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### Research Article

## A Bibliometric Analysis of Global Research on Dementia and its Cognitive Function

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### ABSTRACT

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**Introduction:** Dementia is a neurocognitive disease manifested by progressive and global declination in cognition. However, there is a lack of visualization analysis on research in the field of dementia and cognitive function. To evaluate the impact and compare the scholarly work output and productivity among organizations, bibliometrics was used.

**Material and methods** Literature related to dementia and cognitive function were searched from Scopus database. In the area of dementia bibliometrics was used to analyze the leading authors, the journals with higher citation, higher collaboration between the countries, and keywords. Scopus analysis and Biblioshiny R-package were used in the analysis of country collaboration and global cited documents.

**Results:** Total 1753 articles were identified from Scopus database and among these 425 articles were included in the study on basis of inclusion criteria. United states, China and Japan has the highest productivity and China, USA, Australia, Canada and Indonesia and has strong collaboration. The research hotspots in this field focused on Dementia and its impact on cognitive function. According to Lotka's Law, the studies in the field of dementia is limited and need to be conducted further.

**Conclusion:** Dementia is a major public health issues in India and this study has thrown light on all articles which has manifested the current trends and important areas of research on dementia. After an intensive analysis the study concluded that there is still a gap in international collaboration among leading countries. In India dementia can be a research gray area and focus of future attention.

### Introduction

Dementia is a syndrome occurring as a result of disease of the brain, which is usually chronic or progressive in nature caused by different types of diseases in which the nerve cells of the brain are

damaged over time and may lead to deterioration in cognitive functions.<sup>1,2</sup>

It is also considered that Dementia is a major neurocognitive disorder and required residential care among older adults. Worldwide roughly

around 46 million people are undergoing this condition and affecting their executive, psychic and physical spheres.<sup>3</sup>

The neurons of the brain are damaged in dementia caused different disease condition leads to progressive deterioration in executive brain function.<sup>4</sup> In the course of dementia there is progressive deterioration in functional activities and require assistance to manage day-to-day activities due to cognitive and functional impairment. Physical impairment associated with reduced quality of life in people with dementia and increased health care expenditure.<sup>5</sup>

Worldwide dementia and cognitive impairment are rising and expected to increase more and more in developing countries.<sup>6</sup> Dementia is manifested by speech difficulties, memory, decision making and other executive functions which put impact on an individual's ability to carry out daily activities.<sup>7</sup>

India is augmenting with its population and embracing highest aging composition and expected to excel China as the world's most populous country. India is a dwelling place of 1.37 billion people, entailing 18% of the total world population in 2019. India population by 2050 is expected to increase about 20% (319 million) of total Indian population on or above 60 years of age and holding 15.4% of Indian people aged 60 years and older globally. This demographic shift exhibits that there is increased longevity, because in India life expectancy rate has remarkably rising from 42.9 years in 1960 to 70.4 years in 2020 which is enlightening that India is in potential alarming stage because aging is the most common and aggravating risk factor for dementia.<sup>8</sup>

The early onset of dementia occurs before the age of 65 years (working age) and those people affected with dementia after 65 years of age is called late-onset of dementia. The etiological theory of dementia is not clearly understood yet but due to dementia the anatomical and chemical changes occurs in brain, leading to damage of nerve cells and shrinkage of brain cell occurs.<sup>1</sup>

The course of mental and physical dysfunction of early or mild intellectual disability is nearly 20 years and lacked with knowledge to improve their disability through different modalities.<sup>9</sup>

The research on dementia currently has covered broad array. Nevertheless, the extensive investigation of the present research publication ground has not been considered to throw light on the content of published research. This type of bibliometric analysis would be contributively to portray the worldwide trends in the field of research pertaining to health and interventions for dementia patients to fulfil the purpose of the research and to find answers to the research questions.<sup>10</sup>

People living with dementia have difficulties in carrying out activities of daily living (ADLs) and Instrumental activities of daily living (IADLs) considered as global cognitive dysfunction, and they are lacked with adequate support and leads to increase dependency and vulnerability.<sup>11</sup>

The current study aims to reveal the global research publication trends, and its impact related to health and interventions for dementia client. However, the investigator tried to throw a comprehensive insight into the present global research status on the health of and interventions for dementia patients which consider global productivity among topmost countries and their research collaboration and keyword trends. To evaluate the impact and

compare the scholarly work output and productivity among organizations, bibliometrics was used.<sup>12,13</sup>

One of the most common types of iMetrics is bibliometrics. Bibliometrics is supposed to give a "dynamic view of concepts and semantics".<sup>14</sup> Bibliometrics is the analysis of published information (e.g., books, journal articles, datasets, and blogs) and its related metadata (e.g., abstracts, keywords, and citations) by using statistics to describe or show relationships between the published works and considered as a quantitative performance indicators of published research, to recover from the disadvantage of bias in peer review and expert decisions.<sup>15,16</sup>

