A Bibliometric assessment of research literature on Ebola virus disease based on Scopus database

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Abstract

Ebola virus disease is a highly infectious viral hemorrhagic fever in human and other primates caused by Ebola virus. The largest outbreak in year 2014 has drawn the attention of many researchers in the world. The study attempted to identify the global trend in research activities on Ebola and the productive country, productive author, degree of collaboration and productive articles among the Ebola related literature. The study period was from 1977 to 2015. The Ebola related publications indexed in Scopus database was considered for the study. The study gives an understanding of the global trend on Ebola virus research. Further it identified that leading role in Ebola research was United States (US); Feldmann, H from Unites States was the most productive author and Journal of Virology was the most productive journal publishing more number of literatures. Internationally more prominent journal Science and Nature published in US and United Kingdom respectively, dominate as venues for the mostly cited Ebola related papers.

Keywords: Ebola virus; Bibliometric analysis; Scopus; Research literature

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Introduction

Ebola virus disease is a rare and deadly disease caused by infection with one of the Ebola virus strains. The disease has high mortality rate often between 50% and 90%. World Health Organization reported that worldwide, there have been 28,601 cases of Ebola virus disease and 11,300 deaths as at 31st December 2015(WHO, 2016). Guinea, Liberia, and Sierra Leone are the mainly affected countries in the world. Ebola was initially discovered in 1976 near the Ebola River in what is now the Democratic Public of Congo. Since then, outbreaks have appeared sporadically in several African countries. The 2014 outbreak is the largest Ebola outbreak in history. As it is a lethal and highly infectious disease, it has drawn a great concern of many researchers on this viral infection.

"Bibliometric assessments are based on the assumption that most research findings are published in international journals where they can be read and cited by other researchers" (Rehn & Kronman, 2008). There are many bibliometric studies conducted on various infectious diseases. Vera-Polania et al, (2015) studied on Chikungunya and reported the global growth of literature. Bibliometric analysis of Dengue research in India analyzed the involvement in Dengue research by Indian researchers (Bhardwaj, 2014). Bibliometric studies are useful to identify the research trend in a subject. This paper is attempted to study the global research trend on Ebola virus from1977-2015.

Objectives

The main objective of the study was to conduct a bibliometric assessment of research publications related to Ebola virus. Further the research sought to identify the global trend in research activities on Ebola and the productive country, productive author, Degree of collaboration, productive articles among the Ebola related literature.

Methodology

The research method of this study was a bibliometric analytical method which adopts a detailed analysis of secondary data. "Scopus" is the widely accepted database by the academic community and also it offers author profiles which cover affiliations, number of publications and details on the number of citations to each indexed article. The data for the study was derived from Scopus database in first week of March 2016. Research publications related to Ebola virus indexed in Scopus database from 1977 up to the end of year 2015 were

retrieved by using the search term 'Ebola" (available in title, abstract and keywords) for analytical purpose. Basic search method was used in order to include all types of documents indexed in Scopus. The retrieved data showed that earliest publication on Ebola indexed on Scopus database was from 1977. There were a total of 6,217 publications including all types of documents published from the beginning (year 1977) up to the end of year 2015. Bibliographic details of mostly cited 2000 publications were selected as a sample for the analysis of the study. The selected data was analyzed using Microsoft Excel 2007 and Bib excel developed by Persson, Danell, & Schneider, (2009) in terms of bibliometric parameters.

Results and Discussion

Growth of publication

There were total of 6,217 publications were indexed in Scopus during the study period. Figure 1 shows increasing trend in growth of publications over the study period. It clearly shows the sharp increase in number of research outputs on Ebola virus between 2014 and 2015. Although it was about thirty years of study, 56% of the documents were published during two years period which was in year 2014 and year 2015. It can be said that most of the research activities were taken place after the severe Ebola virus infection reported in year 2014.

