# Visual Analysis of Pandemic Disease literature in Global Health perspective: A Scientometric study

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***ABSTRACT:*** *The current study focused on the last two decades' research articles related to Pandemic Diseases (PDs). The extensive citation database, Web of Science (WoS), is used to obtain bibliographic data from 2000 to 2019. We identified 7,089 publication records retrieved from the WoS database for this present study. During the study, the growth in pandemic-related literature has grown steadily from 2000 to 2011, and in another tenure, we found a fluctuation in the publications. The Pandemic Disease research focused on highly co-cited documents and their sourced journals. However, the most remarkable documents in Pandemic Disease research have originated from the USA, England, and People R China. In addition, PDs research also focuses on the WOS subject categories of Infectious Diseases; immunology and Virology are the most remarkable disciplines. Influenza, infection, and pandemic Influenza got the highest frequency, but in terms of citation bursts in Hong Kong, Human Immunodeficiency Virus and Seasonal Influenza are trending in recent years.*

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## 1. Introduction

There is little difference between the terms "pandemic," "epidemic," and "outbreak." This definition is based on its symptoms, such as time, place, and size type, the prevalence of the disease, infection rate, and the number of people affected. So, there are some variations in the definition of each word. The world health organization (WHO) defines a pandemic as "a worldwide spread of a new disease." What is a pandemic? Compared to epidemic diseases, a pandemic is an epidemic condition of an infectious disease that has spread across a large geographic area, for instance, multiple continents or worldwide, affecting many people[1]. There have been different pandemics of diseases such as plague, cholera, Ebola, smallpox, dengue, Typhus, Measles, AIDS, influenza, Leprosy, SARS, etc. The word "Pandemic" originates from the Greek word pan, meaning "all" and demos "the people." The word is commonly taken to refer to a widespread epidemic of contagious disease throughout the whole of a country or one or more continents simultaneously [2], [3]. After globalization and increased populations, new inventions, living styles, slam areas, and least Density places for a living are the reason for the birth of different unique types of viruses. The last few years globally recorded other viruses like Zika, Nipah, Ebola, Smallpox, SARS, influenza, etc. Previous researchers researched the infectious disease and global health perspectives and included their reviews. For example, Wang et al. [4] conducted a study on international health research from 1996 to 2019 for 14,692 documents on health issues, and Sivaprakasam et al. [5] studied Nipah virus: An exploratory scientometric analysis 1999-2018 on Nipah virus publications covered by WOS globally. Chen et al. [6] studied Regenerative medicine, which involves research in a few fields and disciplines like stem cell research, tissue engineering, and biological therapy. In this study, Regenerative medicine is a fascinating and fast-moving subject matter. Gupta et al. [7] analyzed and evaluated the research performance of Indian medical colleges, hospitals, research institutes, universities, research foundations, and the characteristics of published literature in Indian and foreign journals. Mahbuba et al. [8] studied scientometric comparisons between Bangladesh and India's two health and population research. Rasolabadi et al. [9] concluded that diabetes

mellitus as a chronic disease had replaced infectious diseases as the leading cause of morbidity and mortality. Singh [10] focused on his study of scientific activities on the Zika virus that got impetus during last few years after the outbreak of the disease out of SouthAfrican and Asian countries.

## 2. Objective of the Study

We have designed our study based on a few premises and purposes outlined. The goals are more specific that can able to address the dimensions of the research output studied.

• To Draw the basic structural pattern on "pandemic diseases" research output.

• To examine the network of cited references and find the top-cited documents used in the publications covered for the Study.

• Explore the author co-citation network of top-cited authors.

• Measure the degree of collaboration at the author, institute, and country level.

• To know the most cited sources in the PDs publications.

• To identify WoS co-occurring subject categories and trends. Keywords.

• To find out top-cited articles by Citation Frequency and Betweenness Centrality.

## 3. Data and Methods

The current study is conducted using the bibliographic database Web of Science (WoS), focusing on the contribution of publications on Pandemic Diseases. We accessed the bibliographic dataset on July 2nd, 2020, using WoS to analyze pandemic disease scholarly literature research output. We carried out a comprehensive bibliographic search using the words "Pandemic Diseases" in the primary search field by topic and period selected in the last two decades from 2000 to 2019. The first search resulted in 7672 records retrieved, then we refined and excluded English language records in the first stage of filtering. Following another refining stage, we considered only journal articles, review articles, proceeding papers, and all other types of documents excluded from the retrieved records. The final records, 7089, were selected and considered for the current study with full bibliographic details concerning PDs publications from 2000 to 2019.

In the present study, we used the *R Studio Bibliometrix* package to obtain a fundamental analysis of the data collections. The Cite Space is used for mapping, network analysis, and visualization of PDs publications in a more specific context. The CiteSpace approved only 7087 bibliographic data records for analysis and visualization. The network was constructed based on the top 30 documents in each slice by the year, and the network presented clusters by LSI and LLR terms. The network visualization construct is based on the entire 30 documents by the year in each slice to analyze the document co-citation, cited authors, etc. The node size demonstrates citation frequency, links represent the relationship of co-citation documents, and colors are warm red, cold, and spotlight yellow are shown closer to the latest publication.

## 4. Results and Discussion

### 4.1. Basic Data Structure and Analysis

Table 1 represents the fundamental data analysis of PDs published documents to formulate the collection based on different Biblio/Sciento metrics. The primary data analysis describes five basic categories to define Basic Data Collections and their Numeric Values, document types, authors and their collaboration, and keywords. The Basic data represent the considered Timespan (2000-2019), Number of used Sources (1814), Number of Publication Documents (7089), Average publication (7.42), Average Publications Per Document (38.08), Average Citation Per Year Per Document (3.649) and Total Cited References (223183) used in the publications.