## **Subjects and Methods**

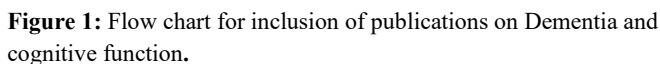
Bibliometric analysis method was used in present study to achieve the purpose of the research and to get the answers to the unsolved research problems. Bibliometrics is described as the analysis of published documents which includes books, published articles, datasets, and blogs and its related metadata such as abstracts, author keywords, and document citations by using different statistical methods to find out or justify the relationships between the published documents.<sup>17</sup>

Hence visualized analysis method of bibliometrics was used by the researcher to explore the global trends of selected articles including journal article, country, organization and key word along with Scopus analysis descriptive data. Biblioshiny R-packages were also used to find out the research trends of dementia and cognitive function globally by exploring research gray areas, topmost author as well as total link strength of countries collaboration and citations by analyzing the relevant local and international studies through bibliometric methods.

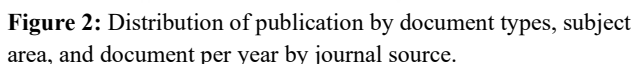
## **Data collection**

Scopus data base was used to collect the secondary data and didn't require any human interaction for which there was zero ethical issues attached to it and also institutional review board's permission was not needed. Articles from Scopus database were obtained between 18th and 21st October. The review of literature was done by using the keywords "dementia" AND "cognitive function". Then, from Scopus database the studies were filtered as per set categories (nursing, medicine, neuroscience, psychology and health profession), time period (1989-2024), publication type (final article) and language (English), source type (all open access journal). As a result of this inclusion criteria 1753 published articles were searched. Titles, abstracts, or full texts were cross checked to find out whether the documents are meeting the criteria or not. The selected articles were assessed and screened by two independent reviewers. The exclusion criteria of the studies were as follows: (1) publications without keywords (2) publications without abstract; (3) repeated publications Finally, 425 number of articles were retrieved from the database.

All the bibliographic information from Scopus database was extracted to an Excel datasheet. The downloaded bibliographic data included details of the author including contact information, study title, year of publication, abstract, keywords, and journal details

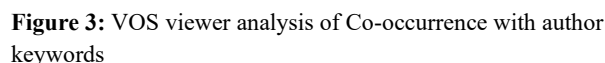


## Results



Name of the country	Number of publications
United state	80
Japan	73
China	54
Taiwan	42
South Korea	41
United Kingdom	31
Hong Kong	22
Canada	20
Spain	18
Australia	17

### Co-occurrence with author keywords



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stimulation related search (center in sky blue), cluster 4 cognitive functioning related search (left center in yellow ), cluster 5 quality of life related search (top right corner in purple) and cluster 6 Alzheimer's disease related search (top left corner in light blue), cluster 7 elderly and cognitive function related search ( top in orange ) and cluster 8 cognitive disorder and rehabilitation related search (right bottom in brown color).

In cognition related cluster, the most occurring key words are "cognition" (65 times), "physical activity" (26 times), "cognitive decline" (23 times). In the cluster cognitive impairment, the frequently used keywords are "mild cognitive impairment" (58 times), "memory" (10 times), "physical function" (7 times). In the cluster dementia and cognitive stimulation most occurring key words are "dementia" (202 times), "Alzheimer's disease" (43 times), "cognitive stimulation" (4 times). In cognitive function related search, the most frequently used keywords are "older adults" (32 times), "music therapy" (7 times) "cognitive functioning" (6 times). In quality-of-life cluster, the most occurring keywords are "depression" (33times), "quality of life" (11 times), and Cognitive dysfunction (7 times). In Alzheimer's disease related cluster "cognitive impairment" (34 times), "Alzheimer disease" (22 times). In elderly and cognitive function related cluster most occurring key words are "cognitive function" (95 times), "elderly" (25 times) and in last cluster of cognitive disorder and rehabilitation related the most frequently used key words are "cognitive performance" (5 times). Cognitive disorder (4 times).

Publication with keywords", "cognitive function", "cognitive impairment", "Alzheimer's disease" focuses on cognitive health of dementia patient and publication with keywords "cognitive stimulation", "Cognitive stimulation therapy", "occupational therapy", "rehabilitation", "non- pharmacological intervention", "psychosocial intervention" and "cognitive training" focuses on intervention for the target population.