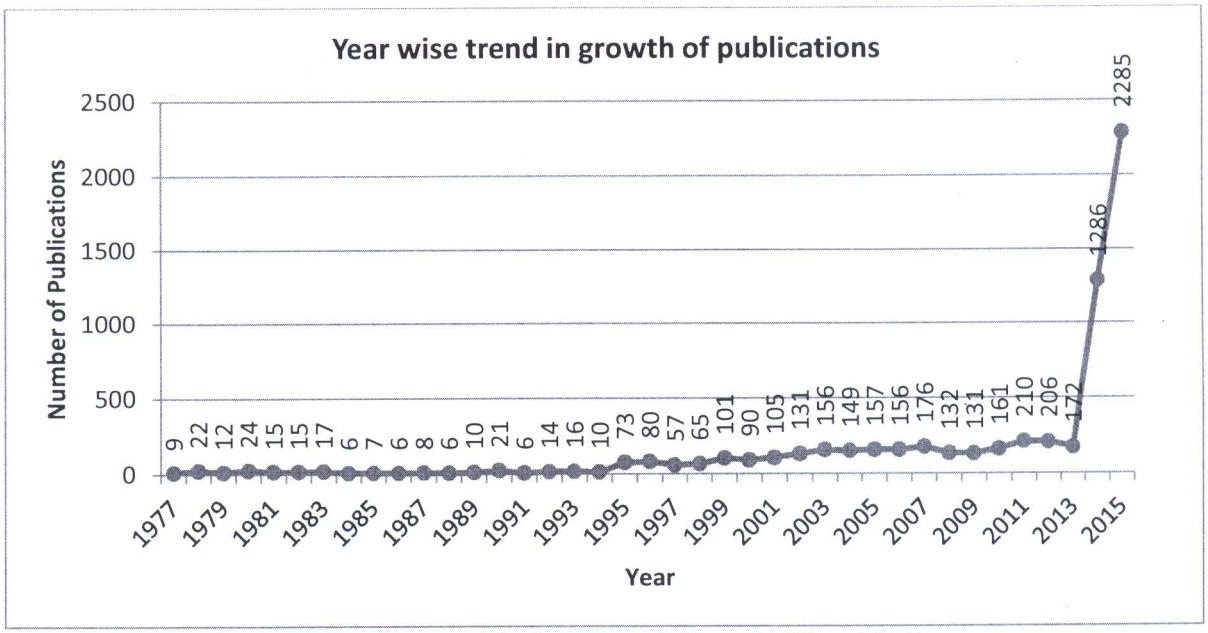

Figure 1: Growth of publications on Ebola research from 1977 to 2015

Degree of Collaboration (DC)

The degree of collaboration is above 0.5 throughout the study period. In most of the years, DC is above 0.8 within the study period except for a few years. It shows that multi-authored research papers lead the prominent position indicating cooperative research work on Ebola virus.

Country productivity

Table 1: Geographical distribution of authors

Rank order	Name of the Country	Number of authors	Percentage (%) of authors
1	United States	3449	52.00
2	Germany	361	5.40
3	United Kingdom	335	5.50
4	France	310	4.67
5	Canada	285	4.20
6	Japan	181	2.70
7	Belgium	108	1.60
8	Gabon	93	1.40
9	Switzerland	92	1.40
10	Spain	80	1.20

Table 2 presents the ranked list of productivity of countries. There were a total of 6629 authors from 166 different countries all over the world. The majority of the authors, which was 52% of the total authors, were from the United States (US). The study identified globally the leading role in Ebola research was conducted in the United States and it was followed by Germany, the United Kingdom, France and Canada.

Ranking of the productive authors

A total of 6857 authors contributed 2000 research papers in this study sample. Table 2 shows ranking of the top ten most prolific authors based on the number of citations recorded on Scopus. Further the table 2 shows the number of papers published on Ebola by each author during the study period. The study identified that the most productive author based on the number of publications and the highest number of citations was Feldmann, H. from the US with 153 research publications and a total of 7277 citations from Ebola literature within the study sample.