The second category of primary research output represents the types of documents that were analyzed in this study as Articles (5498), Proceeding papers (214), and Review Articles (1377) from 2000 to 2019. The third and fourth categories belong to authors metrics and describes the total Number of Authors (31330), followed by Author Appearances, Authors of Single and Multi-Authored Documents (46314, 556, 30774), respectively. We also define different author collaboration metrics such as Single Authored Documents (630), Documents Per Author, Author Per Document, Co-Author Per Document, and Collaboration Index (0.226; 4.42; 6.53 and 4.76), respectively. We also elaborate, and the Keywords Plus (12689) and Author Keywords (10523) used PDs publications.The primary data analysis picturized the data collection and numeric metrics on PDs publications.

**Table 1. Main Information about the Documents & collections**

| Documents Data Description | Numeric Values | Documents Data Description | Numeric Values |
|---|---|---|---|
| Timespan | 2000-2019 | **Authors** | |
| Sources (Journals, Books, etc.) | 1814 | Authors | 31330 |
| Documents | 7089 | Author Appearances | 46314 |
| Average publication | 7.42 | Authors of single-authored documents | 556 |
| Average citations per document | 34.08 | Authors of multi-authored documents | 30774 |
| Average citations per year per doc | 3.649 | **Authors Collaboration** | |
| References | 223183 | Single-authored documents | 630 |
| **Document Types** | | Documents per Author | 0.226 |
| Articles | 5498 | Authors per Document | 4.42 |
| Proceeding's paper | 214 | Co-Authors per Documents | 6.53 |
| Review | 1377 | Collaboration Index | 4.76 |
| **Keywords** | | | |
| Keywords Plus (ID) | 12689 | Author's Keywords (DE) | 10523 |

Table 1. Main Information about the Documents and Collections

### 4.2. Publications and Citation Pattern

In the present study, we observed and defined the publications and citations growth in PDs literature. We have focused on the growth rate of research publications in the pandemic literature in Figure 1. From the first 12 years from 2000 to 2011, steady growth has been observed in the literature, while growth fluctuates. The highest number of publications showed in 2011 with 10.95% (776). Also depicted the curved line to present the citation pattern and found the highest number of citations, 27998 (11.59%) in the year 2010, and the lowest citation, 1467 (0.61%) in 2019. In 2019, citations were received the quietest period, which is one year, compared with the 2010 citations with huge 10-year period differences.

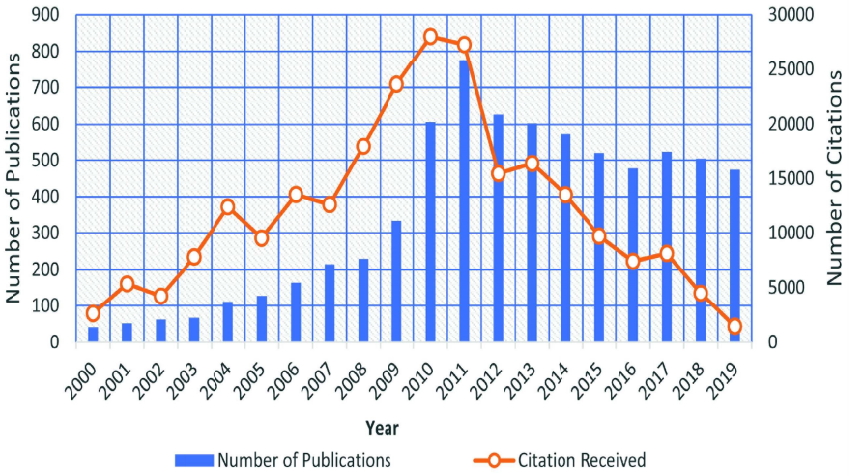


Figure 1. Scientific Research output and Growth Trends with Citations of PDs Publications

### 4.3. Cited Documents Network

Document co-citation analysis can reveal the underlying intellectual structure of a knowledge area and verify the quality and authority of references cited by publications. The references cited by PDs publications, especially those frequently appearing ones, can be considered the intellectual foundation for his research [11]. The network visualization of document co-citation contains 379 nodes and 1901 links with the visualization density are 0.0265 to represent the highly cited document in the top

clusters shown in Figure 2. The clusters have the full five cited papers, indicated with different colors based on their cluster size. Silhouette value for clusters represented in the networks is considered between 0.771 to 0.999 ranges, defined by Rousseeuw; 1987 [12]. The silhouette value 1 represents the perfect separation of clusters, ranging from -1 to 1. The network is divided into eight broad co-citation clusters. The largest cluster is #0; "influenza/pandemic influenza" has 59 members with a silhouette value of 0.843, cluster #1; "influenza/reverse genetics," has 50 members and a silhouette value of 0.904. The lowest size cluster #7, "global virus network/Zika virus," with ten members, but highly silhouette values have 0.999 almost nearest by 1, represents perfect cluster separation from other the clusters.

