Identification of Scientific Output on Dental Health Research by Means of Bibliometric Method

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ABSTRACT: *We took base years of 2007 till 2016 and analysed the literature produced in Dental Science. We used a few measures such relative growth rate to analyse the dental science literature in relation of the national output with that of global research output.*

Keywords: Relative Growth Rate, Literature Analysis, Dental Science Productivity Study

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1. Introduction

Bibliometrics is a type of research method used in Library and Information Science. It is the application of mathematical and statistical methods to various aspects of literature on a topic and is used to identify the pattern of publication, authorship and secondary journal coverage with the objective of getting an insight in to the dynamics of growth of knowledge in the areas under consideration. This consequently leads to the better organization of Information resources, which is essential for its most effective and efficient use. Bibliometrics today has attained sophistication and complexity having national, international and interdisciplinary character. It provides tools for the evaluation of scientific research. Bibliometrics assessments are based on the assumption that most scientific discoveries and research results eventually are published in international scientific journals where they can be read and cited by other researchers. The number of citations to a journal article can be considered to reflect the articles impact on the scientific community. Bibliometric analyses have attracted much attention within the past years for several reasons.

1. The availability of full databases of scientific literature with worldwide electronic access (MEDLINE, ISI, Inspec etc);

2. The availability of efficient tools to perform automatic textual analysis; and

3. The major interest they raise at institutions aiming to analyses recent research trends, Position, national effort outcomes in relation to others and evaluate national policies and laboratories etc. The present study focuses attention on the bibliometric analysis of the pattern of publication, authorship and journal coverage in the field of Dental Health.

2. Definitions of Bibliometrics

Pritchard (1969) defined bibliometrics as "the application of mathematical and statistical methods to books and other media of communication". Fairthrone (1969) defined the term as "The Quantitative treatment of the properties of recorded discourse and behaviours pertaining to it".

2.1 Applications of Bibliometrics

Bibliometrics as a technique has extensive applications in identifying the research in subject, trends in a authorship and collaboration in research to identify core periodicals, obsolescence and dispersion of scientific literature, useful in estimating the comprehensiveness of secondary periodicals, studying the author productivity and impact of research, distribution of scientific publications by researchers. Further bibliometrics could be used in the identification of emerging research areas.

2.2 What is Dental Health?

It's important to take care of one's mouth and teeth starting from childhood. If one don't, one could have problems with their teeth and gums - like cavities or even tooth loss.

To keep one's mouth and teeth healthy the following should be observed.

- Brush the teeth every day with a fluoride toothpaste.
- Clean between the teeth every day with floss or another type of between-the-teeth cleaner.
- Snack smart - limit sugary snacks.
- Don't smoke or chew tobacco.
- See the dentist or oral health professional regularly.

3. Statement of the Problem

The present study aims at analyzing the research output performance of Dental health researchers in academic and scientific work, publication is the chief mean of communicating research and a primary means of recognition and reward and also a central social process. Therefore, it is through publication the scientists receive professional recognition and esteem as well as promotion, advancement, and funding for future research. Publication is so central of productivity in research that the work becomes 'a work' only when it takes a conventional, physical (that is published) form, which can be received, assessed and acknowledged by the scientific community.

4. Objectives

1. To show the overall distribution of Dental Health Literature at International level.

2. To identify the subject-wise distribution of Dental Health research output at international level.

5. Methodology

The present study is carried out of source of documents and research output. The published Dental Health documents and their research output are analyzed in terms of their distribution both at National and International levels pertaining to dental health scientist's contribution. This study evaluates the overall literature output over a period of ten years time (i.e., 2007-2016). The

authorship pattern is examined to find out the research pattern of the contributions. The study leads to the research concentration of research in dental health articles.

6. Statistical Tools

6.1Relative Growth Rate

The researcher has applied the relative growth rate and doubling time model developed by Mahapatra2 to examine the total growth rate of the SAARC countries and weightage has been given to the Indian DENTAL Publications obtained from MEDLINE Database. The relative growth rate is increased in terms of the number of publications/pages per unit of time. The mean relative growth rate R (1-2) over a specified period of interval can be calculated from the following equations:

$$R(1–2) = \frac{w2 – w1}{T2 – T1}$$

Where, $R(1–2)$ = Mean relative growth rate over the specified period of interval.

$W1 = Log\ W1$: (Natural Log of initial number of publications / pages)

$W2 = Log\ W2$: (Natural Log of final number of publications / pages)

$T2 – T1$ = The Unit difference between the initial time and final time.

The relative growth rate for both publications and pages can be calculated separately.

