MAPPING THE RESEARCH PRODUCTIVITY OF MELIOIDOSIS: A SCOPUS BASED STUDY ON SCIENTOMERTICS

Dr. R. Duraipandi

I/c Librarian, UGC- Human Resource Development Centre,
Jawaharlal Nehru University, New Delhi – 110067.
e-mail: durai2@yahoo.com

Abstract:

Scientometrics study has to apply for all branches of sciences, no exception for LIS research. It is an attempt to observe the research productivity of Melioidosis. It is an infectious disease caused by a gram-negative bacterium, Burkholderia pseudomallei, found in soil and water. It is of public health importance in endemic areas, particularly in Thailand and northern Australia. It exists in acute and chronic forms. Signs and symptoms may include pain in chest, bones, or joints; cough; skin infections, lung nodules and pneumonia. Researcher has applied the search string "Melioidosis" on Scopus database as found and downloaded a total of 1969 records during 1991-2015(20Years) of this study and applied the Scientometric tools for analysis the bibliographic output of each categories were analyses, tabulation and the results were brought under the year wise distribution, author wise distribution, source wise, document type wise, affixation wise, country wise and subject wise and keyword wise ranks were measured.

Keywords: Melioidosis; Communicable Disease; Scientometrics; Scopus; Bibliographic Output; Bibliometrics

Introduction

Recently, it is an emerging infection in India but it certainly increasing worldwide travel of both humans and other animals, the potential exists for melioidosis to spread to new and fertile pastures. Melioidosis is an infectious disease caused by a bacterium, Burkholderia pseudomallei and infection commonly involves the lungs. It can be not only diagnosed with the help of blood, urine, sputum, or skin-lesion testing but also treated with antibiotics. The overall mortality rate is 40%. Melioidosis is similar to glanders disease, which is passed to humans from infected domestic animals. It is most frequently reported in Southeast Asia and Northern Australia. It also occurs in South Pacific, Africa, India, and the Middle East. Infection most commonly occurs during the rainy season. In the United States, confirmed cases range from none to five each year and occur among travelers and immigrants, according to the U.S. Centers for Disease Control and Prevention (CDC).

Recent Break-up in India

India is among countries at high risk from melioidosis, a disease that mimics others and is difficult to diagnose without access to a good microbiology laboratory, according to a new study led by experts at the University of Oxford which published in the journal Nature Microbiology, the study predicts the disease is present in 79 countries, including 34 that have never reported it. It expects a rise in those infected as the number of diabetes cases also increases, especially among the poor. This study also predicts high infection rates in countries like India and Vietnam, where the disease is gradually being recognised more frequently and awareness of the disease is low even among health workers too. The deadly disease, Melioidosis, is contracted through the skin and lungs or by drinking contaminated water. Researchers say the infectious disease, melioidosis, is hard to detect because it mimics other diseases. The study estimates that melioidosis killed 89,000 of the 165,000 people who contracted it in 2015. The disease is contracted through the skin, lungs or by drinking contaminated water and is particularly tricky to diagnose because it mimics other diseases. The bacterium is resistant to a wide range of anti-microbial drugs, and inadequate treatment can result in fatality rates exceeding 70%. "Melioidosis is a great mimicker of other diseases and you need a good microbiology laboratory for bacterial culture and identification to make an accurate diagnosis.

It especially affects the rural poor in the tropics who often do not have access to microbiology labs, which means that it has been greatly underestimated as an important public health problem across the world,"

Objectives

The following main objectives were framed for the present study is:

- Ranking the Year wise Distribution of Melioidosis Publications;
- Identify the Author wise Distribution of Melioidosis Publications;
- Ranking the Source wise Distributions of Publications Melioidosis;
- To find out the various Document Types of Melioidosis Publications;
- Ranking of Institutions wise Collaboration with Melioidosis Publications
- Ranking the Countries wise collaboration of Melioidosis research Scientists;
- Ranking the major Subject Areas of Melioidosis Research Output;
- Tracing the Language and Keyword wise Distribution of Melioidosis Research;

Methodology

The methodology is applicable and adopted for this is Bibliometric study, which is used to analyzed in details the bibliographic attributes of the research productivity in Melioidosis which indexed in Scopus database for the study period of 1996-2015 (20 years) and found the records a total of 1969 using which tabulated and analyzed for the study to ranking the each category of research output.