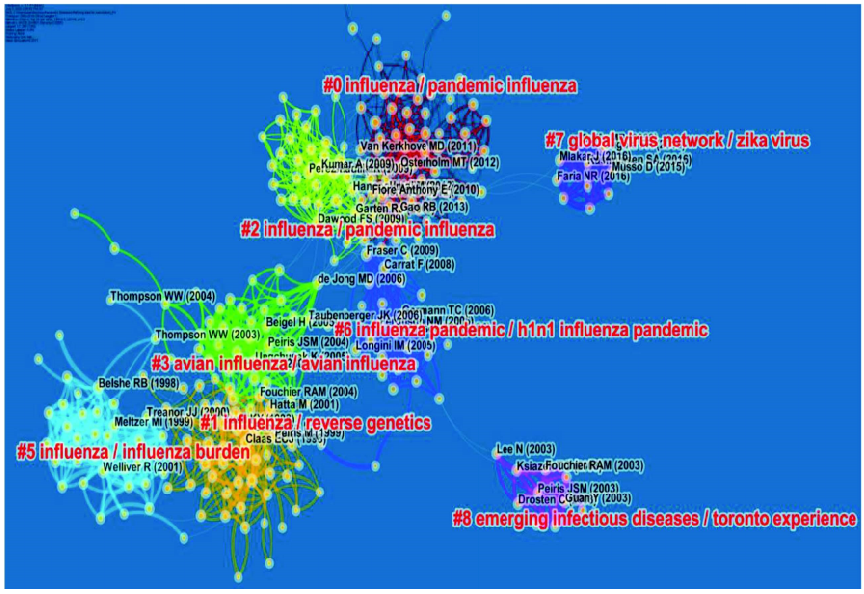


Figure 2. Document Co-citation of literature of Pandemic Disease with Clusters

The top 10 cited documents present in table 2, with their citation frequency, burstiness, centrality, and cluster-ID. Dawood (2009), Jain (2009), and Fraser C (2009) depicted received the highest citations, 444, 302, and 282, respectively. The highest burst documents are Gao RB (burst 52.94; 2013) and Dawood F.S. (burst 44.8; 2012), highly centrality documents are Dawood F.S. (2009 recorded with 0.2)

| Frequency | Burstiness | Centrality | Author | Year | Source | Cluster |
|---|---|---|---|---|---|---|
| 444 | 36.11 | 0.2 | Dawood FS | 2009 | NEW ENGL J MED | 2 |
| 302 | 34.59 | 0.04 | Jain S | 2009 | NEW ENGL J MED | 2 |
| 282 | 10.49 | 0.08 | Fraser C | 2009 | SCIENCE | 6 |
| 253 | 22.56 | 0.02 | Ferguson NM | 2006 | NATURE | 6 |
| 248 | 10.75 | 0.03 | Garten RJ | 2009 | SCIENCE | 2 |
| 237 | 39.12 | 0.01 | Ferguson NM | 2005 | NATURE | 6 |
| 223 | 41.76 | 0.01 | Perez-Padilla R | 2009 | NEW ENGL J MED | 2 |
| 203 | 22.83 | 0.01 | Germann TC | 2006 | P NATL ACAD SCI USA | 6 |
| 202 | 27.34 | 0.03 | Hancock K | 2009 | NEW ENGL J MED | 2 |
| 200 | 36.44 | 0.09 | Lorgini IM | 2005 | SCIENCE | 6 |

Table 2. Top 10 Cited Documents with their Burstiness Centrality and Cluster

### 4.4. Cited Authors' Network

Concerning Figure 3, network visualization of author co-citation network of top-cited authors, presented in cluster view by citation frequency, threshold minimum frequency is 15 by the title terms. The cited authors' network is divided into four co-citation clusters. In contrast, clusters are labeled by Log-Likelihood Ratio (LLR) from their citers with a maximum threshold of 10 top documents in each cluster. The entire 4 clusters are depicted in 4 different colors with alpha-colored areas to show each cluster's capacity. Visualization has 321 nodes and 1895 links to represent clusters' co-relations with others. The most significant two clusters summarize the network to understand the complete visualization. Cluster #0, "avian influenza," has contained the most significant 66 members with a 0.911 silhouette value, and cluster #1, "virus infection," has 62 members. A 0.807 silhouette value is the second largest, representing the clear separation of clusters under the prescribed value range. The most significant two clusters demonstrate the most cited authors, the WHO group author has a central position with the highest citation frequency, and bursts show publication strength with other authors nodes.

