International Journal of Research in Engineering and Science (IJRES)
ISSN (Online): 2320-9364, ISSN (Print): 2320-9356
www.ijres.org Volume 09 Issue 7 ǁ 2021 ǁ PP. 90-96

Scientometric Analysis of Research on Infectious Diseases

K. Sivasami
Assistant Professor, Department of Library and Information Science,
Annamalai University, Annamalai Nagar – 608 002, Tamilnadu, India

ABSTRACT
This paper discuss on scientometric analysis of research on infectious diseases, the study aims to analysis, The data have been collected from the Web of Science database; during the study period 8333 records were retrieved for the study. Objectives of study, to find out year wise publications on infectious diseases research, to examine authorship pattern, to find out top ten authors contributions, to find out top ten institutions contributed on infectious diseases research, to find top ten sources contributions, to identify top ten countries contributed on infectious diseases research. The study reveals that, the year wise analysis shows on infectious diseases research an increasing and decreasing trend. Totally 30859 authors were contributed in infectious diseases research, among the authors, Zwizwai R is highly contributed with 66 papers, Wang X M has second position, Wang Y Q has third position, the remaining authors are contributed so on. The authorship pattern on infectious diseases research collaborative contributions high compare with single author contributions. Countries wise contribution on Infectious diseases research USA occupies first position, England has second position, and Peoples R China has third position.
KEYWORDS: *Scientometric,* infectious, endemic, *Infectious diseases, Epidemic infections,*

I. INTRODUCTION

Infection is the term that defines the entrance and development of an infectious agent in a human or animal body, whether or not it develops into a disease (Thagard P 1998). Infectious diseases occurrence in human populations could be in endemic form, when the epidemic is generalised and involves different countries and a large population it is called a pandemic (Barreto, Mauricio L, et al.2003). Epidemic infections, such as cholera, malaria, and the sudden outbreak of COVID-19, cause global life threats and socioeconomic recession. The 1918 pandemic of influenza virus A/H1N1 and the 2020 pandemic of coronavirus disease 2019 (COVID-19) are the most dramatic examples of this in recent human history. Pathogens can also re-emerge with new characteristics, such as multidrug resistance, or in different places, such as Ebola virus in West Africa in 2013 and Zika virus in Brazil in 2015, to cause new epidemics (Rogier. H van Doorn 2021).

Infectious diseases are disorders caused by an infectious organism such as a bacterium, a virus, a fungus, a prion, a worm, or other parasite. Prions are infectious proteins that are transmitted either by inheritance or by eating/receiving contaminated meat or other biological product (Kotra, Lakshmi P, 2007) Infectious diseases are a major limiting factor in cattle production in many parts of the world (Roger W. Blowey, A. David Weaver, 2011). Infectious diseases constituted the most serious health issue in the world until the beginning of the 20th century when chronic degenerative diseases began to dominate this scenario in developed countries (Ziegler P) Large amounts of funding are allocated to research in infectious diseases each year (Adam T, Ralaidovy AH, Swaminathan S, 2019).

II. METHODOLOGY

The data have been collected from the Web of Science database; the search string was used 'Infectious diseases' in the Title search box, field was used, and the time span field was select from 2011 to 2020. A total of 8333 records were retrieved, the data downloaded and analyzed using MS office-Excel as per objectives of the present study.

Relative Growth Rate (RGT) and Doubling Time (DT)

The relative growth rate is the increase in the number of publications/pages per unit of time. Here, one year is taken as the unit of time. The mean relative growth rate R (1-2) over a specified period of interval can be calculated from the following equation suggested by Mahapatra (1985).

$$R(1-2) = \frac{W2 - W1}{T2 - T1}$$

Where,

R = Mean relative growth rate over the specific period of interval;
W1 = log w1 (Natural log of initial number of publications/ pages);

W2 = log w2 (Natural log of initial number of publications/pages);
T2-T1 = Unit difference between the initial time and final time.
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)

Doubling Time (DT)

A direct equivalence exists between the relative growth rate and doubling time. If the number of publications/pages of a subject doubles during a given period, then the difference between the logarithms of the numbers at the beginning and at the end of the period must be the logarithms of the number 2. This difference has a value of 0.693. Thus, the corresponding doubling time for publication and pages can be calculated by the following formula:

$$\text{Doubling time (Dt)} \text{ ---------} \frac{0.693}{R}$$

Therefore,

$$\text{Doubling time for publications Dt (a)} \text{ -------} \frac{0.693}{R(a)}$$