DATA ANALYSIS AND INTERPRETATION

1. Year wise Distribution of Melioidosis Research Productivity

The below table -1 shows the year wise distributions of publication of Melioidosis from 1996 - 2015. The study based on total 20 years, the total output of 1969 publications was taken for analyses. Among the years, 2015 and 2013 has shared the rank of top with 161(8.18%) of publications each; followed the year 2014 stood at second rank has scored 156(7.92%) of records; the year 2012 has scored the third rank with 149(7.57%) of records; the year 2011 has scored the fourth rank with 146(7.41%) of publications and followed by the years and ranked their respective place of research output of Melioidosis with records. Since, 1925 to 1996 produced only single digit publications showing slow and steady progress of publications after 1996. Hence, it also shows that clearly there is a fluctuation but certainly a vertical trend of publications.

Table -1 Yearly Output of Melioidosis Research

Year	Recs	%	Rank
2015	161	8.18	1
2014	156	7.92	2
2013	161	8.18	1
2012	149	7.57	3
2011	146	7.41	4
2010	124	6.30	6
2009	101	5.13	9
2008	128	6.50	5
2007	109	5.54	8
2006	98	4.98	10
2005	112	5.69	7
2004	74	3.76	11
2003	71	3.61	13
2002	62	3.15	15
2001	58	2.95	16
2000	76	3.86	12

| 1999	66	3.35	14
1998	41	2.08	17
1997	41	2.08	17
1996	35	1.78	18
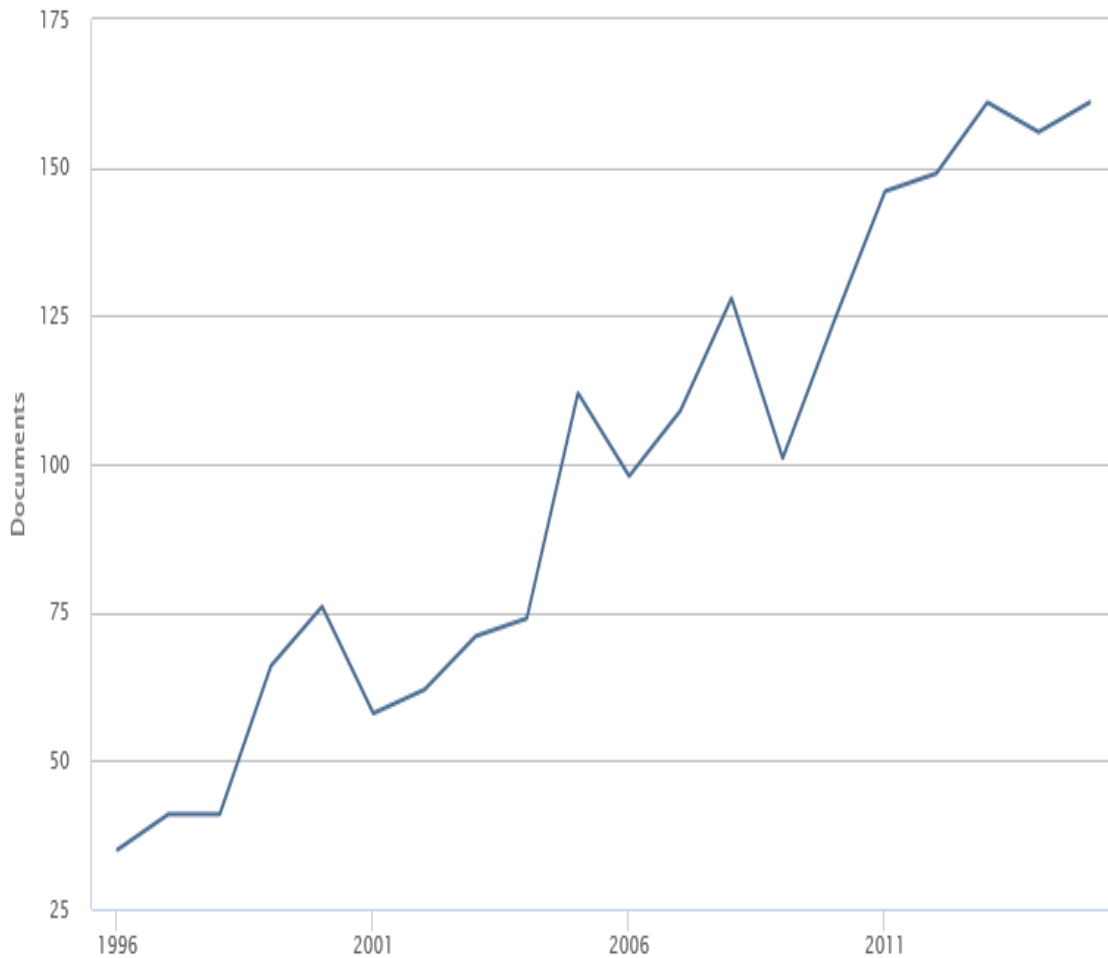
Figure -1 show the Yearly Output of Melioidosis Research