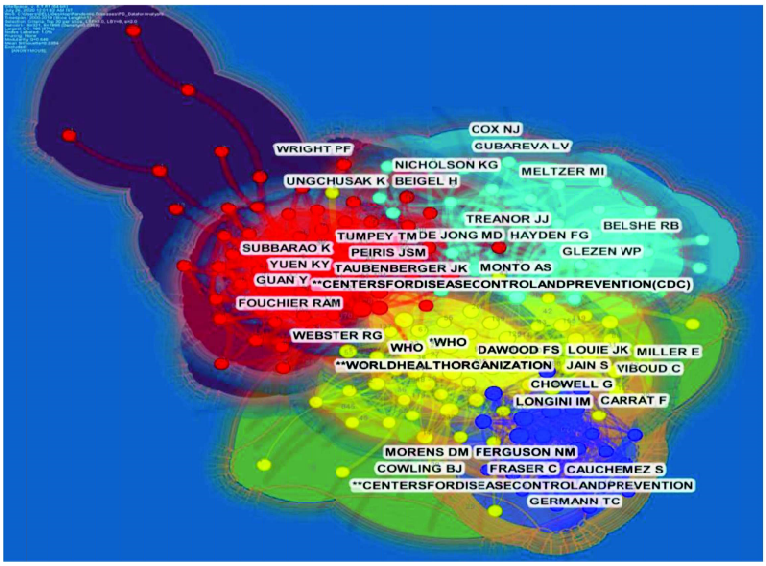


*Figure 3. Author Co-citation Network Visualization by large 'k' clusters*

### 4.5. Co-authorship Analysis

This study depicted the network of author's correlations via co-authorship analysis. The co-authorship analysis and visualization network clearly illustrate the institutes and countries' collaborations defined by Zaho (2017). We have analyzed and identified the topmost productive co-authors, as shown in Figure 4, which are highly collaborated articles in the studied domain. Nodes denote the authors, given the co-authorship network, and the connection link between the authors demonstrates the publication's collaboration strength in the networks. The author's collaboration network graphs have 960 nodes and 2494 links. The node size represents publication numbers, and the connection link's thickness denotes the authors' co-relationship level. The overall visualization density is 0.0054, and the modularity Q is 0.0954. The network represents 11 broad co-citation clusters. Cluster #0, "China/avian influenza," has the highest 77 members and 0.925 silhouette value, focused on and involved highly researched areas like pre-existing mycobacterium tuberculosis, persistent cell, human sputum, etc. The second-largest co-citation cluster #1, "viruses/global antigenic diversity", focused on the research topics of variable virulence, diverse genetic constellation, and pandemic h1n1, with his member size 71 and a silhouette value of 0.965. Cluster #12, "hemagglutinin receptor/ receptor-binding preference," have only 13 members with the highest silhouette value of 1, representing the perfect separation of the cluster in the visualization. The most significant 66 members with a 0.911 silhouette value, cluster #1, "virus infection," has 62 members. A 0.807 silhouette value is the second largest, representing the clear separation of clusters under the prescribed value range. The most significant two clusters demonstrate the most cited authors; the WHO group author has a central position with the highest citation frequency, and bursts show publication strength with other authors' nodes.

The leading authors' visual analysis of publications history and burstiness have viewed the most active and highly collaborated publications on pandemic research. Figure 5 presents the top 10 co-authors with the most robust citation burst. The author Webster has the highest strength, 7.9074, showing the most substantial publication burst compared with others. The author Garciasastre Adolfo has the most extended duration of citation burst span from 2006 to 2014, and Holick and Michael have minimum or lowest publication burst.

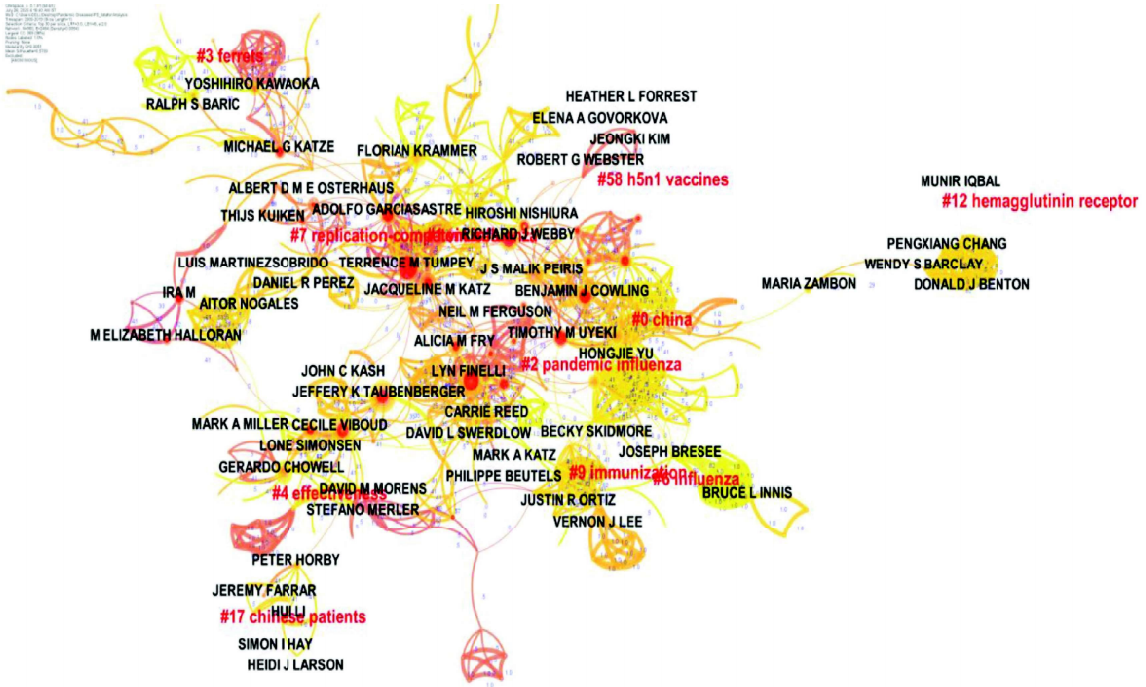


Figure 4. Co-authorship network analysis


Figure 5. Top 10 Co-authors with strongest citation burst

### 4.6. Journal Citation Analysis and Network

Figure 6 presents the Cite Space analysis outputs of cited journals based on the following parameters like frequency of journal citations, citation burstiness, centrality, degree, citation sigma, and half-life of the journal, including cluster information. The cited journals network analysis map has 79 nodes and 491 link connections, and the network visualization density is 0.1594. The pandemic publication of the journal network is divided into four broad clusters. The most significant cluster #0 (epidemiological analysis) has a 0.779 silhouette value with 30 members; top research publications focused on influenza, comparative pathology, and health system. Results are obtained from the admired journals; the top-ranked, highly cited journal is “The New England Journal of Medicine,” with a citation frequency of 3706. The second and third-ranked journal is “Journal of Infectious Diseases” and “PNAS” with the frequency of 2650 and 2920, respectively. Concerning citation burstiness strength, “British Medical Journal” in a cluster #0 (strength; 2000–2011) with a burst of 120.74, “Annals of Internal Medicine” and “Journal of Experimental Medicine” both burstiness strength 2000–2010 in cluster #0 and #1, with 101.09 and 75.26 bursts respectively. The highly burst journal is “Scientific Reports” with 165.62, and the second-ranked “Morbidity and Mortality Weekly Report” is 130.47. “The New England Journal Medicine,” which is in cluster #0, represents strong betweenness centrality 0.28, and “Journal of Infectious Diseases” lookup also in cluster #0 with 0.25, reflects strong relationships between the nodes which are used shortest path and highest connectivity.

