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Research Paper

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Scientometric Analysis of Epidemiology Research Output in Netherland

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ABSTRACT

This bibliometric study was carried out to investigate the trend in epidemiology research in Netherland from 1999 - 2012. The relevant data collected from web of science database and the publications were identified with the keyword "epidemiology" and an affiliation to a Netherland institution. We found 1175 articles published since 1999-2012. The paper deals authorship pattern, subject wise, year wise, institution and language wise. We have observed an increasing and decreasing trend in epidemiology publications based on research done in Netherland, and overall mean doubling time value 3.7.

Introduction

Epidemiology is a quantitative discipline that relies on a working knowledge of probability, statistics, and sound research methods, and it is a method of causal reasoning based on developing and testing hypotheses grounded in such scientific fields as biology, behavioral sciences, physics, and ergonomics to explain health-related behaviors, states, and events. However, epidemiology is not just a research activity but an integral component of public health, providing the foundation for directing practical and appropriate public health action based on this science and causal reasoning (Cates W 1982). Epidemiology is concerned primarily with the distribution and determinants of the frequency of disease in population (Macmahon B, Pugh T.F 1970). In the mid-1800's John Snow was conducting a series of investigations in London that warrant his being considered the "father of field epidemiology." Twenty years before the development of the microscope, Snow conducted studies of cholera outbreaks both to discover the cause of disease and to prevent its recurrence. Because his work illustrates the classic sequence from descriptive epidemiology to hypothesis generation to hypothesis testing (analytic epidemiology) to application, two of his investigations will be described in detail Snow's famous studies in 1854 when an epidemic of cholera erupted in the Golden Square of London (Snow, J. 1930).

Objective

- Year wise research output on epidemiology
- To study authorship pattern
- To find top twenty countries contribution
- To examine the language wise distribution
- To find out top twenty subject research publication
- To identify the top twenty journal publication of the study
- To find source wise research output

Methodology

The data were collected from web of science database; the study period is during 1999 to 2012. The search string 'epidemiology' in the title, keyword field was used to extract publications related to epidemiology, A totally 1175 records downloaded and analyzed by the Microsoft Excel office spread sheet application.

Relative Growth Rate (RGR)

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).

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

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

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:

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

Therefore,

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

Analysis and Interpretation

Table 1 Year wise publication

Sl.No	Year	No. of Records	% of 1175	Cum.%
1	1999	40	3.40	3.40
2	2000	53	4.51	7.91
3	2001	46	3.91	11.83
4	2002	40	3.40	15.23
5	2003	98	8.34	23.57
6	2004	78	6.64	30.21
7	2005	82	6.98	37.19
8	2006	93	7.91	45.11
9	2007	129	10.98	56.09
10	2008	94	8.00	64.09

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11	2009	135	11.49	75.57
12	2010	84	7.15	82.72
13	2011	102	8.68	91.40
14	2012	101	8.60	100
	Total	1175	100	

Year wise publication

Table 1 shows that year wise publication output on epidemiology in Netherland, out of 1175 records in 2009 has occupies first place with 135 records, 2007 has occupies second place with 129 records, 2011 has third place with 102 records, followed by 2012 has 101 records, 2003 has 98 records, 2008 has 94 records, 2006 has 93 records, 2010 has 84 records, 2005 has 82 records, 2004 has 78 records, 2000 has 53 records, 2001 has 46 records, 1999 and 2002 has published each 40 records.

Table 2 Relative Growth Rate and Doubling Time of overall output in epidemiology

Sl.No	Year	Total Output	Cumulative	W1	W2	R(a)	Mean (a) 1-2	Doubling Time	Mean pt (a) 1-2
1	1999	40	40		3.7				
2	2000	53	93	3.7	4.5	0.8		0.82	
3	2001	46	139	4.5	4.9	0.4		1.72	
4	2002	40	179	4.9	5.2	0.3		2.74	
5	2003	98	277	5.2	5.6	0.4		1.59	
6	2004	78	355	5.6	5.9	0.3		2.79	
7	2005	82	437	5.9	6.1	0.2	0.4	3.33	2.16
8	2006	93	530	6.1	6.3	0.2		3.59	
9	2007	129	659	6.3	6.5	0.2		3.18	
10	2008	94	753	6.5	6.6	0.1		5.20	
11	2009	135	888	6.6	6.8	0.2		4.20	
12	2010	84	972	6.8	6.9	0.1		7.67	
13	2011	102	1074	6.9	7	0.1	0.15	6.94	5.13
14	2012	101	1175				0.27		3.64
	Total	1175							

Relative Growth Rate and Doubling Time

Table 2 indicates the Relative Growth Rate of research output in epidemiology research. It is apparent that the Relative Growth Rate has increasing and decreasing trend. The mean relative growth rate for the period 1999-2005 is worked out to 0.4 and it is 0.15 for the period 2006 to 2012. The overall study period has witnessed a mean relative growth rate of 0.27. Moreover the mean doubling time for the period 1999 to 2005 is worked out to 2.16 years and for the period 2006-2012 which is calculated as 5.13 years, and doubling time mean value 3.64 during thought the study period.