2. Source Wise Distribution of Melioidosis Research Output

The table – 2 presents the top source wise distribution of melioidosis output of 1969 during 1996 to 2015 found a total of 151 journals. Among them the "American Journal of Tropical Medicine and Hygiene" has scored 84(4.27%) of documents and ranked at top; followed by the "Infection and Immunity" has occupied the second rank with72(3.66%) of documents; the "Journal of Clinical Microbiology" has occupied third rank with 71((3.61%) of documents and followed by other journals in their respective places.

Table – 2 shows the Top 20 Source Output of Melioidosis Research

| Source	Recs	%
American Journal of Tropical Medicine and Hygiene	84	4.27
Infection and Immunity	72	3.66
Journal of Clinical Microbiology	71	3.61
Plos One	54	2.74
Transactions of the Royal Society of Tropical Medicine and Hygiene	53	2.69
Emerging Infectious Diseases	52	2.64
Southeast Asian Journal of Tropical Medicine and Public Health	41	2.08
Clinical Infectious Diseases	39	1.98
Plos Neglected Tropical Diseases	38	1.93
Antimicrobial Agents and Chemotherapy	27	1.37
Journal of Medical Microbiology	25	1.27
Acta Tropica	24	1.22
Zhurnal Mikrobiologii Epidemiologii I Immunobiologii	22	1.12
International Journal of Antimicrobial Agents	22	1.12
BMC Microbiology	20	1.02
Singapore Medical Journal	18	0.91
International Journal of Infectious Diseases	17	0.86
Journal of Infectious Diseases	17	0.86
Clinical and Vaccine Immunology	15	0.76
Applied and Environmental Microbiology	15	0.76
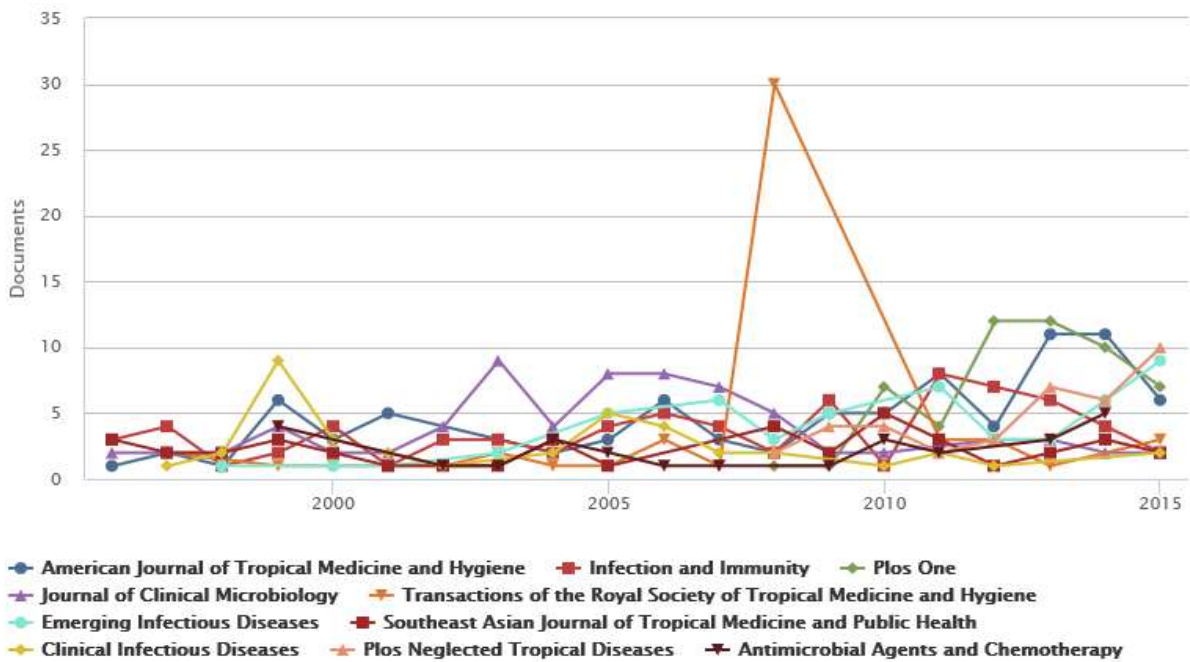
Figure – 2 shows the Top 10 Source Output of Melioidosis Research

3. Author Wise Distribution of Melioidosis Output

The table-3 presents the highly productive authors distribution output of melioidosis, out of the total documents 1969 for the study period of 1996 to 2015 found a total of 152 authors, among them resulted that the first rank has scored by "Currie, B.J" with149(7.57%) of documents; followed by the second rank has scored by "Peacock, S.J." with 122 (6.20%) of documents; the third rank has scored by "Wuthiekanun, V." with 118(5.99%) of documents and followed by other authors in their respective places.

