

## Assessment of Scientific Productivity of Health Sciences University in Central India using Bibliometric Analysis of Published Materials from Scopus and Web of Science Databases between 2017 to 2019.

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### Abstract:

**Background:** Bibliometrics is an important tool for the study and analysis of scientific activities of a researcher, institute, and University. Bibliometrics is very much helpful in the assessment of qualitative indicators of research impact like peer review, grants received, patents and awards received. This is the study of Bibliometric analysis of the publications affiliated to the Health Sciences University in Central India published between 2017 to 2019 in Scopus and Web of Science databases.

**Methodology:** This retrospective observational study included accessing the publications affiliated to the Health Sciences University in Central India on Scopus and Web of Science databases with predefined search criteria. The results were compiled and compared for Scopus and Web of Science databases followed by graphical representation of key bibliometric findings for the period of 2017-2019.

**Results:** Total 607 publications were retrieved through the search in Scopus and Web of Science Databases which included 345 in Scopus and 262 in web of science. The Collaboration Index of publications in web of science was greater than publications in Scopus database. Total 125 articles were available in both the databases. So 482 articles were considered for analysis.

**Conclusion:** The progress of the Health Sciences University in terms of Scientific Production in both databases is good over last three years and expected to improve further in coming years.

**Keywords:** Bibliometric, Scopus, Web of Science, Indexing, Publications, University.

## Background:

Bibliometrics, the term coined by Pritchard in 1969 is one of the analytical methods, frequently used in library and information sciences for analyzing scientific literature<sup>[1]</sup>. It facilitates the analysis of impact of research outputs, quality and impact of research. Bibliometrics is an important tool for the study and analysis of scientific activities of a researcher, institute, and University. The bibliometric data of researchers and institutions is essential for various purposes like applying for accreditation, project calls, funding grants, University strategic purposes, assessment of scientific outputs, reporting to public administration, accreditation of PhD programmes and outline research policies and dissemination activities of the institution. Bibliometrics is very much helpful in the assessment of qualitative indicators of research impact like peer review, grants received, patents and awards received [1].

Reference investigation is a usually utilized bibliometric technique which depends on building the reference chart, a system or diagram portrayal of the references between records. Many exploration fields use bibliometric strategies to investigate the effect of their field, the effect of a lot of analysts, the effect of a specific paper, or to recognize especially significant papers inside a particular field of examination. Bibliometrics likewise has a wide scope of different applications, for example, in unmistakable etymology, the advancement of thesauri, and assessment of peruser usage. Historically, bibliometric strategies have been utilized to follow connections among scholarly diary references. Reference investigation, which includes looking at a thing's alluding reports, is utilized in scanning for materials and breaking down their merit. Citation files, for example, Institute for Scientific Information's Web of Science, permit clients to look forward in time from a realized article to later distributions which refer to the known thing. Information from reference records can be broke down to decide the fame and effect of explicit articles, writers, and publications. Using reference investigation to measure the significance of one's work, for instance, is a huge piece of the residency audit process. Information researchers likewise use reference examination to quantitatively survey the center diary titles and watershed distributions specifically trains; interrelationships between writers from various organizations and ways of thinking; and related information about the human science of the scholarly community. Some increasingly down to business utilizations of this data incorporates the arranging of review catalogues, "giving some sign both of the period of material utilized in an order, and of the degree to which later distributions supplant the more established ones"; demonstrating through high recurrence of reference which reports ought to be chronicled; contrasting the inclusion of optional administrations which can assist distributors with measuring their accomplishments and rivalry, and can help curators in assessing "the viability of their stock". There are additionally a few restrictions to the estimation of reference information. They are frequently inadequate or one-sided; information has been to a great extent gathered by hand [which is costly], however reference files can likewise be utilized; inaccurate referring to of sources happens constantly; consequently, further examination is required to genuinely comprehend the method of reasoning behind referring to permit it to be certainly applied.