Therefore,

$R(a)$ = Relative growth rate per unit of publications, per unit of time (Year);

$R(p)$ = *Relative growth rate per unit of pages Per unit of time (Year).*

7. Analysis

7.1 Dental Health Research Output

This study, the research output on Dental Health, is a tool to evaluate the performance of scholars at various levels. Dental Health research at the international level are analysed This section is devoted to the analysis of Dental Health research literature at various levels using time series data of Ten years from 2007 to 2016.

7.2 Dental Health Research Literature at the International (World) Level

Data presented in table 5.1.1a indicate Dental Health research output at the International level. The table shows the distribution of Dental Health research output at the International (world) level. It is evident from a scrutiny of the table that Dental Health research output at the International level is high with 13.61% (23664) publications in the year 2016, whereas in the year 2007 the output is low with 4.40%(7661). Further in the year 2008, 2009 and 2010 the output is gradually increase in percent. Also, in the years 2012 and 2013 the output is 11.22 & 11.87 percent.

Table 1.1b Presents data on the relative growth rate and doubling time of Dental Health research output at the International (World) level In 2007, Dental Health research output at the International level was 7661articles in the year 1984 and it rose to 173936 in 10 years of the study period. The relative growth rate falls. It could be observed that its relative growth rate falls from 0.32in 2008 to 0.10 in 2016. The study period records the mean relative growth rate of 0.15. The doubling time for publications on Dental Health research at the International level increased from 0.99 in 2008 to 10.94 in 2016. The doubling time for publications at the aggregate level has been computed as 6.36 years. There is a steady increase in the number of Dental Health research output at the International (World) level. However, relative growth rate shows a *down* trend; it means the rate of increase is low in terms of volume: this is highlighted by the doubling time of Dental Health research output at the International level which is higher than the relative growth rate.

Sl.No	Year	Dental Health Publication	Percentage	Cumulative Dental Health Publication	Percentage
1	2007	7661	4.40	7661	4.40
2	2008	9183	5.28	16844	9.68
3	2009	13446	7.73	30290	17.41
4	2010	16997	9.77	47287	27.19
5	2011	18364	10.56	65651	37.74
6	2012	19523	11.22	85174	48.97
7	2013	20639	11.87	105813	60.83
8	2014	21891	12.59	127704	73.42
9	2015	22568	12.97	150272	86.39
10	2016	23664	13.61	173936	100.00
	Total	173936	100.00	173936	100.00

Table 1. Distribution of Dental Health Literature International level

The Growth rate and doubling time of Dental Health research output at the International level shown in the following table.

Year	Total No. Articles	Cumulative	W1	W2	R(a)	Mean(a)	Doubling time Dt(a)	Mean Doubling time
2007	7661	7661		8.26				
2008	9183	16844	8.26	8.96	0.70		0.99	
2009	13446	30290	8.96	9.37	0.41		1.69	
2010	16997	47287	9.37	9.66	0.29		2.35	
2011	18364	65651	9.66	9.88	0.22	0.32	3.20	1.65
2012	19523	85174	9.88	10.06	0.19		3.72	
2013	20639	105813	10.06	10.22	0.15		4.54	
2014	21891	127704	10.22	10.35	0.13		5.20	
2015	22568	150272	10.35	10.49	0.15		4.76	
2016	23664	173936	10.49	10.62	0.12	0.15	5.59	4.76
Total	173936	173936	10.62	10.72	0.10		6.67	

Table 1.1b Relative Growth Rate (R) and Doubling Time of Dental Health Research Output at the International (World) Level

8. Findings

Growth Output

There was a total of 173936 publications at the international level on Dental Health research during the period 2007 -2016 (Table 1).

• In 2007, Dental Health research output at the International level was 7661 articles in the year 2007 and it rise to 173936 in 10 years of the study period. It is evident from a scrutiny of the relevant table that Dental Health research output at the International level is high with 13.61% (23664) publications in the year 2016, whereas in the year 2007 the output is low with 4.40% (7661).

8. Conclusion

Publication is so central of productivity in research that the work becomes 'a work' only when it takes a conventional, physical (that is published) form, which can be received, assessed and acknowledged by the scientific community. Hence publication is a social norm in a public sense and serves as a tool for the betterment of the individuals. After publication only, it can be called as research and can be fixed or judged and acknowledge by the scientists in the society. It could be seen clearly from the above points that bibliometrics analysis is an important tool in analyzing any discipline. By keeping this view in mind, the researcher intends to undertake the study on Dental health research. This study attempts to analyses the performance of researchers in the field of Dental health in terms of growth rate, areas of research concentration, author productivity and authorship pattern.