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KEYWORDS ANALYSIS ON DENGUE DISEASE FROM 2005 – 2014: A SCIENTOMETRIC STUDY

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Abstracts

The study has examined the research output of the keyword analysis of 'Dengue disease' during the period 2005 - 2014. Bibliometric indicators were existing journal articles, cited reference, authorship pattern, document wise distribution, journal self – citation and author self-citation, keyword analysis in the dengue disease. The keyword analysis of Dengue Disease for ten-years, during the year 2005 to 2014 taken for the study 3517 words were retrieved in the current study. The highest publication is 691 in 2014 rank is first, the second rank is 2012 in 518 records, third rank is 2011 in 414 records and lowest record is 131 in 2005. The out of 3517 articles single author contributed only 216 (6.14 %) articles while the rest 3301 (93.86 %) articles were contributed by Multi authors. The majority of authorship patterns are multi-author collaborations which is the highest contribution during the ten years. The degree of collaboration ranges from 0.90 to 0.97 and the average degree of collaboration is 0.94. Researchers identified the total number of Countries i.e. 130 during the period between 2005- 2014. But, we observed the majority of the Country "USA" in 1219 records with TLCS- 6211 and TGCS in 27146. Researchers identified the total number of keywords i.e. 5493 during the period between 2005-2014. But selected top 20 keywords for the research purpose. We observed the majority of the keywords "Dengue" in 2038 records with TLCS 10794 and TGCS in 33761. Moreover the present study mirrors the actual published results of the work of Dengue Disease in global level.

Keywords: Dengue diseases, Scientrometrics, Degree of collaboration, authorship pattern, Document type, Bradford's law

Introduction

Scientometrics is the study of measuring and analyzing science, technology and innovation. Major research issues embrace the dimension of impact, reference sets of articles to explore the impact of journals and institutes, considerate of scientific citations, mapping scientific fields and the formation of indicators for use in policy and organization contexts. In observe there is a important be related between scientometrics and other scientific fields such as bibliometrics, information science and science of science policy. Dengue diseases also known as break bone fever, is a mosquito – borne tropic a disease cause y the dengue virus.

Dengue diseases also known as break bone fever, is a mosquito – borne tropic a disease caused y the dengue virus. Symptoms consist of fever, headache, muscle and joint pains, and a quality skin rash that is similar to measles. In a small quantity of cases, the disease develops into the life-aggressive dengue hemorrhagic fever, resulting in bleeding, low levels of blood platelets and blood plasma leakage, or into dengue shock syndrome, where stress occurs. Treatment of acute dengue is compassionate using either oral or intravenous rehydration for mild or moderate disease, and intravenous fluids and blood transfusion for extra severe cases. The number of cases of dengue fever has increased dramatically since the 1960s, with between 50 and 528 million people infected yearly. Early descriptions of the circumstance date from 1779, and its viral cause and transmission were understood by the early 20th century. Dengue has become a global problem since the Second World War and is endemic in more than 110 countries. Apart from eliminating the mosquitoes, work is ongoing on a vaccine, as well as medication targeted directly at the virus.

Signs and symptoms

Typically, people contaminated with dengue virus are an indicative (80%) or only have mild symptoms such as an unsophisticated fever. Therefore, travelers frequent from widespread areas are improbable to have dengue if fever or other symptoms start more than 14 days after arriving home. Children repeatedly experience symptoms related to those of the common cold and gastroenteritis (sickness and diarrhea) and have a greater risk of severe complications, though initial symptoms are generally unconcerned but contain high fever.

Review of Literature

.   Hang Wen and Yi Huang (2012) carried out a investigate on oxidative stress publications published among 1991 and 2010 in journals of all the focus categories of the Science citation index. Publication trends were analyzed by the retrieved consequences in periodical type and language, individuality of articles outputs, country, focus categories and journals, and the incidence of title-words and keywords used. Over the years, there was a significant growth in article outputs, with more countries participating and collaborating. The seven major industrialized countries (G7) published the majority of the world articles while the USA contributed about one-third of the total. Chinese and Indian outputs grew much faster than those of other countries in the past five years. Oxidative stress research in food and ecological associated fields increasingly became the conventional of the research. An analysis of the title-words, author keywords and keywords plus showed that antioxidants in human or rat cells were the hot topic in the field. In addition, ''reaction oxygen species'', ''apoptosis'', and ''nitric-oxide'' were major topics of oxidative stress research recently.

