide. A natural successor to research is academic publishing, which describes a system that is necessary for academic scholars to peer review work while making it available to a broader audience (Hedge et al., 2017, Raj, 2005). Research and publication are as essential to dentistry as they are to any other field.

Qualitative and quantitative evaluations of publications are used to measure the scientific activities of research institutes and universities worldwide (Latif, 2015, Tadmouri and Tadmouri, 2002). The research productivity/scientific publications of academic institutions constitute a crucial measure of their success and of the extent of their contributions to developing new knowledge.<sup>3</sup> Consequently, the research performance of faculty and their scientific publications are frequently regarded as an index of institutional prestige.

Academic institutions, federal agencies, publishers, editors, authors, and librarians increasingly rely on citation analysis, along with publication assessments and expert opinions, for making hiring, promotion, tenure, funding, and reviewer and journal evaluation and selection decisions (Durieux and Gevenois, 2010). The citation of one article by another is characteristic of scientific publications, and it is generally accepted that the number of citations of a particular article is a reflection of its impact in the scientific community (Rhen and Kronman, 2006).

The Kingdom of Saudi Arabia (KSA) has made a remarkable development in different fields of education, including in the medical and dental sciences, during the last two decades.

There has been a commendable rise in hi-tech research centers and universities. Consequently, research output, especially in the field of medical and dental sciences, is on the rise (Tadmouri and Tadmouri, 2002). There are 27 dental institutions in the KSA that provide training to local students in the art and science of dentistry. However, data on the research productivity of the dental institutions in the KSA are scarce. Hence, the present study was conducted to evaluate the trend of scientific publications produced by dental colleges in the KSA using the SCOPUS database for the years 2016 to 2018.

## **METHODS**

An observational study was conducted on the publications and citations for the Saudi dental colleges for the period of the last three years (2016-2018). The research documents produced by the researchers of various dental colleges in the KSA were browsed using bibliometric indicators from Elsevier's SCOPUS database. To obtain the profile of various Saudi Arabia universities in the SCOPUS database, we used the standard name (obtained from the university/institutional website) as a keyword. As the present systematic analysis of bibliometrics does not involve any medical/dental subject-related inquiries, Boolean operators were not used. The 'Affiliation' search option of the SCOPUS database was used to retrieve the data. The 'Affiliation match' option was explored to reveal any instances of multiple affiliations for a single university. The data for the total number of articles, total annual citations and the h index for each college were downloaded. To assess the recent publication productivity of the dental colleges, the citation data from the years, 2016-2018 were also recorded.

## **RESULTS**

Affiliation IDs of 18 dental colleges out of 27 were found in the SCOPUS database. The King Abdulaziz University- Faculty of Dentistry (Jeddah) published the most articles (453),

followed by Jazan University- College of Dentistry (203), and Najran University-College of Dentistry (2) published the fewest. However, the total number of citations varied. The King Abdulaziz University- Faculty of Dentistry (Jeddah) had the highest number of citations, followed by Imam Abdulrahman Bin Faisal University- College of Dentistry, and Najran University-College of Dentistry (Nil) had the lowest number of citations. The highest h index was 31 for King Abdulaziz University- Faculty of Dentistry (Jeddah), followed by 19 and 15 for King Saud University- College of Dentistry and Imam Abdulrahman Bin Faisal University- College of Dentistry, respectively. Table 1 summarizes the SCOPUS-based citation analysis of the dental colleges in the Kingdom of Saudi Arabia.

The citation analysis for 2016 to 2018 revealed a different picture. Jazan University- College of Dentistry published the most articles (174), followed by King Abdulaziz University- Faculty of Dentistry (Jeddah) (172), and Batterjee Medical College- Dentistry and Najran University-College of Dentistry(2) published the fewest. Imam Abdulrahman Bin Faisal University- College of Dentistry had the most citations, followed by Abdulaziz University- Faculty of Dentistry (Jeddah), and Batterjee Medical College- Dentistry and Najran University- College of Dentistry (Nil) had the fewest citations. Consequently, the highest H-Index was 8 for Imam Abdulrahman Bin Faisal University- College of Dentistry, followed by 7 and 6 for Abdulaziz University- Faculty of Dentistry (Jeddah) and King Saud bin Abdulaziz University for Health Sciences- College of Dentistry, respectively. Table 2 summarizes the SCOPUS-based citation analysis of dental colleges of Saudi Arabia for 2016-2018

Table 3 shows the top five journals in which the articles from Saudi dental colleges were published. The highest number of articles were published in the Journal of Contemporary Dental Practice followed by Journal of International Oral Health. Dr. Shankargouda Patil (87) published the most articles, followed by Dr. Alam MK (58) (Table 4).

## **DISCUSSION**

The present study was conducted to evaluate the research output of Dental colleges of the KSA using the SCOPUS database for the period from 2016 to 2018. It is encouraging to note that the publication productivity of the dental fraternity of the KSA is steadily growing, with more than eight hundred papers published from 2016-2018.