Table 3 Authorship pattern

Sl.No	Authors	No. of Records	%	Cum.%
1	Single	187	15.91	15.91
2	Double	153	13.02	28.94
3	Three	137	11.66	40.60
4	Four	126	10.72	51.32
5	Five	115	9.79	61.11
6	Six and Above	457	38.89	100.00
	Total	1175	100	

Authorship pattern

Table 3 indicates authorship pattern of epidemiology research, six and above authors were published 38.89 percent records with first position, second place occupies single authors 15.91 percent records, third place occupies 13.02 percent records, and followed by three authors were published 11.66 percent records, four authors published 10.72 percent records, and five authors published 9.79 percent records.

Table 4 Document wise distribution

Sl.No	Document Type	N0. of Records	% of 1175	Cum.%
1	Articles	578	49.19	49.19
2	Meeting Abstract	227	19.32	68.51
3	Proceeding Paper	143	12.17	80.68
4	Review	120	10.21	90.89
5	Editorial Material	77	6.55	97.45
6	Letter	14	1.19	98.64
7	Correction	11	0.94	99.57
8	Biographical - Item	2	0.17	99.74
9	Book Review	2	0.17	99.91
10	Review; Book Chapter	1	0.09	100
	Total	1175	100	

Document wise distribution

Table 4 indicates that document type wise research performance in epidemiology, articles has predominate place with 49.19 percentage records, meeting abstract has 19.32 percentage records, moreover proceeding paper has published 12.17 percentage records, review has 10.21 percentage records, editorial material has 6.55 percentage of records, letter has 1.19 percentage of records, correction has 0.94 percentage records, bibliographical item and book review has respectively 0.17 percentage of records, very least 0.09 percentage of records published by review book chapter.

Table 5 Language wise publication

Sl.No	Language	No. of Records	% of 1175	Cum.%
1	English	1170	99.57	99.57
2	Dutch	4	0.34	99.91
3	French	1	0.09	100
	Total	1175	100	

Language wise publication

Table 5 shows that language wise distribution of epidemiology, English language has first position with 1170 records, followed by Dutch has published with 4 records, French has published only 1 record.

Table 6 Top twenty source wise contribution of Epidemiology

Sl.No	Sources	No. of Records	% of 1175
1	International Journal of Antimicrobial Agents	145	12.34
2	Veterinary Parasitology	131	11.15
3	European Journal of Epidemiology	68	5.79
4	Journal of Clinical Virology	68	5.79
5	Preventive Veterinary Medicine	61	5.19
6	Infection Genetics And Evolution	58	4.94
7	Virus Research	57	4.85
8	ACTA Tropica	43	3.66
9	Journal of Hepatology	30	2.55
10	Journal of The Neurological Sciences	30	2.55
11	European Journal of Plant Pathology	24	2.04
12	Oral Oncology	17	1.45
13	Cancer Causes & Control	16	1.36
14	Mycopathologia	16	1.36
15	European Urology Supplements	15	1.28
16	Journal of Affective Disorders	13	1.11
17	Schizophrenia Research	13	1.11
18	Mutation Research-Reviews In Mutation Research	12	1.02
19	Sleep Medicine	12	1.02
20	Tropical Animal Health And Production	12	1.02

Top twenty sources in Epidemiology research

It indicates that top twenty productive sources in Epidemiology research, 139 sources were published 1175 records, International Journal of Antimicrobial Agents has first place with 145 records, Veterinary Parasitology has second place with 131 records, European Journal of Epidemiology and Journal of Clinical Virology has third place each with 68 records, followed by Preventive Veterinary Medicine has 61 records, Infection Genetics And Evolution has 58 records, Virus Research has 57 records, ACTA Tropica has 43 records, Journal of Hepatology and Journal of the Neurological Sciences has respectively 30 records, European journal of plant pathology Oral Oncology has 17 records, Cancer Causes & Control and Mycopathologia has respectively 16 records, European Urology Supplements has 15 records, Journal of Affective Disorders and Schizophrenia Research has each 13 records, Mutation Research-Reviews In Mutation Research, Sleep Medicine and Tropical Animal Health And Production has last position with 12 records.

Table 7 Publisher wise contribution of Epidemiology

Sl.No	Publishers	No. of Records	%	Cum.%
1	Elsevier Science Bv	906	77.11	77.11
2	Springer	144	12.26	89.36
3	Kluwer Academic Publ	86	7.32	96.68
4	IOS Press	13	1.11	97.79
5	Van Zuiden Communications	8	0.68	98.47
6	Royal Netherlands Veterinary Assoc	6	0.51	98.98
7	Swets Zeitlinger Publishers	3	0.26	99.23
8	Misset Uitgeveriji Bv	2	0.17	99.40
9	Bentham Science Publ Ltd	1	0.09	99.49
10	Bohn Stafleu Van Loghum Bv	1	0.09	99.57
11	Brill Academic Publishers	1	0.09	99.66
12	Elsevier Science Publ Bv	1	0.09	99.74
13	Koninklijke Nederlandse Maatschappij Voor Diergeneeskunde	1	0.09	99.83
14	Kowsar Publ	1	0.09	99.91
15	VSP Bv	1	0.09	100
	Total	1175	100	

Publisher wise contribution of Epidemiology

It is reveals that publisher wise contribution on epidemiology, 15 publishers contributed 1175 records Elsevier Science Bv has contributed by 906 records, Springer has contributed by 144 records, Kluwer Academic Publ has contributed by 86 records, IOS Press has contributed by 13 records, Van Zuiden Communications has contributed 8, Royal Netherlands Veterinary Assoc has 6, Swets Zeitlinger Publishers has 3, Misset Uitgeveriji Bv has 2, and other seven publishers has respectively 1 record.