Gupta, R., & Tiwari, R. (2014) conducted a study based on quantitatively evaluate Indian dengue research output during the 10 years from 2003 to 2012, using Scopus international multidisciplinary database. The study focused on global publication output, share, rank, and citation impact of top 15 most productive nations, India's publications output, growth, global publication share and research impact, international collaborative papers share in national output and the share of major international collaborative partner countries in total India's international collaborative papers, contribution of various sub-fields and distribution by population age groups, productivity and citation impact of its leading Indian institutions and authors and Indian contribution in most productive journals. Among the top 15 most productive countries, India holds second position in dengue fever research output, with global publication share of 10.22% during 2003-12. The average citation per paper scored by India was 3.27, the least among the top 15 most productive countries during 2003-12. India's share of international collaborative papers was 10.55% during 2003-12, which increased from 9.12% during 2003-07 to 11.13% during 2008-12. Present India's research efforts in dengue research are low in view of the 50,222 cases of dengue in 2012 alone. The country needs to increase its research output and also increase its research impact substantially particularly through enhanced national and international

collaboration, besides evolving a national policy for identification, monitoring and control of dengue cases and also evolving a research strategy with sufficient funding commitment to solve this growing national problem.

Sa'ed, H. Z. (2016) the focused emergence the of the dengue is a significant emerging and re-emerging infection worldwide as a quickly growing and extensive public health problem, with diffusion occurring in more than 128 countries in Asia, Americas, southeast Africa, western Pacific, and eastern Mediterranean regions. The consistent search advance based on the exploit of the keyword "dengue" in the title, abstract and keyword field was used to get examine output related to dengue at a global level. All data related to dengue were collected from the past to December 31, 2015.A total of 19,581 dengue-related documents identified in the Scopus database. The leading countries in dengue research were the USA (4,709; 24.05 %), India (1,942; 9.92 %), Brazil (1,530; 7.81 %), Thailand (1,260; 6.43 %), the UK (1,129; 5.77 %), and France (1,087; 5.55 %). Only 226 (1.16 % of the overall global research effort in the dengue field) articles were published in the Arab region. The total number of citations for all publications was 352,710, with an average of 18.0 citations per publication. Furthermore, the h-index for all extracted data related to dengue research was 186. Kingdom of Saudi Arabia (KSA) was the most productive country in the Arab region with 102 documents representing 45.1 %. Furthermore, the h-index for all extracted data related to dengue research was 27. The USA was Arab's most main cooperative partner (46, 20.4 %), followed by India (36, 15.9 %). It was concluded that the amount of literature related to dengue research has considerably increased over the last decade. This bibliometric investigation has confirmed the significant role that the USA, India, Brazil, Thailand, the UK, and France participate in dengue research. The Arab world formed fewer publications correlated to dengue with lower eminence than further world countries.

Lalitha Kumari (2009) analyses the research output and impact in Synthetic Organic Chemistry (SOC) during 1998–2004, applying standardized scientometric indicators. Volume of research publications and their citations presented as percentage world share is illustrative of the trend pattern against time. Adopting relative indicator - Absolute Citation Impact (ACI) and Relative Citation Impact (RCI), a cross national assessment is attempted at three levels of aggregations - global, Asian and Indian. Based on this investigation, it is concluded that G7 nations, being

leaders in respect of the volume of literature published, and citations attracted are showing a decreasing trend over the years probably due to shifting and diversification of their research efforts to other emerging research fronts.

Bhardwaj, R. K. (2014) explored Dengue is a disease primarily characterized by headache, eye pain, skin rash, debilitating muscle, and sudden high fever. Presently, no vaccine is available to counter this disease. The best antidote is disturbance strategies to limit the extent of a virus. This paper is an attempt to make a scientometric assessment of research on dengue during 2001-12. The data of this study is obtained from Scopus (http://www.scopus.com) multidisciplinary database and analyzed from different angles. The study reveals that there were 9618 publications within the period under study. During the period 2001-12 annual growth rate was 13.4 percent, compared to 14.31 percent in the period 2001-2006, and 12.48 percent in 2007-2012. The USA is found to be the leading country on dengue research. The USA has contributed 24.88 percent of world publications. Mahidol University, Thailand, is the majority industrious organization which has contributed the highest number of publications (353 papers; 6502 citations; h-index value 40). Guzmán, María Guadalupe from Instituto de Medicina Tropical Pedro Kouri, was found to be the most dynamic author in the field of dengue research.