Table- 3 shows the Top 25 Authors of Melioidosis Output

| Author	Recs	%
Currie, B.J	149	7.57
Peacock, S.J.	122	6.20
Wuthiekanun, V.	118	5.99
Limmathurotsakul, D.	90	4.57
Day, N.P.J.	69	3.50
Mayo, M.	63	3.20
Cheng, A.C.	62	3.15
White, N.J.	53	2.69
Chaowagul, W.	51	2.59
Chantratita, N.	50	2.54
Titball, R.W.	49	2.49
Chierakul, W.	46	2.34
Norton, R.	43	2.18
Dance, D.A.B.	41	2.08
Puthucheary, S.D.	41	2.08
Sirisinha, S.	41	2.08
Wongratanacheewin, S.	40	2.03
Tuanyok, A.	37	1.88
Ketheesan, N.	35	1.78
Inglis, T.J.J.	35	1.78
Wiersinga, W.J.	34	1.73
Woods, D.E.	31	1.57
Keim, P.	30	1.52
Lertmemongkolchai, G.	30	1.52
DeShazer, D.	30	1.52
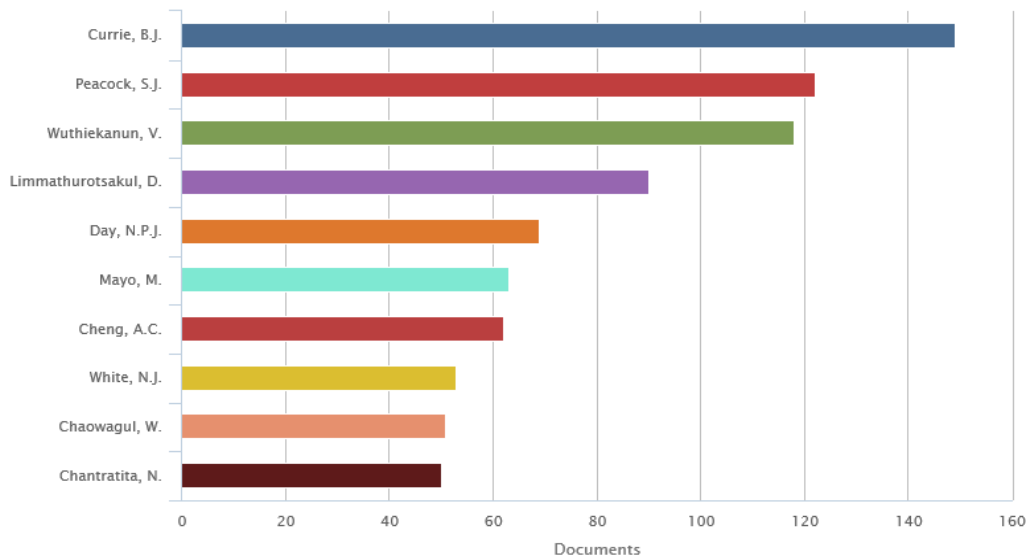
Figure- 3 shows the Top 10 Authors of Melioidosis Research Output

4. Affiliation Wise Collaboration Research Output of Melioidosis

The table – 4 presents the top affiliations wise collaboration output of melioidosis and found a total of 160 institutions out of the total of 1969 documents during 1996 to 2015. Among them the "Mahidol University" has scored with 333(16.91%) of documents and stood the top rank; the "Menzies School of Health Research" ranked at second with 148(7.52%) of publications; the "Khon Kaen University" ranked at third with 1121(7.52%) of documents and followed by other institutions in their respective places.