Table 2: Most productive top ten authors from 1977 -2015 ranked by total number of citations

No	Name of the author	Total number of citations	Total number of publications
1	Feldmann, H.	7277	153
2	Geisbert, T.W.	7271	85
3	Rollin, P.E.	5886	68
4	Jahrling, P.B.	5857	66
5	Sanchez, A.	5360	52
6	Peters, C.J.	4461	48
7	Nichol, S.T.	4392	58
8	Ksiazek, T.G.	3923	49
9	Klenk, H.-D.	3752	40
10	Hensley, L.E.	3570	53

Highly cited articles

The study attempted to identify the highly cited articles on Ebola literature. The total number of time, an article was cited which was recorded in Scopus was retrieved and analyzed. Ranking of top ten articles were listed in Table 3. It clearly demonstrates that many of the mostly cited articles were published by Science, Nature and Nature review. It is interesting to note that an article published in 1978 was ranked in the seventh position among the mostly cited articles. All the other articles were published in year 2000 or after that. Internationally more prominent journals Science, Nature and Nature review published in the US and the United Kingdom respectively, dominate as venues for the mostly cited top six Ebola related papers.

Table 3: Ranking of the mostly cited articles on Ebola research between 1977- 2015

No	Title	Year	Citations	Source journal
1	Emerging infectious diseases of wildlife - Threats to biodiversity and human health	2000	1564	Science
2	Global trends in emerging infectious diseases	2008	1436	Nature
3	Knocking down barriers: Advances in siRNA delivery	2009	1171	Nature Review
4	Furin at the cutting edge: From protein traffic to embryogenesis and disease	2002	584	Nature Review
5	Viral membrane fusion	2008	550	Nature Review
6	Fruit bats as reservoirs of Ebola virus	2005	547	Nature
7	Isolation of the etiologic agent of Korean hemorrhagic fever	1978	508	Jou.of.Inf.Dis
8	2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Health Care Settings	2007	497	Ame.Jou. Inf. Con
9	HIV-1 and Ebola virus encode small peptide motifs that recruit Tsg101 to sites of particle assembly to facilitate egress	2001	477	Nature medicine
10	Development of a preventive vaccine for Ebola virus infection in primates	2000	465	Nature

Ranking the productive journals

Table 4: Most productive journals publishing Ebola literature

No	Journal	Total Publications	% Share
1	Journal of Virology	188	9.4
2	Journal of Infectious Diseases	143	7.2
3	Virology	76	3.8
4	The Lancet	62	3.1
5	PLoS Pathogens	46	2.3
6	Proceedings of the National Academy of Sciences of the United States of America	44	2.2
7	New England Journal of Medicine	40	2
8	Science	38	1.9
9	Emerging Infectious Diseases	37	1.85
10	Antiviral Research	33	1.7

The study identified that there are collectively 520 journals publishing Ebola related literature. Table 4 presents the top ten productive journals publishing literature on Ebola based on the number of papers in the study. The Journal of Virology published in the US had published most number of literatures in this study. It was followed by Journal of Infectious Diseases, Virology and Lancet.

Among the listed ten journals, eight journals are published from the US. It clearly indicates that US takes the leading role in Ebola research.

Conclusion and Recommendations

The study identified the global trend in research studies on Ebola virus disease between 1977 and 2015. Findings of the analysis revealed that multi-authored articles occupy the prominent position indicating the cooperative research work. In respect to the country productivity, the leading role in Ebola research was the United States (US) and it was followed by Germany, the United Kingdom, France and Canada. The most productive author based on the number of publications and the highest number of citations was Feldmann, H. from the US with 153 research publications and collectively a total of 7277 citations recorded in Scopus on Ebola within the study sample. The most productive article was Emerging infectious diseases of wild life published in year 2000 with 1564 citations recorded in Scopus. The Journal of Virology published in the US published had the most number of literatures in this study. Internationally more prominent journals Science, Nature and Nature Review published in the US and the United Kingdom respectively, dominate as venues for the mostly cited five Ebola related papers. Though the infectious disease of Ebola was identified in year 1976, majority

of the research findings were published after the severe outbreak in year 2014. It is the time to generate more research activities to control and eradicate the lethal infectious disease and make the world free from Ebola without waiting for the next sporadic infection.

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