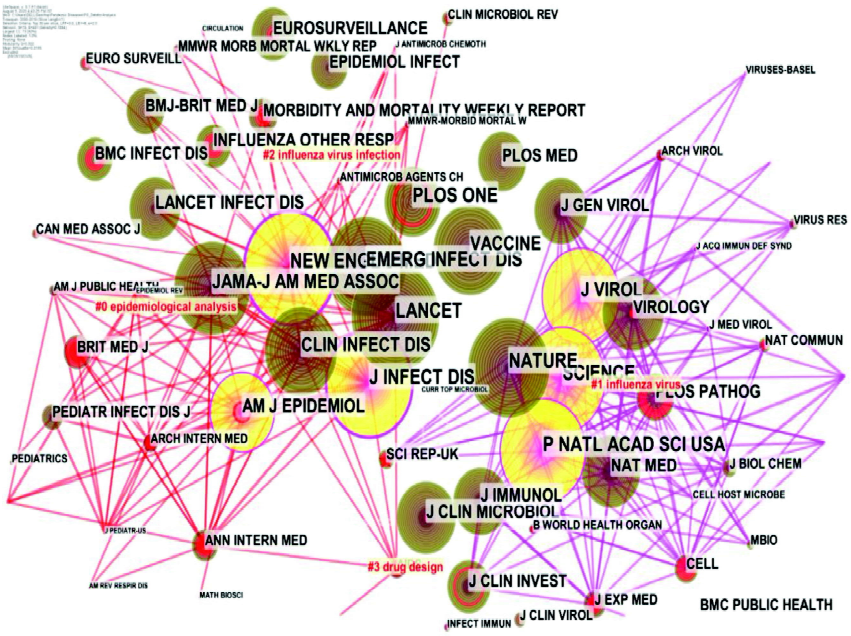


Figure 6. Network Analysis map of cited

**4.7. Institutes collaboration and analysis:**

The PDs publications network builds a contribution by the countries and institutions. The co-institution network presents 245 nodes and 1129 links. The size of nodes indicates the strength of publications, and connections mean a co-relationship between two or more nodes in a span. As shown in figure 7, the most significant node in size Centers for Disease Control and Prevention (328) publication frequency, followed by the University of Hong Kong, University of Washington, University of Oxford, and NIH article frequency are 155, 124, 121, and 109, respectively.

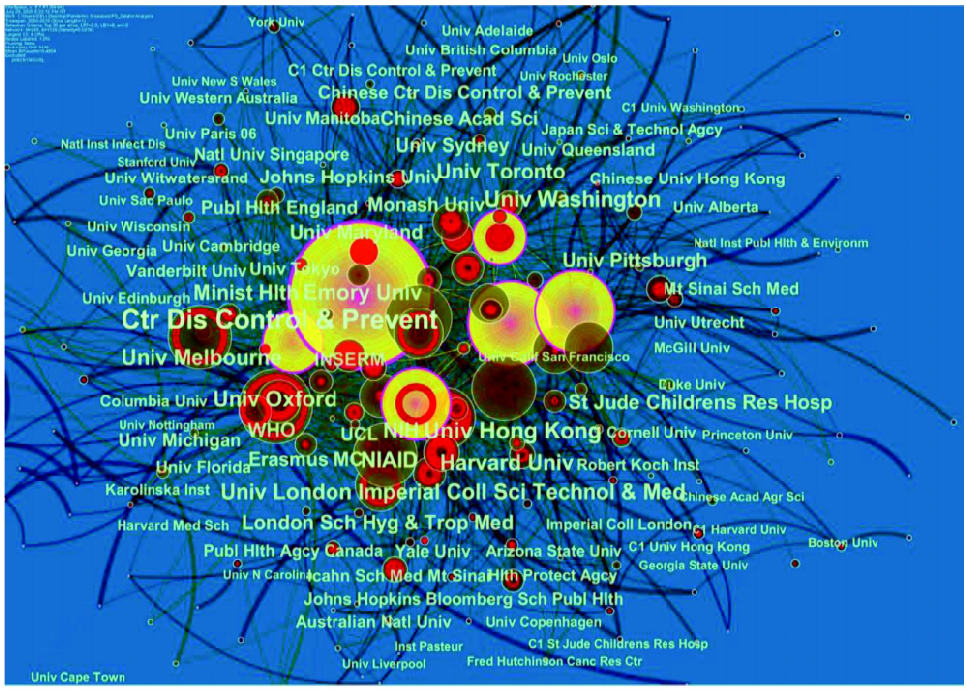


Figure 7. Co-institutions Collaboration Network map

Furthermore, the purple ring highlighted the betweenness centrality of nodes in the network. The highest betweenness centrality of the Centres for Disease Control and Prevention is 0.23, followed by the University of Washington and NIH holds 0.14, 0.11, respectively. That represents the publications have engaged at central spots in the network and found massive collaborations between the institutes. Additionally, citation burstiness between the institutions recordable demonstrates in the network during the minor duration. The highest burstiness was recorded Centers for Disease Control and Prevention (burst strength 13.38 in the period 2000-2007), Mount Sinai School of Medicine (burstiness 8.136 in span 2004-2010), and University Hong Kong (burstiness 7.64 in span 2002-2007).

**4.8. Co-Countries collaboration**

Figure 8 represents the co-authorship network via countries' co-relationship in the PDs publications. The co-countries collaboration network has 61 nodes and 728 links with a network density of 0.3978. The thickness of the network map is high where there are many links to show the correlation between two or more countries. The USA (2943), England (803), and Peoples R China (730) are the top collaborated cocountries in the network. India has in the 12th position in this ranked publication with 220 articles. The network had a big spotlight ring to represent the highest collaboration, publication contributed by the USA. The strongest publication burstiness between the countries was demonstrated during the shortest duration of the network. The highest burstiness point out England 14.6319 from 2000-2004, Uganda 6.3186 during 2004-2007 and South Africa has the most extended burstiness periods from 2001-2007.