Table -4 shows top 25 Affiliation Wise Collaboration Research Output of Melioidosis

| Affiliation	Recs	%
Mahidol University	333	16.91
Menzies School Of Health Research	148	7.52
Khon Kaen University	121	7.52
Nuffield Department of Clinical Medicine	97	6.15
Royal Darwin Hospital	74	4.93
University of Cambridge	71	3.76
Sappasitthiprasong Hospital	61	3.61
James Cook University, Australia	55	3.10
University of Malaya	51	2.79
University of Exeter	47	2.59
Defence Science and Technology Laboratory	46	2.39
London School of Hygiene & Tropical Medicine	46	2.34
Townsville Hospital	43	2.34
Academic Medical Centre, University of Amsterdam	42	2.18
Colorado State University	41	2.13
Universiti Kebangsaan Malaysia	40	2.08
Flinders University of South Australia	36	2.03
University of Oxford	36	1.83
U.S. Army Medical Research Institute of Infectious Diseases	35	1.83
Northern Arizona University	35	1.78
DSO National Laboratory, Singapore	33	1.78
Health Sciences Centre Calgary	30	1.68
Centers for Disease Control and Prevention	30	1.52
Chulabhorn Research Institute	30	1.52
National University of Singapore	28	1.52
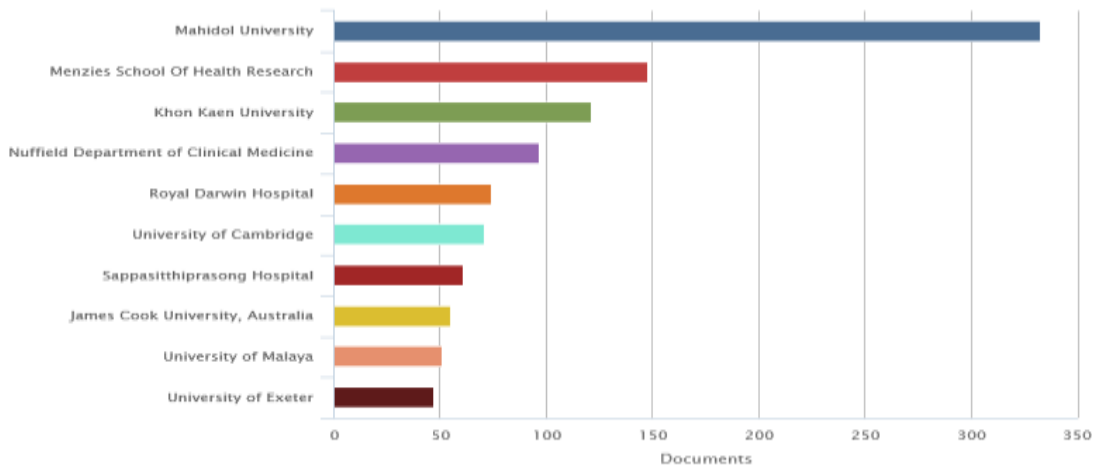
Figure -4 shows top 10 Affiliation Wise Research Output of Melioidosis

5. Country Wise Distribution of Research Output of Melioidosis

The table – 5 presents the top countries output of melioidosis,a total of 1969 for the study period of 2006 to 2015 found that the country wise collaboration distributions resulted 77 among them the "Thailand" has found as 476(24.17%) of documents and topped the rank; followed by "United States" has scored 381(19.35%) of documents and ranked at second; the third rank has got by "United Kingdom" with 368(18.69%) of records; whereas, the country "India" with 125(6.35%) of publications which got the six rank and followed by other countries in their respective places.

Table- 5 shows the Top 25 Country wise Output of Melioidosis Research

| Country	Recs	%
Thailand	476	24.17
United States	381	19.35
United Kingdom	368	18.69
Australia	343	17.42
Malaysia	141	7.16
India	**125**	**6.35**
Singapore	120	6.09
Germany	73	3.71
Netherlands	63	3.20
France	62	3.15
Canada	61	3.10
Taiwan	54	2.74
Laos	28	1.42
Brazil	27	1.37
Hong Kong	25	1.27
China	20	1.02
Japan	19	0.96
Cambodia	17	0.86
Italy	17	0.86
South Korea	17	0.86
Switzerland	16	0.81
pain	14	0.71
Russian Federation	11	0.56
Israel	10	0.51
Belgium	9	0.46
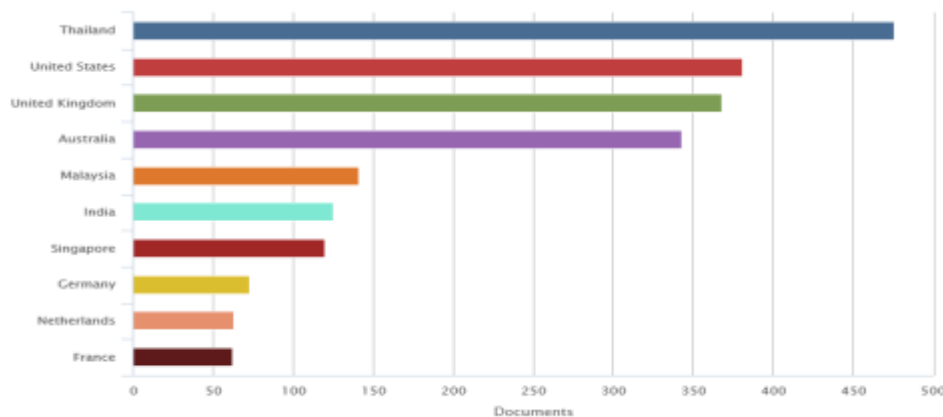
Figure- 5 shows the Top 10 Country wise Output of Melioidosis Research