Dutt, B., Kumar, S., & Garg, K. C. (2010) have analyzed of 2566 papers published during 1987 to 2008 and indexed by Science Citation Index - Expanded indicate a gradual rise in the quantum of output. About 80% of the papers appeared in journals originating from the USA. The UK, Netherlands, France, and Germany. Total output came from 74 countries of which 17 countries contributed 87% of the total output. The highest number of publications came from the USA followed by India. However, in the later block (1998-2008) the proportion of the output of both USA as well as India declined as compared to the first block (1987-1997). More than half of the scientific output is concentrated among four sub-disciplines of microbiology & virology, immunology & vaccine. Epidemiology and entomology. Among the prolific institutions, the publication output of institutions from the US and Taiwan had a higher impact. Of all the papers published 17%, did not get any citations. The incidence of High-Quality Papers, Citations per Paper (CPP) and Relative Quality Index (RQI) were more than average for the USA. The proportion of co-authored papers increased significantly in the year 2008 as compared to 1987. The proportion or mega authored paper was high for the Netherlands, Taiwan, China, Cuba, Brazil, France, and Japan.

Objectives

The following are the important objectives of the study,

- ➤ To find out year-wise publication of articles
- ➤ To find out Document Type
- ➤ To find out the institution wise Records
- ➤ To find out the Authorship pattern
- ➤ To determine the degree of collaboration,
- ➤ To find out the Single and Multi Authorship pattern
- ➤ To find out most prolific authors, most productive institution and¬ author productivity

Methodology

The present study data were collected from the web of science core collection database which is published by Thomson Reuters [WOS]. The records on 'Dengue Disease' research output during 2005 – 2014 have taken for the analysis. The present study analysis for the authorship pattern, countries, institutions, keywords in dengue disease. Bradford's law of scattering has also been applied in this study. The keywords investigation for dengue disease during the study period was taken and 3517 words were retrieved for the present study. The collected data from a web of science core collection database records of analyzed through Histcite and calculated using excel sheet to find out the result.

Data Analysis and Interpretation

Table: 1 year wise publication of records

S.No	Publication Year	Records	%	TLCS	TGCS
1	2005	131	3.72	1640	5733
2	2006	185	5.26	2227	6876
3	2007	208	5.91	2081	7152
4	2008	282	8.02	1765	7000
5	2009	323	9.18	1417	6533
6	2010	382	10.87	1352	7628

7	2011	414	11.77	1305	6190
8	2012	518	14.73	808	4996
9	2013	383	10.89	471	2293
10	2014	691	19.65	82	731
Total		**3517**	**100**	**13148**	**55132**

Table1 analyses the yearly output brought out by the scientists on dengue disease at world level from 2005 to 2014. From the below table, we could clearly see that there is about 3517 total output brought out by the scientists on dengue the year wise analyses indicate the increasing trend. In the year the output measured is 131. It increased to 691 in the year 2014. Yet there is a declaring trend is observed in the year 2013 from the year 2005 to 2009. The output performance rate is measured to below 10 percentages; still, from 2010 onwards the performance is observed to more than 10 percentages. And the year 2014 is a progressive year. The increasing trend is noted from this year 2005 and the light output performance is noted in the year 2014. Yet there is a declaring status in the output performance is observed in the year 2013 to which the reason is unknown. The study includes the data covered in a web of science database from 2005 to 2014.