Bibliometrics are presently utilized in quantitative exploration appraisal activities of scholastic yield which is beginning to undermine practice based examination. Indexation of journals is another key issue reflecting quality of published materials. Web of Science is one of the publisher-independent and the best citation database trusted globally. Web of Science database marks the basis of most of the bibliometric studies. As per the records of Journal Citation Reports [JCR]- 2019, the ISI Web of Science database includes 11877 journals from about 81 countries. Scopus being the biggest and well known abstract and citation database of

scientific literature, is very convenient for accessing the research outputs in medical literature and it's smart features facilitate easy tracking and analysis. Scopus and Web of Science databases are multidisciplinary and differ in terms of their coverage, focus, and the analytical tools. It is an open-source instrument for quantitative exploration in scientometrics and bibliometrics that incorporates all the principle bibliometric strategies for investigation. With biblioshiny, the gleaming application presented from adaptation 2.0, bibliometrix has gotten exceptionally simple to utilize in any event, for the individuals who have no coding abilities. Bibliometrix bundle gives different schedules to bringing in bibliographic information from SCOPUS, Clarivate Analytics' Web of Science, PubMed, Digital Science Dimensions and Cochrane databases, performing bibliometric examination and building information lattices for co-reference, coupling, logical joint effort investigation and co-word investigation[1].

Bibliometrix is an exceptional instrument, created in the measurable figuring and realistic R language, as per a consistent bibliometric work process. R is profoundly extensible on the grounds that it is an item situated and utilitarian programming language, and along these lines is truly simple to computerize investigations and make new capacities. As it has an open-programming nature, it is additionally simple to find support from the clients' locale, principally made by noticeable analysts. Subsequently, bibliometrix is adaptable and can be quickly updated and can be incorporated with other measurable R-bundles. That why, it is helpful in a continually changing science, for example, bibliometrics. Today bibliometrix is something other than a measurable device. It is turning into a network of global designers and clients who trade questions, impressions, suppositions, and models inside an open source venture. Bibliometrix incorporates all the primary bibliometric strategies for investigation, however we use it particularly for science mapping and not for estimating science, researchers, or logical efficiency. Orchestrating past exploration discoveries is one of the most significant assignments in propelling a line of examination. Different strategies exist to sum up the measure of logical action in a space, however bibliometrics can possibly present a deliberate, straightforward and reproducible survey process. This is applicable during a time when the quantity of scholastic distributions is ascending at an extremely quick pace and it is progressively unfeasible to monitor everything that is being distributed; and when the accentuation on observational commitments is bringing about voluminous and divided examination streams, and a challenged field. Writing audits are progressively assuming a urgent job in incorporating past exploration discoveries to viably utilize the current information base, advance a line of examination, and give proof based bits of knowledge into the act of practicing and continuing expert judgment and skill. The mind-boggling volume of new data, theoretical turns of events and information are the milieu wherein bibliometrics gets valuable, by giving an organized investigation to a huge assortment of data, to gather inclines after some time, topics explored, recognize moves in the limits of the orders, to distinguish most the prolific researchers and organizations, and to show the "master plan" of surviving exploration.

This study was conducted for Bibliometric analysis of the publications affiliated to the Health Sciences University in Central India published between 2017 to 2019 in Scopus and Web of Science databases.

### **Objectives:**

1. To assess the trend of publications affiliated to Health Sciences University over the period of last 3 years.
2. To analyze and compare the pattern of citations, network collaborations and research area of publications in Scopus and Web of Science databases.

## Methodology:

This retrospective observational study included online access to Scopus and Web of Science database through Login into corresponding website followed by Affiliation search. The search query input for Scopus database was List of total 345 documents was obtained for the years 2017-2019.

From ISI Web of Science database, publications affiliated to the Health Sciences University were searched from the using the specified search terms [Annexure-3 [1]] with English as the language of writing and publication for the period from 2017 December 2019. Key bibliometric information was retrieved later which included author names and author affiliations, journal names, title of publication, year of publication, document type, etc. List of total 137 documents was obtained after removing duplicates obtained from list of publications in Scopus database for the years 2017-2019.

Duplicates publications in both databases were identified using Zotero from folders of Research area wise publications data. Key bibliometric information was retrieved which included author name, affiliation, journal name, publication title and year and document type. The two Bibtex files of Scopus and Web of science lists were exported to R-Studio Application. Imported data was downloaded and used to create bibliographic data frame. Basic information of publications was summarized using descriptive statistics which included number of citations, citation density, journals, publication year, authors, institution, and country of origin.