6. Document Types of Research Output of Melioidosis

The table – 6 presents the document types wise output of melioidosis, out of 1969 for the study period of 2006 to 2015. Among the various types of documents analysis which resulted 10 which "Article" has scored with 1519 documents ranked at top; the second rank placed by "Review" which scored 186 records; the third rank occupied by "Letter" with 116 documents and followed by other subject areas. The below figure also illustrate by graphically the same with percentage.

Table 6- Types of Documents of Melioidosis Output

| Document Type	Recs
Article	1519
Review	186
Letter	116
Conference Paper	38
Note	30
Book Chapter	21
Short Survey	21
Editorial	16
Article in Press	15
Erratum	7
Total	**1969**
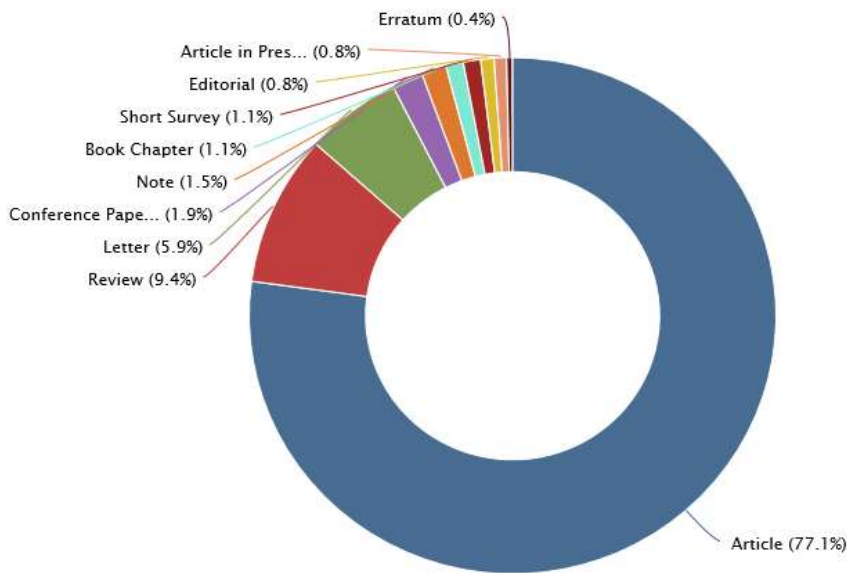
Figure-6 - Types of Documents of Melioidosis Output

7. Subject Area Wise Distribution of Melioidosis Output

The table – 7 presents the major subject area wise output of melioidosis, a total of 1969 for the study period of 2006 to 2015 found a total of 20 areas. Among the subject area wise analysis found as "Medicine" has scored 1541 documents among the other subject areas with dominant position; followed by "Immunology and Microbiology" has scored 831 documents and ranked at second; the third rank placed by "Biochemistry, Genetics and Molecular Biology" has scored 317 records and followed by other subject areas in their respective places. The below figure also show the diagrammatic explanation of melioidosis output.

Table -7 Subject Areas of Melioidosis Output

| Document Type	Recs
Medicine	1541
Immunology and Microbiology	831
Biochemistry, Genetics and Molecular Biology	317
Pharmacology, Toxicology and Pharmaceutics	106
Agricultural and Biological Sciences	90
Environmental Science	29
Veterinary	29
Undefined	29
Multidisciplinary	23
Chemistry	19
Health Professions	13
Physics and Astronomy	10
Neuroscience	8
Social Sciences	7
Chemical Engineering	5
Dentistry	5
Engineering	4
Nursing	4
Computer Science	3
Earth and Planetary Sciences	2
Materials Science	2
Mathematics	1
Total	**1969**
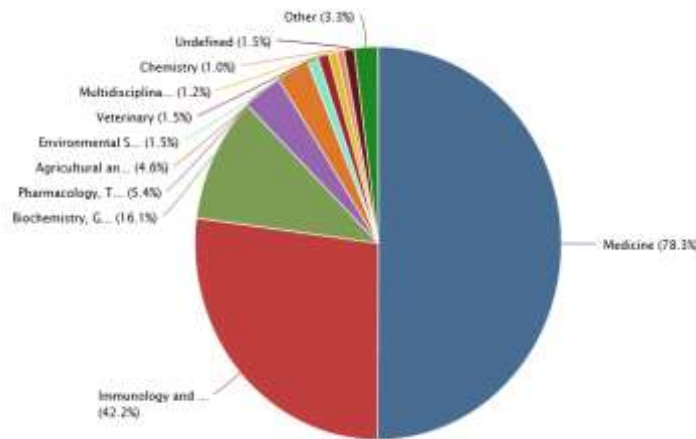
Figure-7 shows the Subject Areas of Melioidosis Output