Figure: 1 year wise publication of records
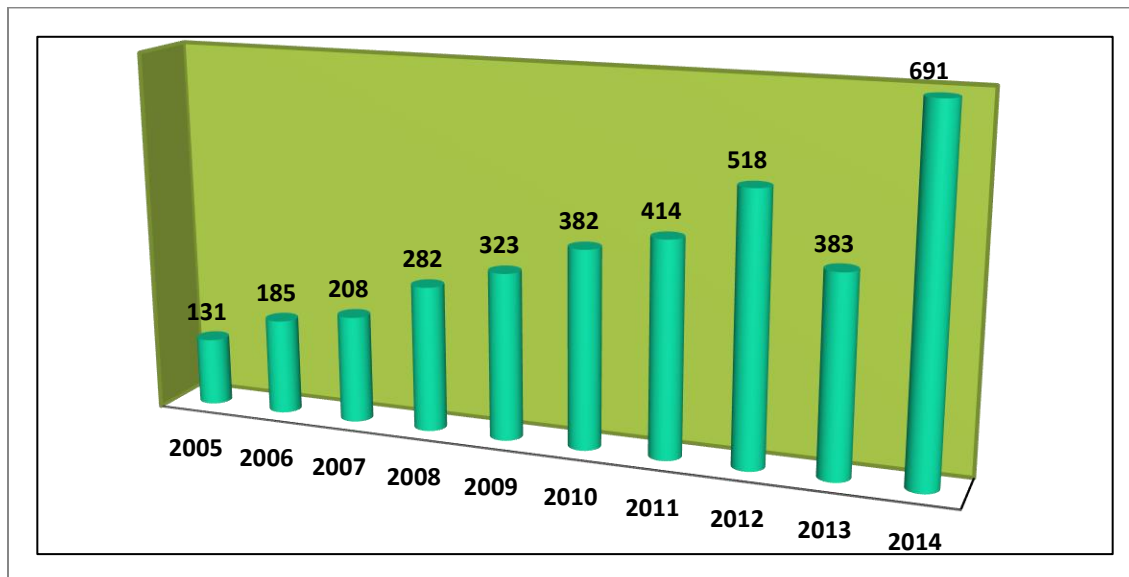
Table: 2 Language Wise of Articles

S.No	Language	Records	%	TLCS	TGCS
1	English	3376	95.93	13010	54594
2	Spanish	51	1.45	14	106
3	Portuguese	39	1.11	33	156
4	French	29	0.82	88	249
5	German	14	0.4	0	14
6	Turkish	4	0.11	3	12
7	Polish	2	0.06	0	1
8	Czech	1	0.03	0	0
9	Dutch	1	0.03	0	0
10	Korean	1	0.03	0	0
11	Malay	1	0.03	0	0
Total	**11**	**3517**	**100**	**13148**	**55132**

Table 3 lights on the language wise distribution of research output given by dengue researcher. The overall strong period corers 11 different languages. The dengue scientists are spread over 11 different language speakers. Among then 5 languages are observed. The majority of the scientists prefer publishing their reserved output in English language. It is routed to be about 3376.out of total output of 3517 language English occupies to be the top and it is calculated to 95.93percentage.The next language that the dengue scientist prefer is Spanish which is accounted to 51.

Figure: 2 Language Wise of Articles
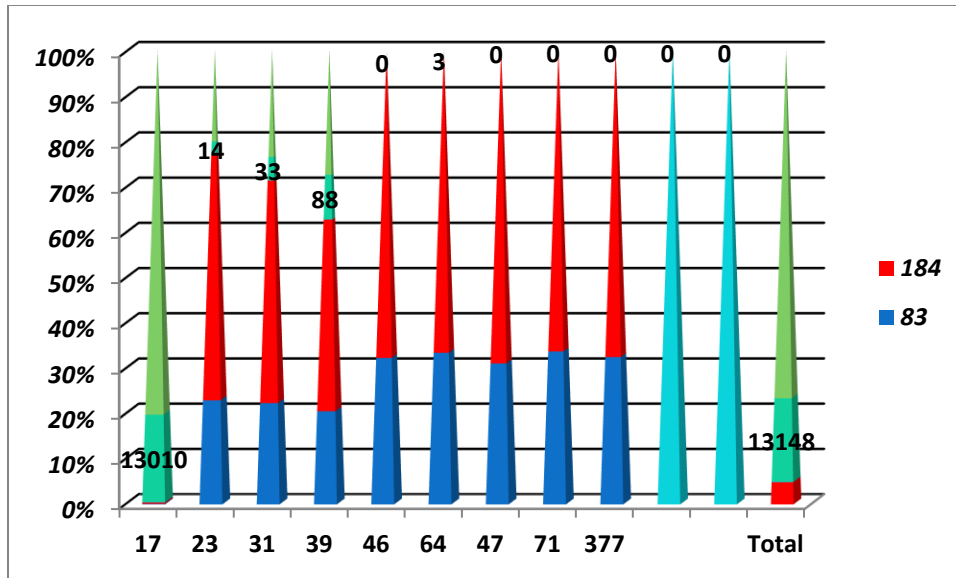
Table: 3 Country wise Records (130 countries)

