

Bibliometric Analysis of Oral Hygiene Related Scientific Productions of Health Sciences University in Central India.

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Abstract:

Introduction: Bibliometrics is the quantitative analysis of the published scientific literature to give the valuable information pertaining to the specific subject. Over the years, oral health has never received its due importance among the Indian population and most common oral diseases cited among the Indians are dental caries and periodontal diseases. Array of published data exists for the oral hygiene practices, oral hygiene status and impact of the oral hygiene training in the improvement of oral health status for the different groups of population. The current bibliometric study was taken up with the aim to statistically analyse the available literature on oral hygiene in central India.

Methodology: The web of Science database was accessed with pre-framed specific search query and list of publications on Oral Hygiene was derived. This list was filtered for the Country -India. The list of 1148 documents was obtained which was downloaded as Bibtex and imported in R-Studio Application for analysis of the data. The graphs and plots were generated using R-Studio with Bibliometric Package.

Results: Total 1148 documents were available for the search related to country India from 680 sources (Journals, Books, etc.) over a period 1991 – 2020. The Author list included total 3694 Authors. Single-authored documents were 59. Authors per Document were 3.22 and Co-Authors per Document were 4.4. The Collaboration Index of all publications was 3.35. Annual Percentage Growth Rate was 15.16369.

Conclusion: This bibliometric study has thrown light on the oral hygiene publications in the Central India, and considering the available literature, it is quite impressive due to the sheer number of published articles.

Keywords: Oral Hygiene, Bibliometrics, Central India, Publications, Articles, Citations

INTRODUCTION

Bibliometric studies are done with the sole intention to measure the impact of publication on particular subject to the scientific community. It is the quantitative analysis of the published scientific literature to give the valuable information pertaining to the subject.¹In recent years, it has become more popular owing to its validity in recognizing the performance of the article, the authors and their institution. Through this the existing scientific gap can be assessed and the way to overcome such gaps can also be planned.²

According to World Health Organization (WHO) Oral health is the key indicator of the individual's overall health, well-being and quality of life. And same agency suggests that most of the oral diseases are preventable and if treated at the early stages may prevent them from becoming debilitating diseases. Good oral health is not only the absence of disease but also the normal functionality of orofacial apparatus. Poor oral health may exhibit with the array problems including dental caries, periodontal disease, tooth loss, oral cancers, oral infections etc. Deterioration of the oral health is many times linked to the poor oral hygiene.³

According to medical dictionary, oral hygiene is defined as “the practice of keeping the mouth clean and healthy by brushing and flossing to prevent tooth decay and gum disease”.⁴ Most of the health agencies worldwide recognize the importance of good oral hygiene and are lending active hand in promotion of the good oral hygiene practices.^{5,6,7,8}

Recently, India is considered as a developed country, nevertheless 69% of its population comes from rural areas.⁹ Over the year's oral health has never received its due importance among the Indian population. Common oral diseases cited among the Indians are dental caries and periodontal diseases. Epidemiological studies have shown that multiple factors influence the oral hygiene. Poor oral hygiene status is the main reason for this high prevalence of these diseases.¹⁰

Most of the people tend to brush once daily and that too the method of cleaning was improper leading to the teeth wear and periodontal problems. Other than this the factors like age, education, socioeconomic status and habits also played the major role in the deterioration of oral hygiene status in Indians. Limited number of people felt the need to visit the dental hospitals or clinics even if the problem existed as they considered it as a least priority.¹¹

Keeping these factors in mind, there is a need to change and implement the oral health related policies in India.¹² However, the changes are hard to bring considering the heterogeneous population of India. Urban population with their life style and dietary habits are the target for the poor oral hygiene condition and the rural population owing to the lack of education related to the oral hygiene practices and deleterious oral health habits are at the risk of developing oral health diseases. Behaviour and life style changes are the key to improve the oral hygiene related quality.

Over the years, it has been proven that the oral hygiene, the dental plaque, dental calculus and gingival inflammation are associated with the increase in the mortality rate. Poor oral health is linked with cancer, cardiovascular disease, non-cancer and non-cardiovascular diseases mortality.¹³ Oral cancers are the third highest type of cancers prevalent throughout the world.

Poor oral health effects the persons with the debilitating diseases like chronic kidney diseases, diabetes mellitus patients, cardiovascular diseases and the pulmonary disorders. Poor oral health condition may lead to systemic inflammation, infection, protein wasting, and the development of atherosclerotic lesions which increase the morbidity and mortality rate in these patients.¹⁴

The scientific research in the field of oral hygiene is explicit. Array of published data exists for the oral hygiene practices, oral hygiene status and impact of the oral hygiene training in the improvement of oral health status for the different groups of population. Even the data available for evaluating the oral hygiene status is heterogeneous. Original research work with multifactorial parametric variables, reviews, and books are few of the sources for the oral hygiene related publication. Young budding researcher may find it difficult to assimilate the overflow of data, wide spread across various journals, books and online platforms. Therefore, a study which could address and update the major publication related to the oral hygiene will be a beneficial step to the scientific community. The current bibliometric study was taken up with the aim to statistically analyse the available literature on oral hygiene in central India.

METHODOLOGY:

Bibliometrics is the analysis of books , articles and other publications using statistical methods. In the field of library and information technology, bibliometric methods are also employed. Scientometrics is the sub-field of bibliometrics which is concerned with the study of scientific publications. Analysis of citations is a commonly used bibliometric method based on the construction of a quotation graph, a network or graph representation of quotations between documents. Many researchers use bibliometric methods to examine the impact of their field, the impact of a group of researchers, the impact of a specific paper or for classifying the impactful papers from a particular field. Apart from this, Bibliometrics has a variety of other applications including in descriptive linguistics, reader use assessment and thesauri growth, etc . This bibliometric analysis focuses on the scientific productions on Oral Hygiene affiliated to the Health Sciences University from Central India over a period of last 15 years.