## Current status of knowledge:

Total 607 publications were retrieved through the search in Scopus and Web of Science Databases which included 345 in Scopus and 262 in web of science. The Collaboration Index of publications in web of science was greater than publications in Scopus database. Total 125 articles were available in both the databases. So 482 articles were considered for analysis. The majority of published documents were Journal Articles. The details of type of documents are summarized in Table 1.

**Table 1: Types of Documents in Scopus and Web of Science Searches**

	Web of Science		Scopus	
SN	Type of Document	Number	Type of Document	Number
1	ARTICLE	185 [70.61%]	ARTICLE	294 [85.21%]
2	BOOK CHAPTER	2 [0.76%]	BOOK CHAPTER	3 [0.86%]
4	BOOK REVIEW	1 [0.38%]	BOOK REVIEW	0
5	EDITORIAL MATERIAL	14 [5.34%]	EDITORIAL	11 [3.18%]
6	LETTER	15 [5.72%]	LETTER	12 [3.47%]
7	MEETING ABSTRACT	29 [11.06%]	NOTE	4 [1.15%]
8	PROCEEDINGS PAPER	1 [0.38%]	PROCEEDINGS PAPER	0
9	REVIEW	17 [6.48%]	REVIEW	21 [6.08%]
	Total	262	Total	345

## Figures:

Fig. 1 indicates the number of publications in respective years. In Scopus, total publication in 2017 were 122; 104 in 2018 and 119 in 2019. In Web of science total publication in 2017 were 74; 71 in 2018 and 117 in 2019.

Figure 1 : Bar Chart of Yearwise Publications in Scopus and WoS

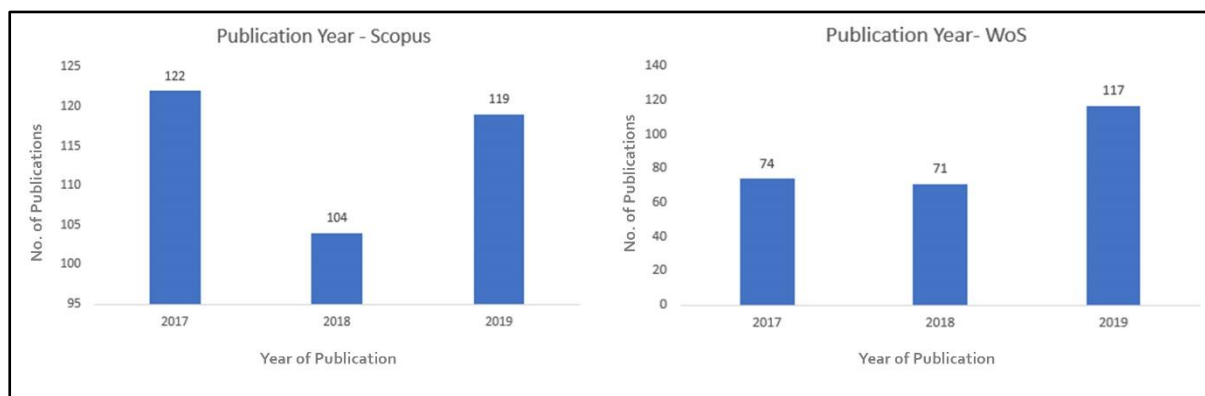


Fig.2 shows the type of documents published. In Scopus database documents included 294 Articles, 21 Reviews, 12 Letters, 11 Editorials, 4 Notes and 3 Book chapters. Web of Sciences database included 185 Articles with 17 reviews, 14 Editorial material, 1 Book review, 29 Meeting Abstract, 15 Letter, 2 Book chapter and 1 Proceedings Papers.

Figure 2 : Bar Chart of Types of Documents Published.