S.NO	Country	Records	Cumulative	TLCS	TGCS
1	USA	1219	1219	6211	27146
2	Brazil	430	1649	948	4292
3	UK	316	1965	1569	6710
4	France	284	2249	1040	5567
5	India	261	2510	591	2159
6	Thailand	255	2765	1462	4613
7	Singapore	186	2951	866	3913
8	Australia	181	3132	615	3404
9	Peoples R China	153	3285	248	1678
10	Germany	144	3429	770	2861
11	Taiwan	124	3553	702	2241
12	Japan	97	3650	349	1242

13	Malaysia	97	3747	279	1105
14	Vietnam	97	3844	737	2712
15	Switzerland	86	3930	377	2633
16	Netherlands	84	4014	199	1326
17	Canada	83	4097	308	2081
18	Mexico	79	4176	118	1066
19	Cuba	68	4244	392	1468
20	Italy	68	4312	134	765
21	Colombia	66	4378	83	463
22	Spain	53	4431	88	649
23	South Korea	52	4483	427	1570
24	Indonesia	50	4533	152	542
25	Pakistan	46	4579	41	158
26	Sri Lanka	46	4625	108	317
27	Venezuela	46	4671	240	696
28	Sweden	43	4714	108	630
29	Argentina	41	4755	82	425
30	Peru	31	4786	44	436
31	Portugal	30	4816	46	261
32	Belgium	29	4845	171	612
33	Philippines	29	4874	90	393
34	Nicaragua	27	4901	235	683
35	Cambodia	25	4926	24	637

36	South Africa	23	4949	209	772
37	Reunion	22	4971	64	375
38	French Guiana	21	4992	73	295
39	Saudi Arabia	21	5013	17	135
40	Costa Rica	19	5032	27	164
41	Kenya	19	5051	34	177
42	Austria	18	5069	30	203
43	Trinid& Tobago	18	5087	36	140
44	Israel	17	5104	100	414
s45	Turkey	14	5118	11	80
46	Fr Polynesia	13	5131	29	115
47	Martinique	13	5144	52	139
48	Ecuador	12	5156	10	129
49	Gabon	12	5168	20	171
50	Egypt	11	5179	9	82
51	New Zealand	11	5190	14	127
52	Denmark	10	5200	47	142
53	Nepal	10	5210	6	39
54	Norway	10	5220	8	139

55	Senegal	10	5230	30	223
	Other 75 Countries	275	5505	1429	4660
TOTAL	Total (130) Countries	5505		21636	96175

Table 4 explains the country wise distribution of publications output on Dengue Disease. The total output observed in the study is 5505 during the short period. There are about dengue contras have collective contributed 5505 research output on dengue disease. The analyses bring out the fact that the USA is ranked to be the first and it has given the productivity of 1219 records on Dengue research. The second rank is occupied by BRAZIL which has brought out 430 publications on Dengue Disease. While comparing the output of USA, Output of BRAZIL seems to be one third of USA's Output. The third rank to the UK .It has reflected with 316 publications output. FRANCE is the next order of rank and it has shows 284 publications. India is ranked to the fifth in order. The output of INDIA is accounted to 261.THAILAND is observed to be sixth in rank order with 255 publishing. There are about 5 countries observed with more than 100 publications on Dengue disease. The other countries are noted with less than 100 publications .The table has listed according to the output of countries up to 10 publications. Number of countries has collectively brought out 219 research output on Dengue Disease.

Table: 4 Year Wise Analysis of Authorship Pattern

Years	Single Author	Two Author	Three Author	Four Author	Five Author	More than five	Total
2005	8	12	21	15	15	63	134
2006	13	25	23	16	24	83	184
2007	15	23	25	34	17	95	209
2008	29	46	46	19	23	120	283

2009	27	43	35	40	31	147	323
2010	23	47	45	42	39	185	381
2011	26	57	36	45	46	203	413
2012	31	58	49	49	64	266	517
2013	11	45	61	46	47	172	382
2014	33	79	94	64	71	350	691
TOTAL	**216**	**435**	**435**	**370**	**377**	**1684**	**3517**

Table 4 shows year wise authorship pattern of the research output on dengue disease. It indicates that out of the 216 contributions to single authors. Year 2014 is highest number i.e-33, since the year 2005 has the lowest number i.e-8 contributions .Out of the 435 contributions to two authors, Year 2014 is highest number i.e-79, since the year 2005 has the lowest number i.e-12 contributions. Out of the 435 contributions to three authors, year 2014 is highest number i.e-94, since the year 2005 has the lowest number i.e-21 contributions. Out of the 370 contributions to four authors, Year 2014 is highest number i.e-64, since the year 2005 has the lowest number i.e-15 contributions.