### Co-authorship analysis with author

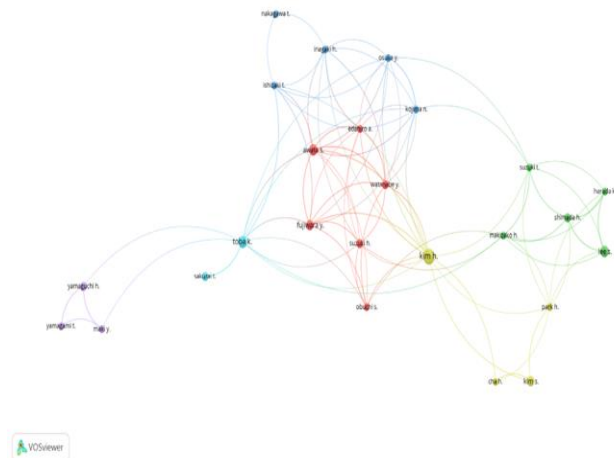


Figure 4: VOS viewer analysis of Co-authorship with author

Fig 4 depicts a collaboration map among the principal author who have published articles on dementia based on co-authorship analysis. In co-authorship analysis among 67 documents 25 documents are connected. In respect to co-authorship and author analysis the author's name mentioned in the circle, the larger the size of the circle wider the network of collaboration. The lines connecting the author to author represents the related research in the field of dementia.

Among the top authors Kim h. has highest number of documents (n=11) and total link strength is 27 and coming under cluster 4.

### C. R- Biblioshiny analysis

#### Country Collaboration Map

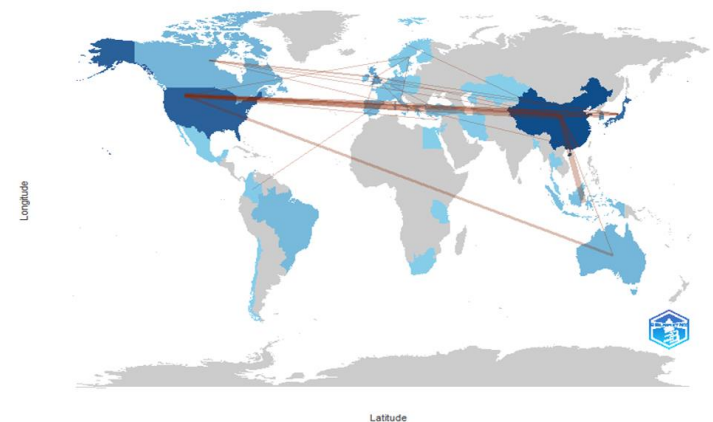


Figure 5: Country collaboration map

The map illustrates the country collaboration in the field of research on dementia. The blue color justifies the intensity of the shaded country proportionate to the total number of productions of the country. In the field of dementia, the deeper the color the higher the number of published documents. The deep blue indicated countries has higher number of publications such as China, USA, Australia, Canada and Indonesia and has strong collaboration with each other.

### Citation analysis of documents

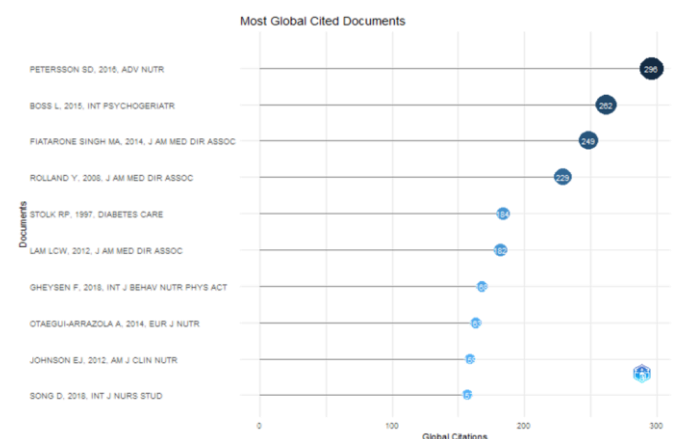


Figure 6: Top 10 global cited documents (retrieved from Biblioshiny)





one work, and those who have published three works should be 1/9 of those who have published one work (Lotka, 1926). As per Lotka's law the author productivity in current study is less by prolific authors. The results of the study recommended that the topic should be related to the concern of people living with dementia.<sup>12</sup> Hence it is clinched that the relevant content related to dementia is limited and needs further research on this aspect.

Though there was a detailed descriptive and quantitative analysis still the study is limited to some areas as publications were limited to Scopus database only which does not index all journals, so articles from other databases (e.g., WOs and PubMed) may have failed to spot. In addition, the publications restricted to nursing field only, which may introduce publication bias. For example, the research in other field like medical science, social science, humanities and psychology may have a greater number of publications which would have given a wide range of research in the field of Dementia.

## Conclusion

Bibliometric analysis is newer adaptive method of published article analysis in medical field by using different software like Vos viewer analysis and R studio Biblioshiny analysis and this study identified significance of conducting study related to dementia as there is still a gap in international collaboration among prolific countries engaged in the field of dementia. As the elderly composition is increasing, India has to take more research initiative in the field of Dementia and their cognitive function. Dementia can be a research hotspot or grey area and may be the focus of future thoughtfulness.

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### Conflict of Interest

Authors declare no conflict of interest.

### Data availability

Data are available upon reasonable request.

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