Table 8 Top twenty subject wise contribution

Sl.No	Subjects	No. of Records	% of 1175
1	Infectious Diseases	206	17.53
2	Virology	125	10.64
3	Parasitology	100	8.51
4	Neurosciences & Neurology	90	7.66
5	Microbiology	79	6.72
6	Veterinary Sciences	75	6.38
7	Public, Environmental & Occupational Health	71	6.04
8	Oncology	54	4.60
9	Agriculture	49	4.17
10	Gastroenterology & Hepatology	36	3.06
11	Biotechnology & Applied Microbiology	35	2.98
12	Immunology	27	2.30
13	Urology & Nephrology	26	2.21
14	Biochemistry & Molecular Biology	18	1.53
15	Cardiovascular System & Cardiology	16	1.36
16	Mycology	16	1.36
17	Environmental Sciences & Ecology	15	1.28
18	General & Internal Medicine	13	1.11
19	Psychiatry	13	1.11
20	Genetics & Heredity	12	1.02

Top twenty subject wise contribution

It is indicates that top twenty subject contribution in Netherland, totally 1175 records were published by 54 subjects,

among twenty subjects Infectious Diseases has first place with 206 records, Virology has second place with 125 records, Parasitology has third place with 100 records, Followed by Neurosciences & Neurology has 90 records, Microbiology has 79, Veterinary Sciences has 75, Public, Environmental & Occupational Health has 71, Oncology has 54, Agriculture has 49, Gastroenterology & Hepatology has 36, Biotechnology & Applied Microbiology has 35, Immunology has 27, Urology & Nephrology has 26, Biochemistry & Molecular Biology has 18, Cardiovascular System & Cardiology and Mycology has respectively 16 records, Environmental Sciences & Ecology has 15, General & Internal Medicine and Psychiatry has each with 13 records, Genetics and Heredity has last contribution 12 records.

Table 9 Top twenty institution wise publication

Sl.No	Institutions	No. of Records	% of 1175
1	Center for Disease Control & Prevent	17	1.45
2	University California Davis	16	0.01
3	Murdoch University	13	1.11
4	Colorado State University	10	0.85
5	Institut National De La Recherché Agronomique	9	0.77
6	University London Imperial Collage Science Technology & Medicine	9	0.77
7	Erasmus Medical Center	8	0.68
8	Harvard University	8	0.68
9	University Athens	8	0.68
10	University Pretoria	8	0.68
11	University Cambridge	7	0.60
12	Ankara University	7	0.60
13	University Washington	7	0.60
14	Katholieke University Leuven	6	0.51
15	Columbia University	6	0.51
16	Karolinska Institution	6	0.51
17	McGill University	6	0.51
18	National Veterinary Institute	6	0.51
19	National Chemical Laboratory	6	0.51
20	Massey University	5	0.43

Top twenty institution wise publication

It is reveals that top twenty institutions published in epidemiology research papers, totally 1175 records were published by 727 institutions, among the twenty institutions Center for Disease Control & Prevent has occupies first position 17 records, University California Davis has occupies second position 16 records, Murdoch University has occupies third position 13 records, Moreover Colorado State University has 10 records, Institut National De La Recherché Agronomique and University London Imperial Collage Science Technology & Medicine has each 9 records, Erasmus Medical Center, Harvard University, University Athens and University Pretoria has 8 records, University Cambridge, Ankara University, and University Washington has respectively 7 records, and six institutions has respectively published 6 records, last position of Massey University has contributed 5 records.

Conclusion

Conclusion from this study, the year wise research publication shows increasing and decreasing trends during the study period. Among 1175 records articles has predominant place with 49.19 percentage, only three language contributed in this study, English has published 1170 records, top twenty subject wise contribution Infections and Disease has published 206 records, twenty source wise publication International Journal of Antimicrobial Agents has occupies first place with 145 records.

REFERENCE

[1] Cates, W. (1982), "Epidemiology: Applying principles to clinical practice." Contemp Ob/Gyn, 20,147–161. | | [2] Macmahon, B., and Pugh, T. F. (1970), In: Epidemiology: principles and methods. Boston: little, Brown; 1-16. | | [3] Mahapatra, M. (1985), "On the Validity of the Theory of Exponential Growth of Scientific Literature." Proceedings of the 15th IASLIC Conference, Bangalore, 61-70 | | [4] Snow, J. (1930), Snow on cholera. London: Humphrey Milford: Oxford University Press. |