Figure: 3 Year Wise Analysis of Authorship Pattern
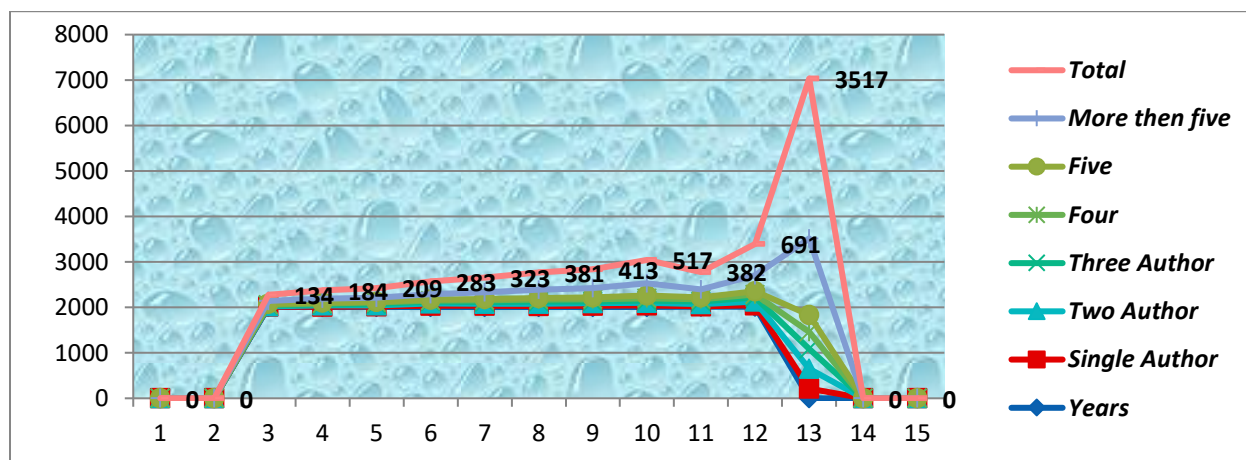
Table: 5 Analysis of Degree of Collaboration

Years	Single Author (NS)	Multiple Author (NM)	Total Authors (NS+NM)	Degree of Collaboration
2005	8	126	134	0.94
2006	13	171	184	0.93
2007	15	194	209	0.93
2008	29	254	283	0.90
2009	27	296	323	0.92
2010	23	358	381	0.94
2011	26	387	413	0.94
2012	31	486	517	0.94
2013	11	371	382	0.97
2014	33	658	691	0.95
Total	**216**	**3301**	**3517**	**0.93**

The table shows the details about the degree of collaboration which indicate tend in single and multiple authorship during 2005 – 2014 as shown in Table. The degree of collaboration ranges from 0.90 to 0.97 and the average degree of collaboration is 0.94. The DC is calculated by using the formula K.Subramaniyam, 1982. The formula is where

DC = Degree of Collaboration

NM = Number of Multi Authors

NS = Number of Single Authors

$$C = \frac{N_m}{N_m + N_s}$$

$$C = \frac{3301}{3301 + 216} = 0.93$$

In the present study the value of DC is 0.93.

As the result, the degree of collaboration in the study Dengue Disease is 9.36 which show the collaborations of multiple authors.

Table: 6 Analysis of keywords on Top 20 Only (5493)

S.No	Word	Records	TLCS	TGCS
1	DENGUE	2038	10794	33761
2	VIRUS	959	4858	18481
3	FEVER	462	2131	6377
4	INFECTION	448	2074	7410
5	AEDES	368	855	5075
6	DISEASE	327	1395	5713
7	AEGYPTI	280	688	4041
8	VECTOR	225	557	2867
9	CONTROL	190	573	3085
10	HUMAN	187	561	2684
11	MOSQUITO	180	372	2626
12	DISEASES	167	215	2392
13	INFECTIONS	156	716	2484
14	VIRAL	154	642	2548
15	PATIENTS	149	552	1754
16	PROTEIN	149	648	2750
17	HEMORRHAGIC	139	994	2517
18	CELLS	138	996	2755
19	DETECTION	131	340	1559
20	CHIKUNGUNYA	129	474	2497

We observed the majority of the keywords "DENGUE" in 2038 research output with TLCS- 10794 and TGCS in-33761 which we got the first position. The next keywords kindly concentrated by the World Scientists on Dengue Disease in 959 records of "VIRUS" which is observed with TLCS 4858 and TGCS in 18481 which we got second position, followed by the "FEVER"462 records with TLCS -2131 and TGCS-6377 which we got the third position.

