Scholarly Communication on Global Alzheimer's disease with Special Reference to Web of Science: A Scientometric Study

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Abstract

The main purpose of the study is to examine the authorship pattern and collaborative trend in the field of Alzheimer's disease literature in global level in the study period 2014-2018. A total of 38936 articles were published. maximum number of (32.86%) contributions are from the USA and it has been placed the first rank and the lowest number of publications were published from Australia with 4.36% among top ten countries. Out of 36749 multi authored publications high number of articles are of 24744 contributed by more than five authors and interestingly anonymous articles are of 466, only 1721 papers are independently produced by single authorship category, An average collaboration of author index, degree of collaboration and average collaborative coefficient are of authors are 4.36, 0.67 and 0.72. 6.73 is the Average Author Per Paper during the study period and 0.51 is the Average Productivity Per Author for the study period 2014 to 2018.

Keywords: *Scientometric, Alzheimer's disease, Authorship pattern, Collaborative Index, Degree of collaboration*

Introduction

Chellappandi (2018) says 'Scientometrics analyses the quantitative aspects of the production, dissemination and use of scientific information with the aim of achieving a better understanding of the mechanisms of scientific research as a social activity'.(Page No.6) Scientometric is one of the discipline that evaluates scientific publications and citations added to the papers to increase an understanding of the structure of science, the growth of science at the global level, the performance of a country in a particular domain, the performance of institutions, departments and divisions, and the scientific eminence of an individual scientist. It also helps in knowing the information-seeking behaviour of scientists and engineers by way of identifying where they publish and what they cite. (Sagar et al, 2009). According to Gaugler (2019) Alzheimer's disease is a brain related progressive disease, significantly the disease befits inferior with time. It thought to begin 20 years or more before exaggerated invisible signs arise in brain with inconsequential changes that are imperceptible to the person. Memory loss and language problems are the prime symptoms and only after years of brain changes do individuals know-how conspicuous signs of the disease. When symptoms are occur then nerve cells (neurons) in parts of the brain involved in thinking, learning and memory (cerebral function) have been injured or shattered , which are tend to grow and start interfering with individuals' ability to perform everyday activities however individuals typically live with Alzheimer's symptoms for years.

Medical scientists were engaged in laboratory settings by carry out experiments on virus, drugs, vaccine and so on related to any diseases. Instantaneously, they bring forth a substantial volume of scientific literature. Hence, a very systematic in-depth and comprehensive scientometric studies are required. For this purpose the research studies on 'Alzheimer's disease research literature' provides an insight into the scholarly activities that were carried out on Alzheimer's disease in different parts of the world. Further, it may help to agencies of

the world in particular for the revision of national policies to plan strategies to facilitate the control and eradication of the disease.

Objectives

- The major objectives of the present study are:
- To identify the nature of authorship pattern
- To ascertain the most productive country
- To find out Collaborative Index
- To compute the degree of collaboration
- To ascertain Collaborative Co-efficient
- To determine author productivity

Scope and methodology

The data was extracting from the database Web of Science, which is launched in 1997. Thomson Returns maintained it previously but now it is maintained by Clarivate Analytics. 'Alzheimer's disease' was the key word used for download the required data in the field of Alzheimer's disease research during the study period 2014 to 2018. Collected data were uploaded to MS-Excel spreadsheets and MS-Word. The outcomes were processed and analyzed to reach the objectives of the study and also tabulated for making interpretations as per the objectives of the study.

Results and discussion

Table 1: Year wise Authorship Pattern

Year	Anonymous	Single	Two	Three	Four	Five<	Total	Percentage (%)	Multi author publication
2014	285	482	683	791	762	4189	7192	18.47	6425
2015	160	379	691	767	831	4520	7348	18.87	6809
2016	21	426	687	771	939	4962	7806	20.05	7359
2017	0	269	712	815	975	5464	8235	21.15	7966
2018	0	165	700	937	944	5609	8355	21.46	8190
Total	**466**	**1721**	**3473**	**4081**	**4451**	**24744**	**38936**	**100**	**36749**

The table 1 displays year wise authorship pattern of the research productivity on Alzheimer's disease. It reveals the nature of association of authors. Anonymity describes situations where the authors identity is unknown. The term 'Anonymous' is used by the persons/authors to hide their identity from its readers. Atrticles get written by the author having no known name or identity or known source is called anonymous artilce. Some writers have argued that namelessness, though technically correct. The important idea here is that a person be non-identifiable, unreachable, or untrackable for a certain values, such as privacy, or liberty. In other cases,

the author's name is intentionally kept secret reasons may vary from fear of persecution to protection of his or her reputation.

Out of 38936 articles, merely 1721 are solo-authored and repose of 3473 articles has been authored by double, 4081 are three and 4451 are of four authored. Obviously the highest 24744 articles have been authored by five and above authors and remarkably the 466 number of articles are of anonymous. It designates that 'Alzheimer's disease' research is highly collaborative.

Table 2: Top 10 County-wise distribution of publications

Sl No	Countries/Regions	Publications	Percentage	Rank
1	USA	12794	32.86	1
2	China	5960	15.31	2
3	England	3532	9.07	3
4	Germany	2813	7.23	4
5	Italy	2696	6.92	5
6	France	2080	5.34	6
7	Japan	1983	5.09	7
8	Canada	1962	5.04	8
9	Spain	1926	4.95	9
10	Australia	1803	4.63	10

The distribution of publications contributed by country wise, clearly states that the maximum number of (32.86%) contributions are from the USA and it has been placed the first rank, followed by 15.31% of the publications contributed by China and it has been positioned the second rank. 9.07% of contributions came from the England and got placed third and the lowest number of publications were published from Australia with 4.36% among top ten countries. A significant observation of the study is that USA dominated other countries.