Objectives

The following objectives are framed for the present study;
To find out year wise publications on infectious diseases research
To identify document types wise research output
To examine authorship pattern
To find out top ten authors infectious diseases research
To find out top ten institutions contributed on infectious diseases
To find top ten sources contributions on infectious diseases research
To identify top ten countries contributed on infectious diseases research

ANALYSIS AND INTERPRETATION

Table 1 year wise publications on infectious diseases research

Sl. No.	Publication Years	No. of Records	Percentages
1	2011	627	7.52
2	2012	681	8.17
3	2013	651	7.81
4	2014	730	8.76
5	2015	788	9.46
6	2016	816	9.79
7	2017	905	10.86
8	2018	888	10.66
9	2019	996	11.95
10	2020	1251	15.01
	Total	8333	100.00

Table 1 shows the year wise publications on infectious diseases research; during the study period 8333 publications were published. In the year 2020; 1251 papers have published, in 2019 have published 996 papers, in 2017 have published 905 papers, in 2018 have published 888 of papers, in 2016 have published 816 papers, in 2015 have published 788 papers, in 2014 have published 730 papers, in 2012 have published 681 papers, in 2013 have published 651 papers, among the year, in 2011 have least publications with 7.52 percent papers. It found that, the year-wise analysis shows on infectious diseases research an increasing and decreasing trend.

Table 2 Relative Growth Rate and Doubling Time of infectious diseases research

Sl. No.	Publication Years	No. of Records	Cumulative	W1	W2	W2 - W1(Ra)	Mean (Ra) W2-W1	Doubling Time	Mean Dt (a)
1	2011	627	627		6.44				
2	2012	681	1308	6.44	6.52	0.08		8.66	
3	2013	651	1959	6.52	6.47	-0.05		-13.86	
4	2014	730	2689	6.47	6.59	0.12		5.77	
5	2015	788	3477	6.59	6.66	0.07	0.05	9.90	2.62
6	2016	816	4293	6.66	6.7	0.04		17.33	
7	2017	905	5198	6.7	6.8	0.1		6.93	
8	2018	888	6086	6.8	6.78	-0.02		-34.65	
9	2019	996	7082	6.78	6.9	0.12		5.77	
10	2020	1251	8333	6.9	7.13	0.23	0.09	3.01	-0.32
	Total	8333					0.07		1.15

Table 2 shows that Relative Growth Rate and Doubling Time of infectious diseases research, the value of average relative growth rate of publications [R(a)] increased from 6.44 to 6.9 during 2011 to 2020 and the corresponding mean doubling time [Dt(a)] for the period decreasing from 2.62 to -0.32.

Table 3 document type wise research publications on infectious diseases

Sl. No.	Document Types	No. of Records	Percentages
1	Articles	4191	50.29
2	Review Articles	1297	15.56
3	Meeting Abstracts	1007	12.08
4	Editorial Materials	911	10.93
5	News Items	323	3.88
6	Letters	284	3.41
7	Corrections	110	1.32
8	Book Chapters	70	0.84
9	Book Reviews	65	0.78
10	Proceedings Papers	45	0.54
11	Early Access	14	0.17
12	Biographical-Items	6	0.07
13	Reprints	4	0.05
14	Data Papers	3	0.04
15	Retractions	2	0.02
16	Retracted Publications	1	0.01
	Total	8333	100.00

Table 3 shows that document types wise papers publications on infectious diseases, totally sixteen document types are contributed in this research, Articles are highly contributed with 4191publications. Review articles are contributed 1297 papers, Meeting abstracts has third place with 100 contributions, Editorial Materials are contributed 911 papers, News Items are contributed 323 papers, Letters articles are contributed 284 papers, Corrections are contributed 110 papers, Book Chapters are contributed 70 papers, Book Reviews contributed 65 papers, Proceedings Papers are 45 papers, Early Access are contributed 14 papers, Biographical-Items are contributed 6 contributions, Data Papers are contributed 3 papers, Retractions are contributed 2

papers, Retracted Publications are only one. It found that, more than 50 percent papers are contributed in article types, and 9 documents types are contributed below one percent document.

Table 4 top ten authors contributed on infectious diseases

Sl. No.	Authors	No. of Records	% of 8333
1	Zwizwai R	66	0.79
2	Wang X M	46	0.55
3	Wang Y Q	45	0.54
4	Qi XL	44	0.53
5	Gao Y L	42	0.50
6	Gao L	39	0.47
7	Styczynski J	38	0.46
8	Beekmann S E	37	0.44
9	Mikulska M	36	0.43
10	Polgreen P M	36	0.43

Totally 30859 authors were contributed in infectious diseases research during from 2011 to 2020, top ten authors were listed in the table 4. Among the authors, Zwizwai R is highly contributed with 66 papers, Wang X M has second position with 46 contributions, Wang Y Q has third position with 45 contributions, followed by Qi X L has fourth position with 44 contributions, Gao Y L has fifth position with 42 contributions, Gao L has sixth position with 39 contributions, Styczynski J has seventh position with 38 contributions, Beekmann S E has seventh position with 37 contributions, Mikulska M and Polgreen PM has ninth and tenth position with 36 contributions respectively.