Table: 7 Analysis of Ranking of Journals (840)

S.No	Journal	Records	Cumulative	TLCS	TGCS
1	PLOS NEGLECTED TROPICAL DISEASES	239	239	0	3892
2	PLOS ONE	183	422	0	1504
3	AMERICAN JOURNAL OF TROPICAL MEDICINE AND HYGIENE	143	565	886	2400
4	JOURNAL OF VIROLOGY	94	659	1101	3287
5	VACCINE	62	721	341	1340
6	JOURNAL OF INFECTIOUS DISEASES	52	773	706	1465
7	JOURNAL OF CLINICAL VIROLOGY	45	818	204	511
8	INTERNATIONAL JOURNAL OF INFECTIOUS DISEASES	42	860	114	306
9	TRANSACTIONS OF THE ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE	42	902	146	558
10	PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA	41	943	574	1991
11	TROPICAL MEDICINE & INTERNATIONAL HEALTH	40	983	218	609
12	VIROLOGY JOURNAL	39	1022	0	442

13	VIROLOGY	37	1059	266	787
14	ANTIVIRAL RESEARCH	36	1095	237	1015
15	EMERGING INFECTIOUS DISEASES	34	1129	363	1149
16	PARASITES & VECTORS	34	1163	0	119
17	BMC INFECTIOUS DISEASES	33	1196	0	388
18	MEMORIAS DO INSTITUTO OSWALDO CRUZ	32	1228	70	339
19	PLOS PATHOGENS	32	1260	0	1048
20	JOURNAL OF GENERAL VIROLOGY	31	1291	188	647
21	JOURNAL OF MEDICAL ENTOMOLOGY	31	1322	51	353
22	JOURNAL OF VIROLOGICAL METHODS	29	1351	88	390
23	ACTA TROPICA	27	1378	79	258
24	CADERNOS DE SAUDE PUBLICA	27	1405	86	239
25	PARASITOLOGY RESEARCH	27	1432	43	236
26	JOURNAL OF MEDICAL VIROLOGY	25	1457	86	295
27	REVISTA DA SOCIEDADE BRASILEIRA DE MEDICINA TROPICAL	25	1482	35	150
28	VECTOR-BORNE AND ZOONOTIC DISEASES	25	1507	80	374
29	SOUTHEAST ASIAN JOURNAL OF TROPICAL MEDICINE AND PUBLIC HEALTH	24	1531	10	59

30	INDIAN JOURNAL OF MEDICAL RESEARCH	23	1554	97	224
31	JOURNAL OF IMMUNOLOGY	23	1577	342	794
32	JOURNAL OF TRAVEL MEDICINE	23	1600	63	315
33	INFECTION GENETICS AND EVOLUTION	22	1622	59	252
34	BMC PUBLIC HEALTH	21	1643	0	190
35	EPIDEMIOLOGY AND INFECTION	20	1663	94	289
36	VIRUS RESEARCH	20	1683	25	203
37	ARCHIVES OF VIROLOGY	19	1702	52	162
38	BIOMEDICA	19	1721	3	29
39	JOURNAL OF INFECTION IN DEVELOPING COUNTRIES	19	1740	26	64
40	CLINICAL AND VACCINE IMMUNOLOGY	18	1758	118	307
41	MATHEMATICAL BIOSCIENCES	18	1776	107	256
42	JOURNAL OF CLINICAL MICROBIOLOGY	16	1792	153	513
43	JOURNAL OF THE AMERICAN MOSQUITO CONTROL ASSOCIATION	16	1808	18	134
44	FUTURE VIROLOGY	15	1823	15	61
45	VIRUSES-BASEL	15	1838	51	144
46	CURRENT OPINION IN INFECTIOUS	14	1852	184	434