8. Language wise Distribution of Melioidosis Research Productivity

The table – 8 presents the language wise research output of melioidosis, out of 1969 for the study period of 1996 to 2015. The language analysis found as 14, in which "English" has scored 1866(94.77%) of documents and ranked at top with strongly positioned; the second rank placed by "Russian" which has scored 39(1.98%) of records; the third rank occupied by "French" with 23(1.17%) of documents and followed by other languages in their respective places with rank.

Table -8 and Figure-8 shows the Languages of Melioidosis Research Output

Language	Recs	%
English	1866	94.77
Russian	39	1.98
French	23	1.17
Spanish	11	0.56
German	10	0.51
Portuguese	6	0.30
Chinese	5	0.25
Japanese	5	0.25
Dutch	4	0.20
Korean	2	0.10
Catalan	1	0.05
Czech	1	0.05
Icelandic	1	0.05
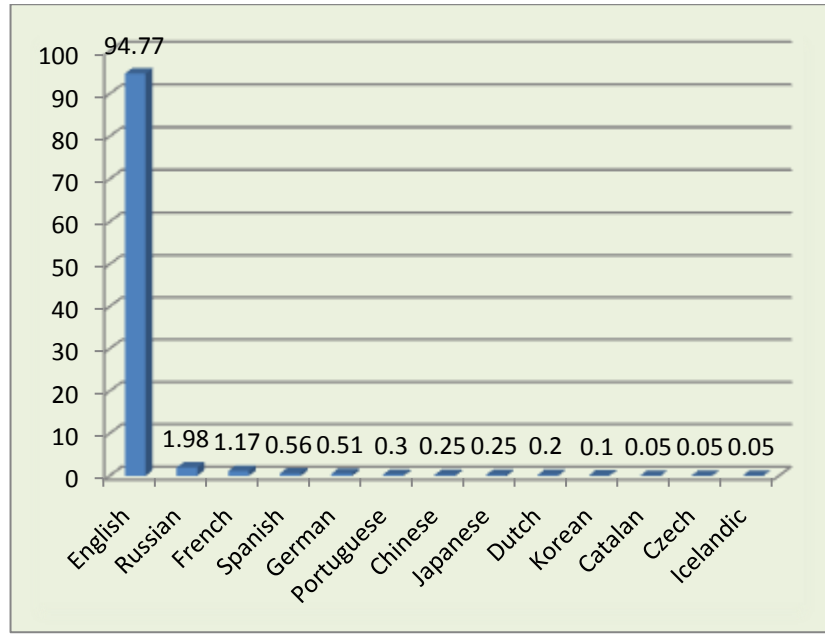
## 9. Keyword wise Distribution of Melioidosis Research Productivity

The table – 9 presents the top keyword wise output of melioidosis, out of 1969 for the study period of 2000 to 2015. Among the keywords analysis has found the word "Melioidosis" has appeared 1,759(89.335) of times/documents ranked at top; the second rank placed by word "Burkholderia pseudomallei" which has appeared 1,598(81.16%) of times; the third rank occupied by "Article" with 1438(73.03%) of times and followed by other keywords shown in the below table.

Table – 9 shows the Top 25 Keyword wise Distribution of Melioidosis Research Productivity

Keywords	Times Appeared	%
Melioidosis	1759	89.33
Burkholderia pseudomallei	1598	81.16
Article	1438	73.03
Human	1290	65.52
Humans	1229	62.42
Nonhuman	904	45.91
Priority journal	732	37.18
Male	646	32.81
Controlled study	592	30.07