Table 3: Collaborative Index

Year	Total Publications	Total Authors	Mono	Two	Three	Four	Five<	Multi Author Publication	CI
2014	7192	43161	482	683	791	762	4189	6425	4.20
2015	7348	48502	379	691	767	831	4520	6809	4.30
2016	7806	58779	426	687	771	939	4962	7359	4.43
2017	8235	52648	269	712	815	975	5464	7966	4.44
2018	8355	58994	165	700	937	944	5609	8190	4.42
Total	**38936**	**262084**	**1721**	**3473**	**4081**	**4451**	**24744**	**36749**	**4.36**

Table 3 find out that the Collaborative Index in other words collaboration of authors on an articles published in the field of 'Alzheimer's disease' from 2014-2018 and Collaborative Index computed by using the following formula derived by Lawani (1980).

$$CI = \frac{\Sigma A\, j=1 jfi}{N}$$

Where,

j = the number of author(s), fj = the number of j-authored research papers published in a discipline during a certain period of time, N= the total number of research papers published in a discipline during a certain period of time and K= the greatest number of collaborated authors per paper in a discipline.

4.36 is the average collaboration of author index. Highest collaborative index noticed in the year 2017 is of 4.44 and in 2014 the lowest collaborative index is recorded that is 4.20.

Table 4: Degree of Collaboration

Year	Total Publications	Total Authors	Mono	Two	Three	Four	Five<	Multi Author Publication	DC
2014	7192	43161	482	683	791	762	4189	6425	0.59
2015	7348	48502	379	691	767	831	4520	6809	0.65
2016	7806	58779	426	687	771	939	4962	7359	0.62
2017	8235	52648	269	712	815	975	5464	7966	0.73
2018	8355	58994	165	700	937	944	5609	8190	0.81
Total	**38936**	**262084**	**1721**	**3473**	**4081**	**4451**	**24744**	**36749**	**0.67**

The degree of collaboration designated in Table 4 and it is assessed by using the following formula derivate by Subramanyam (1983).

$$\text{Degree of Collaboration (DC)} = \frac{Nm}{Nm+Ns}$$

Where,

Nm = No. of Multi-author Publication, Ns = No. of Single Author.

Highest degree of collaboration 0.81 is recorded in the year 2018. It is seen that 0.59. is the lowest degree of collaboration noted in the beginning year (2014). 0.67 is the average degree of collaboration during the study period 2014-2018.

Table 5: Collaboration Coefficient

Year	Total Publications	Total Authors	Anonymous	Mono	Two	Three	Four	Five<	CC
2014	7192	43161	285	482	683	791	762	4189	0.69
2015	7348	48502	160	379	691	767	831	4520	0.71
2016	7806	58779	21	426	687	771	939	4962	0.71
2017	8235	52648	0	269	712	815	975	5464	0.73
2018	8355	58994	0	165	700	937	944	5609	0.74
Total	**38936**	**262084**	**466**	**1721**	**3473**	**4081**	**4451**	**24744**	**0.72**

Collaboration Coefficient interpreted in table 5 by using the following formula and it can be definite by Ajiferuke and others (1988).

$$CC = 1 - \sum_{J=1}^{J=K} \left(\frac{1}{J}\right) Fj/N$$

Where,

j= authorship, Fj= number of j- authored research papers, N= the total number of research papers, k= the greatest number of authors per paper

0.72 is the average collaborative coefficient of authors. The uppermost coefficient of the author is of 0.74 and

it is recorded in the 2018 and the lowest coefficient is of 0.69 logged in the year 2014.

Table 6: Author Productivity (AAPP AND APPA)

Year	Total Publications	Total Authors	AAPP	APPA
2014	7192	43161	6.00	0.17
2015	7348	48502	6.60	0.15
2016	7806	58779	7.53	0.13
2017	8235	52648	6.39	0.16
2018	8355	58994	7.06	0.14
Total	**38936**	**262084**	**6.73**	**0.15**

Average Author Per Paper and Average Productivity Per Author are calculated and presented in the table 6 as per the following formulas:

Average author per paper = No. of authors / No. of papers

Productivity per author = No. of Papers/No. of authors

According to the above table uppermost AAPP is recorded in the year 2016 is of 7.53 and APPA in the year 2014 is of 0.17. Average number of Authors Per Paper and Average Productivity Per Author for 38936 are of 6.73 and 0.51 in the study period of five years (2014-2018).

Findings and conclusion

The Scholarly Communication on Global Alzheimer's disease literature during the study period of five years (2014 to 2018), a total of 38936 publications was published, in that USA dominated other countries. The highest 24744 articles has been authored by five and above authors and remarkably the 466 number of articles are of anonymous. Highest collaborative index noticed in the year 2017 is of 4.44 and in 2014 the lowest collaborative index is recorded that is 4.20. Highest degree of collaboration 0.81 is recorded in the year 2018. It is seen that 0.59. is the lowest degree of collaboration noted in the beginning year (2014). Collaboration Coefficient had an average value of 0.72 in the year 2014-2018. Average number of Authors Per Paper and Average Productivity Per Author for 38936 articles are of 6.73 and 0.51 in the study period of five years (2014-2018).

In the perspective of research performance estimation evaluation of the quality of scientific literature is becoming increasing its significance. The quantitative study of research output in a particular field or discipline is a good indicator of visualization of research literature and helps to recognize the team scope with which authors' collaboration. Bibliographic databases are evocative sources of publication activity in any field of knowledge. Scientometric studies give some idea about the bearing of research, understand the drawbacks and present trends. The studies like this can be extremely useful for academicians, emerging scientists, administrators and policy makers, professional bodies that grant awards and prizes etc.

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