Table 5 authorship pattern on infectious diseases publications

Sl. No.	Authorship pattern	No. of papers	Percentages
1	Single	219	2.63
2	Double	437	5.24
3	Three	967	11.60
4	Four	1165	13.98
5	Five	2274	27.29
6	Six and Above	3271	39.25
	Total	8333	100.00

Table 5shows that authorship pattern on infectious diseases research, 8333 papers were contributed by 30859 authors. The authorship pattern, six and above authors were collaborative contributions are 39.25 per cent, five authors collaborative contributions are 27.95 per cent, four authors collaborative contributions are 13.98 per cent, three authors collaborative contributions are 11.60 per cent papers, double authors collaborative are 5.24 per cent, and Single author contributions are 2.63 per cent papers. The authorship pattern on infectious diseases research collaborative contributions high compare with single author contributions.

Table 6 language wise research performance on infectious diseases

Sl. No.	Languages	Record Count	Percentages
1	English	7972	95.67
2	German	122	1.46
3	Spanish	100	1.20
4	French	70	0.84
5	Japanese	16	0.19
6	Polish	14	0.17
7	Portuguese	12	0.14

8	Czech	7	0.08
9	Russian	5	0.06
10	Dutch	4	0.05
11	Hungarian	3	0.04
12	Korean	2	0.02
13	Chinese	1	0.01
14	Icelandic	1	0.01
15	Italian	1	0.01
16	Serbian	1	0.01
17	Slovenian	1	0.01
18	Turkish	1	0.01
	Total	8333	100.00

Table 6 shows that language wise research publication on infectious disease, 8333 papers are contributed in eighteen languages, among the eighteen languages 95.67 per cent papers ware contributed in English language, 1.46 per cent papers were contributed in German language, in Spanish 1.20 per cent papers published, 0.84 per cent contributions were contributed in French language, 0.19 per cent papers are in Japanese languages, 0.17 per cent papers are in Polish, 0.14 per cent papers are in Portuguese languages, 0.08 per cent contributions are in Czech, 0.06 per cent papers were contributed in Russian language, in Dutch 0.05 per cent, 0.04 per cent contributions in Hungarian, Korean language contributed 0.02 per cent. Followed by Chinese, Icelandic, Italian, Serbian, Slovenian and Turkish languages contributed a single contributions respectively.

Table 7 top ten institutions contributed on infectious diseases

Sl. No.	Institutions name (Affiliations)	No. of Records	% of 8333
1	Harvard University	297	3.56
2	University of London	274	3.29
3	University of California System	255	3.06
4	Johns Hopkins University	180	2.16
5	National Institutes of Health Nih - USA	163	1.96
6	Institut National De La Sante Et De La Recherche Medicale -INSERM	154	1.85
7	Centers for Disease Control Prevention - USA	148	1.78
8	London School of Hygiene Tropical Medicine	134	1.61
9	University of Washington	133	1.60
10	University of Texas System	132	1.58

Table 7 shows that top ten institutions contributed in infectious diseases research output, totally 7495 institutions contributed in the infectious diseases research during the study period, among the 7495institutions ten institutions are listed in the this table, Harvard University has first position with 3.56 per cent contributions, University of London has second place with 3.29 per cent contributions, University of California System has third place with 3.06 per cent contributions, followed by Johns Hopkins University has fourth place with 2.16 per cent, National Institutes of Health Nih - USA has fifth place with 1.96 per cent contributions, Institut National De La Sante Et De La Recherche Medicale -INSERM has sixth place with 1.85 per cent contributions, Centers for Disease Control Prevention - USA has seventh place with 1.78 per cent contributions, London School of Hygiene Tropical Medicine has eighth place with 1.61 per cent contributions, University of Washington has ninth place with 1.60 per cent contributions, University of Texas System has tenth place with 1.58 per cent contributions. The remaining 7485 institutions were contributed below 131 publications on infectious diseases research publications.