Female	547	27.78
Adult	537	27.27
Animals	466	23.67
Ceftazidime	463	23.51
Case report	394	20.01
Cotrimoxazole	370	18.79
Middle Aged	327	16.61
Anti-Bacterial Agents	293	14.88
Doxycycline	286	14.53
Microbiology	281	14.27
Burkholderia	278	14.12
Mouse	276	14.02
Mice	266	13.51
Bacteria (microorganisms)	250	12.70
Aged	235	11.93
Bacterium culture	221	11.22
Animal experiment	218	11.07
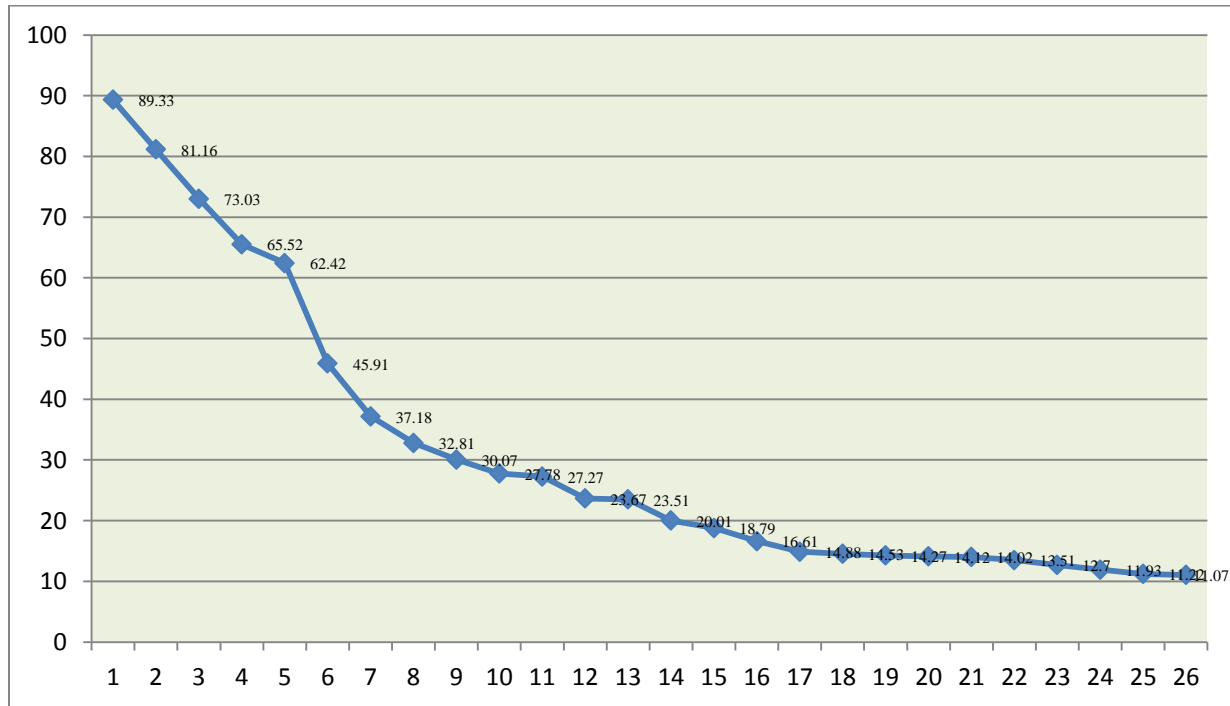
Figure 9 shows the top keyword wise output of Melioidosis

Conclusion:

Melioidosis is highly prevalent in western coastal India and yet, greatly underestimated. Better awareness, both among clinicians and microbiologists, coupled with improved diagnostic methods to allow early diagnosis and hence early treatment, will significantly reduced the morbidity and mortality related disease. This study based on total 20 years the total output of Melioidosis, out of 1969 publications and applied the scientometrics tools for analyses by Scopus database and reveals that the year wise break -up analysis shows, 2015 and 2013 has shared the rank of top with 161(8.18%) of publications each; the author wise analysis found 152 authors, among them resulted first rank by "Currie, B.J" with149(7.57%) of documents; the source wise analysis resulted 151 journals in which "American Journal of Tropical Medicine and Hygiene" has scored 84(4.27%) of documents and ranked at top; the

affiliation wise collaboration resulted 160 among them the "Mahidol University" has scored with 333(16.91%) of documents and stood the top rank; the subject area wise analysis found a total of 20 areas, among them found as "Medicine" has scored 1541 documents among the other subject areas with dominant position; the various types of documents analysis found 10 items in which "Article" has scored with 1519 documents ranked at top with predominately; the keywords analysis has found the word "Melioidosis" has appeared 1,759(89.335) of times/documents ranked at top; the language analysis which resulted 14 in which "English" has scored 1866(94.77%) of documents and ranked at top with strongly positioned; Whereas, the country wise collaboration of melioidosis research resulted 77 among them the "Thailand" has found as 476(24.17%) of documents and topped the rank.

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