The spotlight nodes color in yellow highlights the country's path connectivity with strong betweenness centrality. The node size represents the highest publication frequency of nations and the small red point in the Centre of England denotes high burstiness among the publication between specific time frames. The right corner also describes the USA publications and growth trends in the linear representation of studied periods.

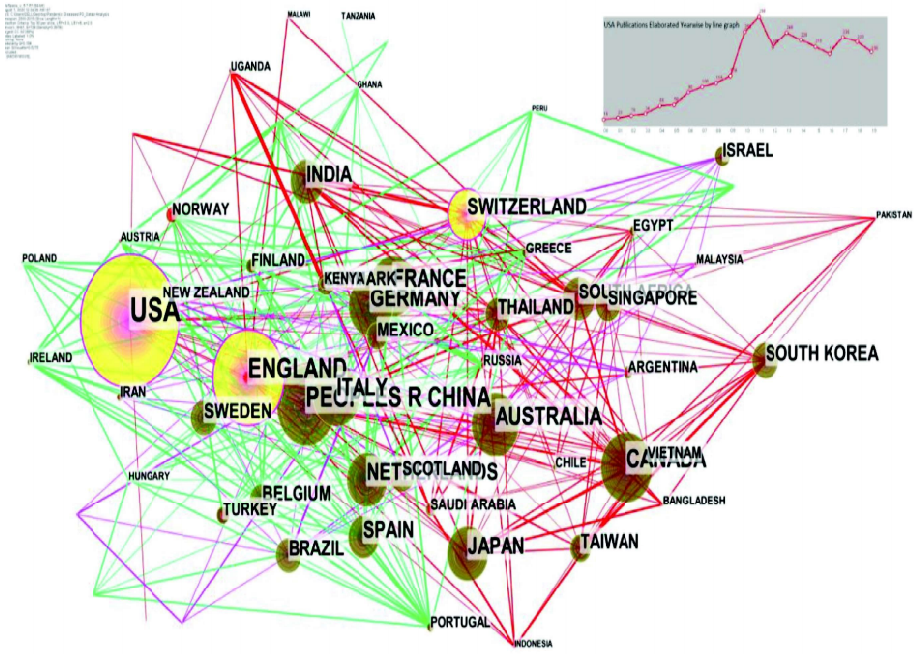


Figure 8. Co-country analysis and Collaboration Network

**4.9 Subject co-word analysis**

With the help of co-word analysis of subject categories and keywords, we pointed to the research trends and topics' most good themes of any subject area. This study has focused on frontier research areas on health and medical science-specific PDs. 4.9.1.WoS Co-Occurring Subject Categories: The WoS database assigned the subject categories to each publication according to the journals' covered subject area and theme. The co-occurring subject categories network of pandemic research contains 76 nodes and 448 link connections to focus on and analyze emerging and trending research subject categories in pandemic research, as shown in figure 9.

The size ring, dark bold, and fed letters in the nodes indicate publication frequency in each subject category. Infectious

Diseases (freq. 1290) is highest in the network, followed by Immunology (freq. 1011) and Virology (freq. 768). The network silhouette mean value of 0.7684 represents straightforward and perfect clustering in the visualization. The Paediatrics (burst 22.59) showed the highest burst items with the most activeness, followed by General and Internal Medicine (burst 18.97) and Critical Care Medicine (burst 17.17). Pharmacology and Pharmacy got the strongest betweenness centrality of 0.28 with the article frequency 312, followed by Public Environmental and occupational health (0.2; 731) and Environmental Science and Ecology (0.18; 153), respectively.