Table 8 top ten sources contributed on Infectious diseases

Sl. No.	Sources titles	Record Count	% of 8333
1	Clinical Infectious Diseases	220	2.64
2	lancet Infectious Diseases	188	2.26
3	Plos One	185	2.22
4	International Journal of Infectious Diseases	147	1.76
5	Science	106	1.27
6	Clinical Microbiology and Infection	79	0.95
7	Open Forum Infectious Diseases	69	0.83
8	American Journal of tropical Medicine and Hygiene	64	0.77
9	Journal of Infectious Diseases	59	0.71
10	BMC Infectious Diseases	57	0.68

Table 8 shows that top ten sources contributed in Infectious diseases research; totally 2155 sources were contributed 8333 papers on Infectious diseases research. Among the 2155sources, Clinical Infectious Diseases has first position with 2.64 per cent records, lancet Infectious Diseases has second position with 2.26 percent records, Plos One has third position with 2.22 per cent, followed by International Journal of Infectious Diseases has fourth position with 1.76 percent records, Science is fifth place with 1.27 records, Clinical Microbiology and Infection has sixth place with 0.95 per cent records, Open Forum Infectious Diseases has seventh position with 0.83 per cent publications, American Journal of tropical Medicine and Hygiene has eighth position with, Journal of Infectious Diseases has ninth positions with 0.71 percent contributions, BMC Infectious Diseases has tenth position 0.68 contributions.

Table 9 top ten countries contributed on Infectious diseases

Sl. No.	Countries	Record Count	% of 8333
1	USA	2957	35.49
2	England	848	10.18
3	Peoples R China	671	8.05
4	France	543	6.52
5	Germany	542	6.50
6	Canada	473	5.68
7	Italy	436	5.23
8	Australia	391	4.69
9	Spain	338	4.06
10	Netherlands	317	3.80

Totally 188 countries were contributed on Infectious diseases, table 9 shows that top ten countries contributed on Infectious diseases research, among the ten countries, USA occupies first position with 35.49 per cent contributions, England has second place with 10.18 per cent contributions, Peoples R China has third place with 8.05 per cent contributions, France has fourth place with 6.52 percent contributions, Germany has fifth place with 6.50 per cent contributions, Canada has sixth place with 5.68 per cent contributions, Italy has seventh place with 5.23 per cent contributions, Australia has eight place with 4.69 per cent contributions, Spain has ninth place with 4.06 per cent contributions, Netherlands has tenth place with 3.80 per cent contributions, The remaining 178 countries were contributed below 300 contributions in this Infectious diseases research.

III. Conclusion

Conclude from the study, year wise analysis on infectious diseases shows on increasing and decreasing trend. Document type wise indicates that articles are highly contributed with 4191 publications followed by review and Meeting, 30859 authors were contributed in infectious diseases research during the study period; Zwizwai R is highly contributed followed by, Wang X M has second position Wang Y Q has third position with 45 contributions. The authorship pattern on infectious diseases research collaborative contributions high

compare with single author contributions. Language wise research publication on infectious disease, 95.67 per cent papers ware contributed in English language, totally 7495 institutions contributed in the infectious diseases research during the study period, Harvard University has first position, University of London has second place, University of California System has third place with 3.06 per cent contributions. Sources wise contribution in Infectious diseases research; Clinical Infectious Diseases has first position, lancet Infectious Diseases has second position, Plos One has third position. Country wise contribution an Infectious diseases research, USA occupies first position, England has second place.

References

[1]. Thagard P. Ulcers and bacteria I: discovery and acceptance. *Stud Hist Phil Biol Biomed Sci* 1998, 29107–136

[2]. Barreto, Mauricio L et al. "Infectious diseases epidemiology." *Journal of epidemiology and community health* vol. 60,3 (2006): 192-5. doi:10.1136/jech.2003.011593

[3]. Rogier. H van Doorn, The epidemiology of emerging infectious diseases and pandemics, Medicine,2021

[4]. Kotra, Lakshmi P.. "Infectious Diseases." *xPharm: The Comprehensive Pharmacology Reference* (2007): 1–2.pp.60849-9

[5]. Roger W. Blowey, A. David Weaver, Infectious diseases, Editor(s): Roger W. Blowey, A. David Weaver, Color Atlas of Diseases and Disorders of Cattle (Third Edition), Mosby, 2011, Pages 221-245

[6]. Ziegler P. *The Black Death*, Dover: Allan Sutton, 1993

[7]. Adam T, Ralaidovy AH, Swaminathan S. Biomedical research; what gets funded where? Bull World Health Organ 2019; 97: 516–516A.

[8]. Mahapatra. M. (1985), On the Validity of the Theory of Exponential Growth of Scientific Literature, Proceedings of the 15th IASLIC Conference, Bangalore, pp. 61-70.