Biblioshiny: Biblioshiny is "no coders bibliometrix" which is operated by Bibliometrix, and its graphical interface is based on the internet. Bibliometrix was programmed in the R language and facilitates the interconnection with other R packages. The Graphical User Interface is intuitive and well structured, and the developers have broken the main menu according to the SMA workflow. This menu provides analysis and graphs for three-level metrics (source, author, document) and three knowledge structures (conceptual, intellectual, and social). The options for the study are broad and divided into 7 groups: 1) summary, 2) sources, 3) authors, 4) papers, 5) conceptual frameworks, 6) intellectual structure, and 7) The social fabric. The generated graphs and performance analyses can be exported to multiple file formats; maps can be exported to Pajek and HTML, and tables can be copied to the clipboard, or saved as Excel, pdf or printed.

For this bibliometric analysis, Web of Science data base was accessed with Search Query input "KP=("oralhygiene*" OR gingivitis* OR periodontitis* OR "teeth staining" OR

halitosis OR "bleeding gums*" OR plaque* OR calculus* OR tartar*) AND CU=(INDIA)". The list of 1148 documents was obtained which was downloaded as Bibtex and imported in R-Studio Application for analysis of the data. The graphs and plots were generated using R-Studio with Bibliometric Package.

Similar query was run in Scopus database and list of 1711 publications was obtained which were fed to R-Studio Application and data was analyzed in the same way as that of Web of Science.

RESULTS:

Total 1148 documents were available for the search related to country India from 680 sources (Journals, Books, etc.) over a period 1991 – 2020. Total 3264 Author's Keywords (DE) were seen. The Author list included total 3694 Authors. Single-authored documents were 59. Authors per Document were 3.22 and Co-Authors per Document were 4.4. The Collaboration Index of all publications was 3.35. Annual Percentage Growth Rate was 15.16369.

Table-1: Annual Scientific Production

Year	Articles
1991	1
1992	6
1993	3
1994	2
1995	3
1996	5
1997	7
1998	3
1999	11
2000	4
2001	6
2002	12
2003	13
2004	11
2005	16
2006	15
2007	24
2008	18
2009	26
2010	37
2011	59
2012	65
2013	71
2014	64

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 WoS, the most commonly occurring keyword was 'Plaque'; followed by 'Calculus'.

DISCUSSION

Oral hygiene is important for improving the oral health related quality of life.¹⁵ Poor oral hygiene can be the cause of systemic disease thus influencing the general health.¹⁶ There is a direct link between improper oral hygiene and prevalence of periodontitis.¹⁷ Compromised oral hygiene behaviour in children can be the cause of early childhood caries.^{18, 19} The current bibliometric study is the first of its kind to improve the evidence based practices in relation to oral hygiene in India.

A total of 1148 documents were scanned from around 680 sources from 1991 to 2020. Surge in the publication related to oral hygiene increased from the year 2010 onwards and from then on there is a gradual rise in the number of publication, probable reason might be the increase in the number of dental institution across the globe with more number of post graduate students interested in pursuing the research as a part of their curricular activity and the promotion of collaborative activities amongst the nations.^{20, 21} The study showed that there was around 15.16369 annual percentage growth rate in publication, this might be considered less in comparison to trend of growth in published data in other research areas.²²

The peak increase in publication was seen in the year 2016-2019, this is probable due to the availability of the newer diagnostic tools, more funds and accessibility to remote areas.^{23, 24}

Total number of authors who had taken part in the research related to oral hygiene were 3694 in number out of which only 54 documents were single authored. This clearly indicated the team work in research filed, as most of the oral hygiene studies are field related surveys. Even the collaboration index was 3.35, which is an evidence to the team work in this field.

In the most cited author list, Suri JS remained on top with 24 articles on his name, followed by Gupta A.^{25, 26, 27} Increased number of articles were published in journal of clinical and diagnostic research. This journal has an impact factor of 0.810 for the year 2019-2020.²⁸ Although all branches of dentistry are concerned with the oral hygiene, the speciality, periodontics is usually the one which gives due care to the hygiene related problems. and as a corollary to it, journal of periodontology published 26 articles related to oral hygiene. Next share of published articles was in the journals related to paediatric and preventive dentistry branches, this was predictable as most of the preventive and paediatric journals are concerned with the prevalence of oral hygiene status and evaluation of methods of improving the oral hygiene status in children and the adults respectively.

The key word co-occurrence showed that the key word plaque was frequently co occurred with the key word gingivitis, atherosclerosis, lesion and management.^{29, 30} The key word periodontitis occurred maximum times with disease, population, inflammation, adult periodontitis etc.³¹ The other key word which was most frequently associated with oral

hygiene was calculus which in turn co occurred with key words like derivatives, models, therapy and efficacy.³¹⁻⁴² The mortality and the morbidity rate is directly linked to the key words like Plaque, calculus and the gingival diseases. As an add on if the individual is exposed to the unhealthy oral habits, this inevitable increase the mortality rate. The treatment modalities, in terms of controlled trials and double blinded studies were also cited in this current study. In vivo and in vitro studies in relation to plaque and bacteria as a risk factor for the development of atherosclerosis also were spotted frequently⁴³⁻⁶¹. Bacteria particularly gingivalis strain were also recognised as a part of oral hygiene studies.

CONCLUSION:

The current bibliometric study has thrown light on the oral hygiene publications in the Central India, and considering the available literature, it is quite impressive due to the sheer number of published articles.

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