	DISEASES				
47	MICROBES AND INFECTION	14	1866	64	143
48	HUMAN IMMUNOLOGY	13	1879	70	192
49	JOURNAL OF VECTOR BORNE DISEASES	13	1892	12	68
50	TRAVEL MEDICINE AND INFECTIOUS DISEASE	13	1905	6	45
51	ANTIMICROBIAL AGENTS AND CHEMOTHERAPY	12	1917	36	264
52	FEMS IMMUNOLOGY AND MEDICAL MICROBIOLOGY	12	1929	151	261
53	JOURNAL OF VECTOR ECOLOGY	12	1941	20	85
54	LANCET INFECTIOUS DISEASES	12	1953	143	663
55	TROPICAL BIOMEDICINE	12	1965	8	21
56	CLINICAL INFECTIOUS DISEASES	11	1976	105	414
57	HUMAN VACCINES	11	1987	63	191
58	JOURNAL OF THEORETICAL BIOLOGY	11	1998	48	108
59	REVISTA DO INSTITUTO DE MEDICINA TROPICAL DE SAO PAULO	11	2009	9	67
60	VIRAL IMMUNOLOGY	11	2020	62	165
61	BMC GENOMICS	10	2030	0	121
62	EUROSURVEILLANCE	10	2040	0	178
63	8 journals 9	72	2112	518	1751

64	10 journals 8	80	2192	807	2693
65	12 journals 7	84	2276	377	2174
66	18 journals 6	108	2384	280	1395
67	18 journals 5	90	2474	118	713
68	28 journals 4	112	2586	354	1115
69	54 journals 3	162	2748	704	2549
70	140 journals 2	280	3028	784	3564
71	489 journals 1	489	3517	1073	11012
72	**Total journals**	**3517**		**13191**	**60474**

Further, it was analyzed to find out the key journals in the field of Dengue Disease which have brought out with more number of publications made by the researchers. It was found that there were 840 journals Dengue Disease researchers got their articles published over a period of study. There have been 239 papers published by a single PLOS NEGLECTED TROPICAL DISEASES has published; 0 TLCS, 3892 TGCS. It ranked at first place of research output in the field of Dengue Disease. The second position is taken by PLOS ONE which is accented to 183 publications of Dengue disease researchers in the Indian scientists with; with 0 TLCS, 1504 TGCS. The journal of AMERICAN JOURNAL OF TROPICAL MEDICINE AND HYGIENE 143 Publications, 886 TLCS and 2400 TGCS are scaled and it stands in third position of the publication. JOURNAL OF VIROLOGY has published 94; 1101 TLCS, 3287 TGCS, and it ranked in fourth place. 'VACCINE' has published 62 with 341 TLCS, 1340 TGCS and it stands in fifth position.

Bradford's law of scattering

The aim of Bradford's law is to explain that a group of journals could be arranged in an order of decreasing productivity and this has revealed that journals which yield most productive articles come first while the most unproductive tail last. According to this law journals are to be

grouped into a number of zones each producing similar number of articles. However, the number of journals in each zone will increase rapidly. Then the relationship among the zones is l:a:n2.

Bradford in his study analyzed articles in Dengue Disease. The journals containing to that field in descending order of productivity and divided that list into three 'Zones' each containing roughly the same number of journals .Bradford observed that the number of journals contributing articles to each zone increased by the multiplications of about five. The distribution of journals in various zones is as follows.

Table 7.1 Zone wise analysis of Bradford's Law

Zones	Number of Journals	Number of Records
1	16	1163
2	77	1113
3	747	1241
Total	840	3517

According to Bradford's law of distribution based on equation 1 and 2 the relationship between the zones is $l:n:n^2$,But the relationship between the zones in the present study is contradictory in each as 16:77:747 which does not fit to Bradford's distribution. It is clear that core distribution of articles has been published by a very few journals which means less than what Bradford formulated.

Conclusion

From the conclusion of this present study, the efficiency of the author could be recognized. Therefore, the individual author may be stimulated to distribute more number of contributions to enhance the single author contributions. The atmosphere and infrastructure are also very effective for the entire development of 'Dengue Disease' research area. It should be required to necessitate, stimulate and encourage researchers and scientists in this field of 'Dengue Disease' to carry out research to recognize the impact of research output.   It is mandatory to recruit specific research institutions to support research in the area on 'Dengue

Disease' research in the developing countries. The Universities and research institutions are to be provided with more financial assistance in the form of research grants to increase the quality of research.

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