The citations index and H-Index are time-dependent. Older articles tend to have more citations compared to recent articles. Similarly, older institutions have more citations and a higher H-Index compared to newer upcoming institutions. To overcome this bias, we have included the time frame of the last 3 years (2016 to 2018) for the retrieval of publication data and its analysis. This time restriction enables us to provide a snapshot of the current status of any institution and to perform inter-institutional comparisons.

The SCOPUS database was developed by Elsevier, combining the characteristics of both PubMed and Web of Science. These combined characteristics allow for enhanced utility, both for medical literature research and academic needs (citation analysis), yet access to the database is not free. It also offers powerful features for browsing, searching, sorting, and saving functions, as well as for exporting data to citation management software. Coverage in SCOPUS goes back to 1966 for bibliographic records and abstracts and to 1996 for citations (Falagaas et al., 2008, Meho and Yang, 2007).

Apart from SCOPUS, Web of Science (WoS) also provides institution-specific publication and citation analyses. There could be variations in the number of citations for any particular article reported by WoS, Google Scholar, and SCOPUS. Usually, Google Scholar and SCOPUS assign higher citation numbers than WoS. Although WoS is a widely recognized and accepted database by the scientific community, this index does not always include citations

from textbooks and journals published in languages other than English. In the present analysis, we have used only the SCOPUS database due to a limitation in the availability of resources.

Citation analyses are conducted by information scientists to appraise and evaluate the research growth of the published literature for a targeted period to recognize the academic publication trends, such as publications, authorship, regional, national and international collaborations and other significant details of any specific literature (Swain and Panda, 2012). Such studies play a vital role in formulating policies and in medical decision-making about the advancement of research programs and the allocation of resources (Jamjaan, 2017).

Research publications and academic communication in scientific journals is the most reliable gauge to measure the research output of any country, organization and a specific branch of knowledge. Journal literature provides current and up-to-date information that has been considered the backbone of the research collection and is compulsory for education, research, and patient care (Tadmouri and Tadmouri, 2002). Rattan opined that innovative research with original findings and emerging applications of existing knowledge are published in journals (Rattan, 2011). According to the indexing of Scimago Journal and Country Ranking, the KSA was ranked 26<sup>th</sup> in 2005, with 29 dental sciences publications, but it was ranked 10<sup>th</sup> in 2017, with 336 publications. The United States topped the ranking in 2017, with 1430 publications, followed by Brazil (1360), India (889) and the United Kingdom (766). Based upon the Scimago database, the overall position of the KSA in the field of dentistry is 18, based upon 1770 documents with 11395 citations, and its H-Index rank is 43 (International Science Ranking, 2018).

Data on the assessment of biomedical publications from the KSA are scarce. Haq (Haq, 2017) analyzed the research productivity of 775 items produced by the researchers of King Saud bin Abdul Aziz University for health science, and only 14 articles on dentistry were



identified. This research was based on the information collected from the Thomson Reuters Web of Science database.

Ahmed (Ahmed, 2016) examined the papers on dentistry produced in Libya from 2003 to 2013, and data for 40 articles were found in the PubMed database out of 358 biomedical publications. A study was conducted by Sadeghi et al (Sadeghi et al., 2012). to evaluate the publication of dental research produced in Iran over 20 years (1990 to 2009). Data were taken from PubMed and Iran Medex, and 671 articles were collected by authors affiliated with Iran.

The government of Arabia has been providing substantial financial support for education, especially at higher education levels. Additionally, authorities are generous in giving support to the provision of international scholarship and research grants (Latif, 2015). The present research revealed that the number of dental colleges, research journals on dentistry and research publications in the KSA has increased during the last decade. However, concrete efforts are required to enhance the growth of publications in dentistry, through international collaboration, increasing the of quality research and formulating national research policy.

The present study was conducted utilizing only the SCOPUS database, but future researchers may include the bibliographic citations from the Google Scholar and Web of Science databases. To accurately evaluate and rank scholars, journals, and departments by way of citations, one should employ both WoS and SCOPUS to generate accurate citation accounts because these two databases largely complement rather than replace each other (Meho and Yang, 2007). This study is quantitative; however, qualitative studies can be conducted in the future by using the Impact factor scale of journals, the area of research and the type of papers published.

It is well known that meta-analysis, systematic review, randomized controlled trials, cohort studies, and case-control studies are highly important article types. In contrast, editorials, commentaries, and letters to the editor are less important articles. In the present

bibliometric analysis, there were no restrictions on the types of articles in the inclusion and exclusion criteria. Hence, in terms of the number of publications, it is very difficult to comment on the quality of the papers. We recommend that future studies analyze the quality of papers to better understand the actual research performance of the universities.

In conclusion, this is a first-of-its-kind publication and citation analysis of various dental colleges in the KSA region. Jazan University- College of Dentistry, King Abdulaziz University- Faculty of Dentistry (Jeddah) and Imam Abdulrahman Bin Faisal University- College of Dentistry are the leading dental institutions in the KSA regarding the number of papers published, the number of citations and the H-Index. It is recommended that this kind of analysis be conducted at regular intervals to understand the national trend, which can be used to inform research policies. We also advocate for performing a comparative analysis of different publication and citation databases when analyzing these data for a particular country.