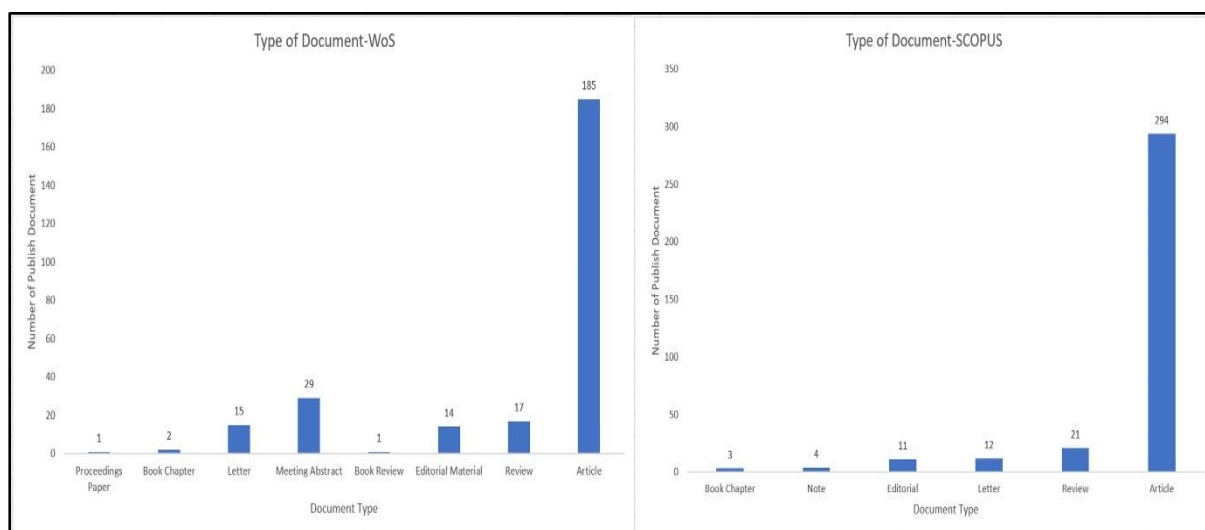


Fig.3 indicates Keyword Co-occurrence - a concept which refers to the common presence, frequency of occurrence, and close proximity of similar keywords present across several articles. Co-occurrence may include keywords that are similar to each other and based on the same topic, but are not exactly the same. In Scopus, Most coomonly occurring keyword was 'Human'; followed by 'Article'. In WoS, the most commonly occurring keyword was 'Oral Submucous Fibrosis'; followed by 'Systematic Review'.

Figure 3: Keyword Cooccurrences Plot.

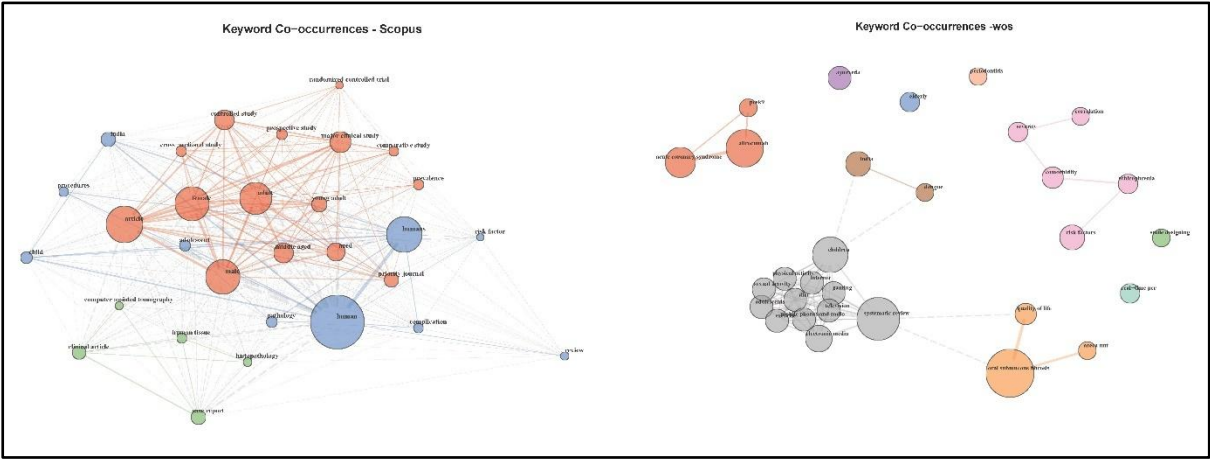


Fig. 4 shows the author collaboration Network that depicts the collaboration between an author and other authors in a dataset. Two authors collaborate when they are both listed as authors in the Web of Science as well as Scopus dataset. The number on connection line depicts the number of collaborations between authors. The WOS data showed highest number of collaborations compared to Scopus.