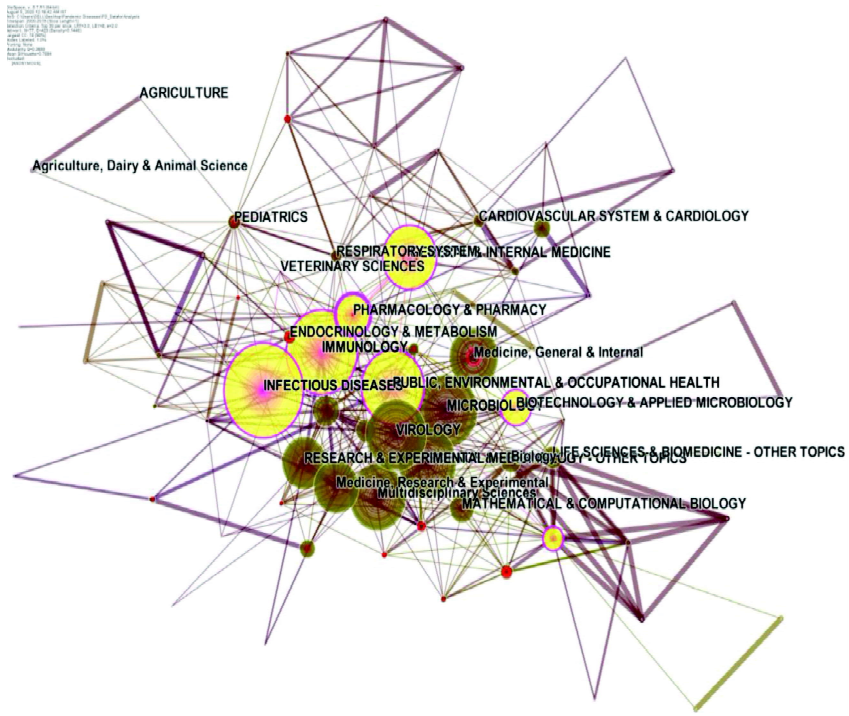


Figure 9. WOS subject category analysis and network

**4.9.2 WoS Co-occurring Keyword Analysis**

The WoS provided keywords are the most appropriate terms to describe subject phenomena according to keywords' domain and co-occurrence analysis. The study helped map trending and new frontier research domains according to keywords burstiness and time being developments. The networks construct using the author and keyword plus 7087 bibliographic records. Cite Space allows users to merge the nodes that are the same entity. The keyword analysis has 174 nodes and 1358 links with 0.0902 network density. The mean silhouette value of map 0.7895 is almost good for separating clusters, shown in Figure 10. The visualization size of keywords and darkness represents high frequency, and the light faded small size keywords indicate the lowest frequency. Influenza (count freq. 1135), infection (count freq. 1070), and Pandemic Influenza (count freq. 910) have dark bold to represent high-frequency counts. The ranked burst keywords in Hong Kong (47.80 bursts), followed by Human Immunodeficiency virus and seasonal influenza (42.00 and 39.35 bursts frequency). The Human Immunodeficiency virus has the strongest betweenness centrality, 0.18.

**4.10 Top Cited Articles Network**

Figure 11 presents the top 30 highly cited articles analyzed per year slice from studied periods. The report "Global trends in emerging infectious diseases" stands out as the top-cited article with a citation frequency of 2695 Jones K, 2008. "The human/animal interface: emergence and resurgence of zoonotic infectious diseases" by Greger M, which has the highest betweenness centrality, is 0.08.

**4.11 Ranked and Categorization of top Articles via Citation Frequency and Betweenness Centrality**

Table 3 represents the top 5 articles using categorization of top-ranked articles by highest citation frequency and top rank articles by highest betweenness centrality. "Global trends in emerging infectious diseases, obesity one the global obesity pandemic" by Jones, 2008 [13] have the highest citation frequency (2695), followed by Swinburn [14] and Corbett [15] with the citation frequency 1871 and 1847, respectively. The Jones, 2008, Corbett 2003, and Ginsberg 2009 [16] article got the most central position in the network by top-ranked citation frequency.

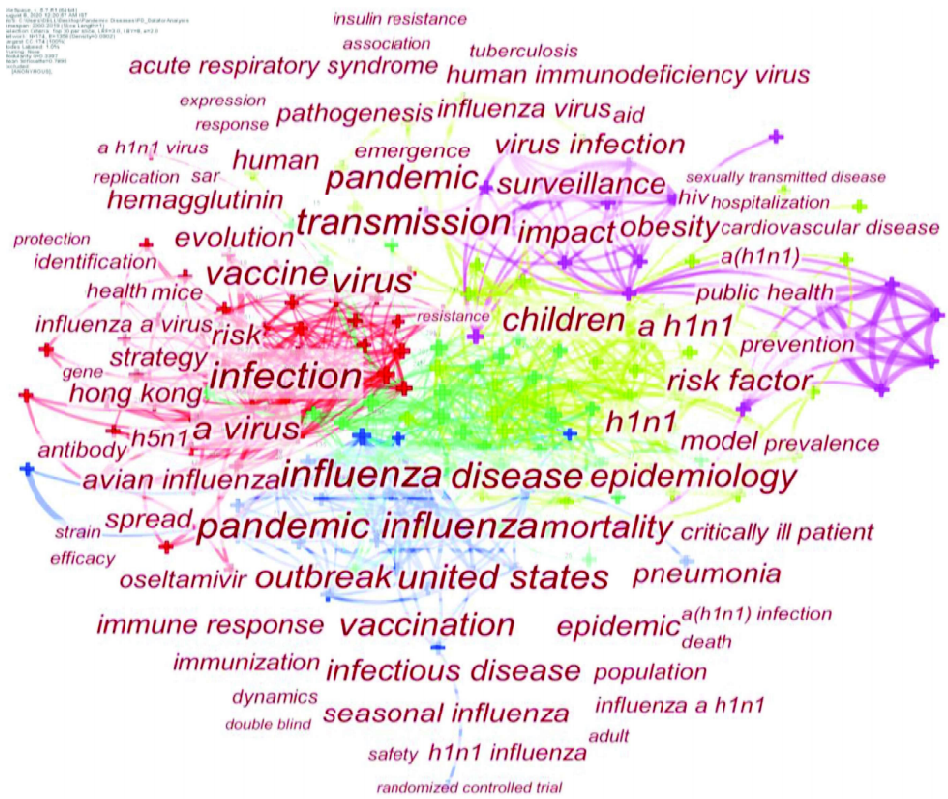


Figure 10. Co-occurring Keyword Network Map

The second categorization of top 5 articles described via top-ranked highest betweenness centrality, which was showed the article's publication influences with others. Greger 2007 [17] has 0.08 highest betweenness centrality, followed by Morse 2012 [18] and Swinburn , 2011 [14], with 0.04 and 0.03, respectively. In the context of studying scientific literature, the idea of structural holes can be translated into an important property of a node in a network its betweenness centrality. A node with a strong betweenness centrality score has a great influence on how information flows through the node [19].