#### **CLINICAL SIGNIFICANCE**

Research output in the university environment is an important gauge to evaluate the productivity of faculty members. Efforts need to be directed towards promoting research and publications in the dental institutions that are not at the forefront in these areas.

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**Table1.** SCOPUS-based citation analysis of the dental colleges in the Kingdom of Saudi Arabia.

S. No.	Name of college	No. of publications	Total citations	H index
1	King Abdulaziz University- Faculty of Dentistry (Jeddah)	452	3965	31
2	Jazan University- College of Dentistry	203	336	8
3	Imam Abdulrahman Bin Faisal University- College of Dentistry	197	1177	15
4	King Khalid University- College of Dentistry	138	379	10
5	Al Jouf University- College of Dentistry	107	210	8
6	Salman bin Abdulaziz University- College of Dentistry (Prince Sattam Bin Abdulaziz University)	86	161	7
7	King Saud University- College of Dentistry	74	978	19
8	King Saud bin Abdulaziz University for Health Sciences- College of Dentistry	61	230	9
9	Qassim University- College of Dentistry (al Qassim University)	40	79	6
10	Umm Al-Qura University -College of Dentistry	35	91	5
11	King Faisal University – College of Dentistry (Al Ahsa)	26	321	8
12	Taif University- Faculty of Dentistry	19	21	3
13	Ibn Sina National College for Medical Studies – Dentistry (Jeddah)	14	19	3

14	Al Majmaa's University- Faculty of Dentistry at Al Zulfi (Majmaah University)	11	9	2
15	University of Hail- College of Dentistry	7	5	1
16	Batterjee Medical College- Dentistry (King Abdulaziz University, College of Medicine and Allied Sciences)	6	69	4
17	Al Baha University- Faculty of Dentistry	3	2	1
18	Najran University- Dentistry	2	-	-

**Table 2.** SCOPUS-based citation analysis of dental colleges of Saudi Arabia for 2016-2018.

s. No.	Name of college	No. of publications (2016-18)	Total citations (2016-18)	H index (2016-18)
1	Jazan University- College of Dentistry	174	181	5
2	King Abdulaziz University- Faculty of Dentistry (Jeddah)	172	216	7
3	Imam Abdulrahman Bin Faisal University- College of Dentistry	123	250	8
4	Al Jouf University- College of Dentistry	90	69	4
5	King Khalid University- College of Dentistry	82	48	3
6	Salman bin Abdulaziz University- College of Dentistry (Prince Sattam Bin Abdulaziz University)	69	67	4
7	King Saud bin Abdulaziz University for Health Sciences- College of Dentistry	37	86	6
8	Qassim University- College of Dentistry (al Qassim University)	30	52	4
9	Umm Al-Qura University -College of Dentistry	24	31	3
10	King Faisal University – College of Dentistry (Al Ahsa)	18	130	5
11	Taif University- Faculty of Dentistry	17	15	3
12	King Saud University- College of Dentistry	13	15	2

13	Al Majmaa's University- Faculty of Dentistry at Al Zulfi (Majmaah University)	11	9	2
14	Ibn Sina National College for Medical Studies – Dentistry (Jeddah)	8	10	2
15	University of Hail- College of Dentistry	6	5	1
16	Al Baha University- Faculty of Dentistry	3	2	1
17	Batterjee Medical College- Dentistry (King Abdulaziz University, College of Medicine and Allied Sciences)	2	0	0
18	Najran University- Dentistry	–	–	–



**Table 3.** Top 5 journals based on the number of publications for the years 2016-18.

S. No.	Journal Name	No. of articles
1	Journal of Contemporary Dental Practice	134
2	Journal of International Oral Health	34
3	Journal of International Society of Preventive and Community Dentistry	24
4	World Journal of Dentistry	23
5	Malocclusion Causes Complications and Treatment	18

**Table 4.** Top 5 authors based on the number of publications for the years 2016-18.

<b>Rank</b>	<b>Authors name</b>	<b>Present Affiliation</b>	<b>No. of articles</b>	<b>Total citations (2016-18)</b>	<b>H index (2016-18)</b>
1	Shankargouda Patil	Department of Maxillofacial Surgery and Diagnostic Sciences, Division of Oral Pathology, College of Dentistry, Jazan University	87	69	4
2	Mohammad Khursheed Alam	Department of Orthodontics, College of Dentistry, Jouf University	58	21	2
3	A. Thirumal Raj	Department of Oral Pathology and Microbiology, Sri Venkateswara Dental College and Hospital, Dr. MGR Medical University	20	9	1
4	Halboub Esam	Department of Maxillofacial Surgery and Diagnostic Sciences, Division of Oral Medicine, College of Dentistry, Jazan University	16	16	3
5	Zohaib Khurshid	Department of Prosthodontics and Implantology, College of Dentistry, King Faisal University	12	125	5