Figure 4: Author Networks Plot

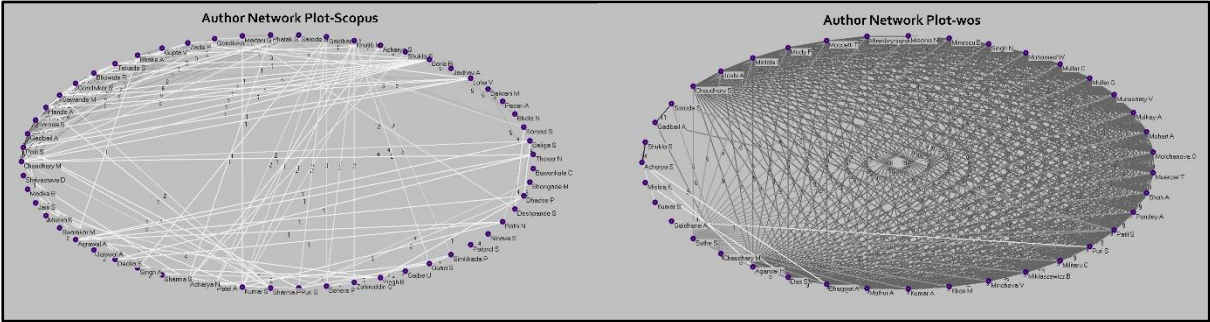
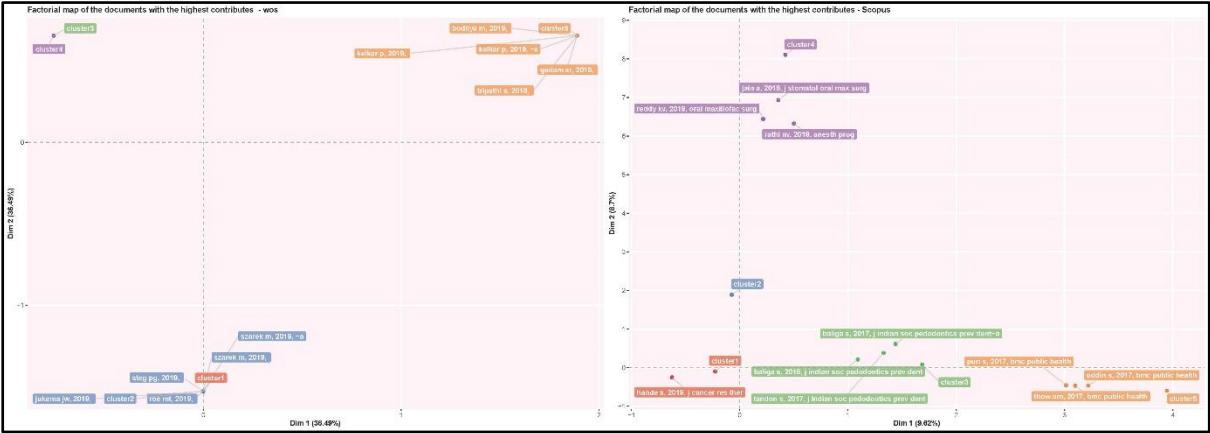


Fig. 5 indicates factorial map of documents with the highest contributions in Web of Sciences and Scopus dataset.

Figure 5: Factorial map of documents with the highest contributes



The Collaboration Index of Scopus database publications was 6.84 whereas that of Web of Science database was 9.31.

The Duplicate Publications in both databases were identified and listed as per the Research Areas as below-

1. Medicine[2-55]-54
2. Biochemistry[56-74]- 19
3. Dentistry[75-89]-15
4. Material Science[90-91]-2
5. Environmental Science[92]-1
6. Health Profession[93]-1
7. Multidisciplinary[94]-1
8. Neuroscience[95] -1
9. Psychology [96-100]-5

In these three years period, the highest number of publications in Web of Science indexed journals was 117 in the year 2019 whereas the highest number of publications in Scopus Indexed journals was 122 in the year 2017. The trend of total citations from both databases is almost similar.