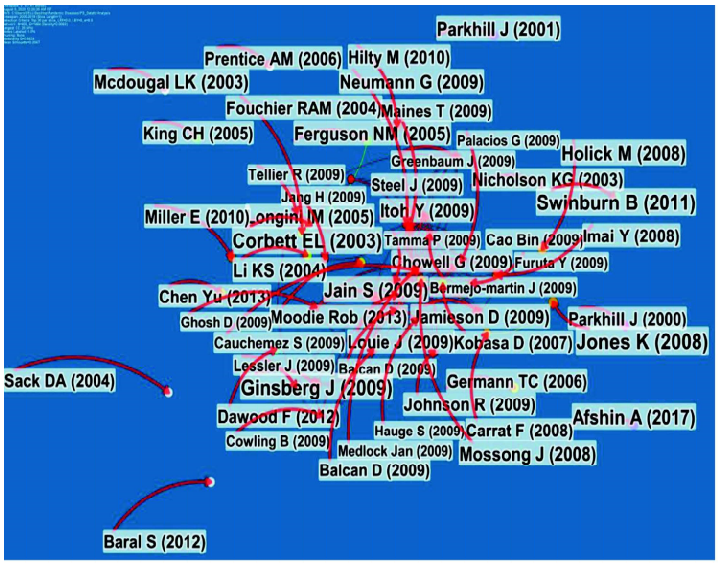


Figure 11. Top Cited Articles4.11. Ranked and Categorization of top Articles via Citation Frequency and Betweenness Centrality

| Categorization | Rank | Author | Title | Year | Freq. | Cent. |
|---|---|---|---|---|---|---|
| Top-ranked articles by highest Citation Frequency | 1 | Jones K. | Global trends in emerging infectious diseases | 2008 | 2695 | 0 |
| | 2 | Swinburn B. | Obesity 1 The global obesity pandemic: shaped by global drivers and local environments | 2011 | 1871 | 0.03 |
| | 3 | Corbett E.L. | The growing burden of tuberculosis - Global trends and interactions with the HIV epidemic | 2003 | 1847 | 0 |
| | 4 | Ginsberg J. | Detecting influenza epidemics using search engine query data | 2009 | 1832 | 0 |
| | 5 | Holick M. | Vitamin D deficiency: a worldwide problem with health consequences | 2008 | 1293 | 0.01 |
| Top-ranked articles by highest betweenness centrality | 1 | Greger M. | The human/animal interface: emergence and resurgence of zoonotic infectious diseases | 2007 | 106 | 0.08 |
| | 2 | Morse S. | Zoonoses 3 Prediction and prevention of the next pandemic zoonosis | 2012 | 282 | 0.04 |
| | 3 | Swinburn B. | Obesity 1 The global obesity pandemic: shaped by global drivers and local environments | 2011 | 1871 | 0.03 |
| | 4 | Peiris J.S.M. | Avian influenza virus (H5N1): a threat to human health | 2007 | 550 | 0.03 |
| | 5 | Manson J.E. | The escalating pandemics of obesity and sedentary lifestyle - A call to action for clinicians | 2004 | 330 | 0.03 |

Table 3. Top 5 Cited Articles details by Citation Frequency and Betweenness Centrality

## 5. Conclusion

The PDs research elaborates and points to different fields under health discipline like pandemic influenza, reverse genetics, swine influenza virus, H1N1 influenza, global virus, Zika virus, avian influenza, virus infection, influenza burden, etc. But our experts did very little research on the future pandemic. This present Scientometric study of PDs focused on the scientific progress of literature in a particular domain. The survey conducted on PDs publications published in Web of Science from 2000 to 2019 and analyzed 7089 documents were retrieved from WOS. The PDs results show that highly co-citation documents are Dawood F.S., sourced from New England journal, the most remarkable document in PDs research. Highly occurred countries are the USA, England, and Peoples R China. In addition, PDs research also focused on the WOS subject categories of Infectious Diseases, Immunology, and Virology. Influenza, infection, and pandemic Influenza got the highest frequency, but in terms of citation bursts in the most recent years are Hong Kong, Human Immunodeficiency Virus, and Seasonal Influenza. Additionally, the topics in the current Table 3. Top 5 Cited Articles details by Citation Frequency and Betweenness Centrality Categorization Rank Author Title Year Freq. Cent. Top-ranked articles by highest Citation Frequency 1 Jones K. Global trends in emerging infectious diseases 2008 2695 0 2 Swinburn B. Obesity 1 The global obesity pandemic: shaped by international drivers and local environments 2011 1871 0.03 3 Corbett E.L. The growing burden of tuberculosis - Global trends and interactions with the HIV epidemic 2003 1847 0 4 Ginsberg J. Detecting influenza epidemics using search engine query data 2009 1832 0 5 Holick M. Vitamin D deficiency: a worldwide problem with health consequences 2008 1293 0.01 Top-ranked articles by highest betweenness centrality 1 Greger M. The human/animal interface: emergence and resurgence of zoonotic infectious diseases 2007 106 0.08 2 Morse S. Zoonoses 3 Prediction and prevention of the next pandemic zoonosis 2012 282 0.04 3 Swinburn B. Obesity 1 The global obesity pandemic: shaped by international drivers and local environments 2011 1871 0.03 4 Peiris J.S.M. Avian influenza virus (H5N1): a threat to human health 2007 550 0.03 5 Manson J.E. The escalating pandemics of obesity and sedentary lifestyle - A call to action for clinicians 2004 330 0.03 issue of PDs research, “pandemic influenza”, “reverse genetics”, and “avian influenza”, are received by co-citation clusters analysis. This present Scientometric study of PDs focused on the scientific progress of literature in a particular domain. The survey conducted on PDs publications published in Web of Science from 2000 to 2019 and analyzed 7089 documents were retrieved from WoS. The PDs results show that highly co-citation documents are Dawood F.S., sourced from New England journal, the most remarkable document in PDs research. Highly occurred countries are the USA, England, and Peoples R China. PDs research also focused on the WoS subject categories of Infectious Diseases, Immunology, and Virology. The study found that there is a lot of scope for working in the ‘Future pandemic’ area. Influenza, infection, and pandemic Influenza got the highest frequency but in terms of citation bursts in the most recent years are Hong Kong, Human Immunodeficiency Virus, and Seasonal Influenza. Additionally, the topics in the current issue of PDs research, “pandemic influenza,” “reverse genetics,” and “avian influenza,” are received by co-citation clusters analysis.

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