### **Discussion:**

In web of science publications, journal articles comprised a major part [70.61%] followed by meeting abstract [11.06%] and Editorial material [5.34%]. In Scopus indexed publications, Articles comprised a major part [85.21%] followed by review articles [6.08%] and Letter to Editor [3.47%]. Thus publications in Scopus are mainly Articles which are more in number compared to those in WOS.

Annual Percentage Growth Rate was 25.74105 in web of science compared to Annual Percentage Growth Rate of 2.036873 in Scopus. Thus WOS has higher number of publications over last three years affiliated to Health Sciences University and growth of scientific publication in WOS is more than 12 times compared to that of Scopus.

In Scopus Database publications, Number of Authors were 2238 with 2912 Author Appearances. Authors of 23 single-authored documents were 13 whereas Authors of multi-authored documents included 2225 names. Documents per Author were 0.155, Authors per Document were 6.45 and Co-Authors per Document were 8.39. In Web of science database publications, Number of Authors 2286 with 14877 Author Appearance. Authors of 15 single-authored documents were 18 whereas Authors of multi-authored documents were 2271. Documents per Author were 0.115, Authors per Document were 8.73 Co-Authors per Documents were 56.8. No. of Authors and Co-authors per document are higher WOS based publications compared to those in Scopus.

For Scopus Indexed publications, Most Relevant Sources included-

1. JOURNAL OF DATTA MEGHE INSTITUTE OF MEDICAL SCIENCES UNIVERSITY-117
2. JOURNAL OF INDIAN SOCIETY OF PEDODONTICS AND PREVENTIVE DENTISTRY-15
3. JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH -14
4. JOURNAL OF KRISHNA INSTITUTE OF MEDICAL SCIENCES UNIVERSITY -11
5. SAUDI JOURNAL OF KIDNEY DISEASES AND TRANSPLANTATION: AN OFFICIAL PUBLICATION OF THE SAUDI CENTER FOR ORGAN TRANSPLANTATION SAUDI ARABIA -7
6. JOURNAL OF CONTEMPORARY DENTAL PRACTICE -5

7. NATIONAL JOURNAL OF PHYSIOLOGY PHARMACY AND PHARMACOLOGY - 5
8. CONTEMPORARY CLINICAL DENTISTRY -4
9. INDIAN JOURNAL OF MEDICAL RESEARCH -4
10. WORLD JOURNAL OF DENTISTRY -4

For web of science Indexed publications, Most Relevant Sources included –

1. JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH -37
2. JOURNAL OF EVOLUTION OF MEDICAL AND DENTAL SCIENCES-JEMDS- 32
3. INDIAN JOURNAL OF PSYCHIATRY-18
4. INTERNATIONAL JOURNAL OF AYURVEDIC MEDICINE-13
5. JOURNAL OF KRISHNA INSTITUTE OF MEDICAL SCIENCES UNIVERSITY -11
6. SAUDI JOURNAL OF KIDNEY DISEASES AND TRANSPLANTATION - 7
7. TRANSPLANTATION- 6
8. INDIAN JOURNAL OF MEDICAL SPECIALITIES- 5
9. CONTEMPORARY CLINICAL DENTISTRY- 4
10. INDIAN JOURNAL OF MEDICAL RESEARCH-4

### **Conclusion**

The progress of the Health Sciences University in terms of Scientific Production in both databases is good over last three years. The collaboration Index for Publications showed progress in both Indexing Databases. The trend of publications and citations in both databases is variable over the period of last three years and is expected to improve further in coming years.

### **"What is known"**

1. Hardly any paper on bibliometric analysis of this University is published.
2. The dissemination of data on Scientific Production of the University will be helpful for academic research purposes and for future Scientific researches.

### **What this study adds:**

1. This study adds the data on scientific production of the University over last 3 years.
2. Gives an idea about the progress made over last three years in terms of Medical Science literature.

### **Competing interests:**

The authors declare no competing interest.

### **Authors' contributions:**

Mr. Roshan Umate and Shital Telrandhe created the Search Query, Accessed the Databases and imported the list of publications from WOS and Scopus.

Mr. Roshan Umate and Aniket Pathade analysed the data, prepared tables , charts and designed the Figures/Graphs using R-studio.

Dr. Manoj Patil organized data, prepared the Technical template, and prepared the manuscript.



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