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Bibliometric analysis of publications on neuroscience and noncommunicable diseases in the Scopus database

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Abstract

Introduction: The present study aimed to perform a bibliometric analysis of neuroscience and noncommunicable diseases in the Scopus database between 2003 and 2023. Bibliometric analysis served as the main tool to analyze academic production.
Methods: 867 papers were selected for the study based on English keywords ("neuroscience," "noncommunicable," and "diseases").
Results: The period from 2015 to 2023 accounted for 58% of the total publications, with 503 academic publications, which had the most significant influence on scientific production in terms of percentage increase. The United States accounted for 35.9% of the production. The most relevant publication sources, with n=10 each, were Neuromethods and Neuroscientist. Farooqui, A.A. obtained the most citations (105) in his four papers. Of the total number of papers, 21% were scientific articles, of which 32% pertained to medicine and 20% to neuroscience. Neuroscience and noncommunicable diseases have advanced significantly in terms of thematic variety, authorship, sources, and accessible resources.
Conclusions: This bibliometric study provides a solid foundation for future research in the field of neuroscience and noncommunicable diseases, highlighting the importance of this area and its growth in the academic realm.

Keywords: these are the keywords, these are the keywords, these are the keywords.

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1. Introduction

The neurosciences bring together both traditional academic fields and emerging areas of study that draw on other disciplines, focusing on the pursuit of knowledge about the anatomy and physiology of the brain in order to gain a comprehensive understanding of human thought and behavior: fields such as bioinformatics, neurology, cognitive psychology, neuropsychology, neurochemistry, physiology and molecular neurobiology (1) (2) (3). In that sense, since neurosciences investigate the anatomy and diseases of the nervous system, it could be easy to establish connections between both fields and health problems (4). However, for most individuals, health is simply related to feeling well, not being sick, or taking care of their own integrity (5) (6).

On the other hand, the most common types of noncommunicable diseases include cancer, heart disease, diabetes, and lung disease (7). Moreover, they are very common because, among other things, people are more prone to make poor lifestyle choices as a result of urbanization and globalization. In this regard, the study of the complex network of biological and social elements that affect the

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health of a population is necessary to meet public demands to combat chronic diseases (8) (9).

In recent years, attention has been drawn to the ways in which neuroscience expertise can help to better understand our identity and the ways in which we operate as social and neurobiological beings (10). In that vein, finding the physiological mediators underlying the association between social variables and health has been an area of research for neuroscience. In addition to covering diseases of a chronic or progressive nature, its applications span the fields of social cognition and neuropsychology (11).

In addition, in recent decades there has been an increase in studies examining neuroscience and non-communicable diseases, since these pathologies, which fall into the category of chronic diseases, are mainly caused by four types of behavior: consumption of tobacco products, poor eating habits, lack of physical activity and hazardous alcohol consumption (12). In any case, bibliometrics is a subfield of information science that tracks the publication of scholarly works such as books, articles, and theses in an effort to determine the diffusion of new ideas and the influence of particular literary works (13).

Therefore, it is crucial to have accurate records in databases to support the scientific substantiation of the study. Consequently, to develop bibliometric indicators, all publications on the topic and those closely related to it must be accurately counted and analyzed (14) (15).

Likewise, research and knowledge on neuroscience and noncommunicable diseases must also follow a bibliometric framework when collecting data. In this regard, when evaluating papers, various indicators are taken into account, such as the category of the paper, the author, the source, the date of publication and the country of origin. Thus, the general objective of the research is: to perform a bibliometric analysis on neuroscience and noncommunicable diseases in the Scopus database between 2003 and 2023.

2. Methods

The purpose of the study was to perform an evaluation of the literature on neuroscience and noncommunicable diseases using a bibliometric approach. According to Salinas and Garcia, bibliometrics is also crucial for this study because it requires the collection of a large amount of data. In addition, because Scopus distributes scholarly publications from all over the world, the search was conducted in this database from 2003 to 2023.

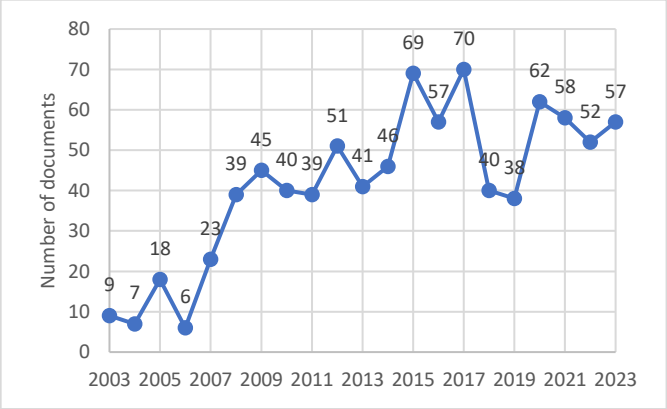
Combinations of Boolean terms such as "*neuroscience*", "*noncommunicable*" and "*diseases*" were used in this research. A total of 1115 academic papers were found, all with some connection to the fields of neuroscience and noncommunicable diseases. However, after the data were cleaned and compiled, 867 peer-reviewed scientific papers were selected. We also included the following exclusion criteria to help with the data filtering operation: a) research conducted before 2003 or after 2023; b) articles with the same content; and c) unrelated studies.

In addition, the global influence of 867 papers on neuroscience and noncommunicable diseases was evaluated using bibliometric criteria. The following factors were taken into account: field of study, partner universities, nations, authors, journals and date of publication (16). Also, quantitative, qualitative and descriptive statistics were part of the research (Excel was used to process and analyze the data) (17). In addition, the keyword co-occurrence map was created using VOSviewer V_1.6.19.

3. Results

This bibliometric analysis includes academic papers published in journals from 2003 to 2023. In this review, 867 papers on the topic of neurology and noncommunicable diseases were examined. Figure 1 shows the most recent papers indexed by Scopus worldwide. In addition, there was a notable spike in the production of new scientific publications from 2015 to 2023, with 503 papers published in total, representing 58% of all publications worldwide.

Figure 1. Documents published by year



Source: Scopus data (2024)

Table 2 shows that 62 different countries were considered for the analysis. In terms of scientific productivity, the United States tops the list with 35.9%, followed by the United Kingdom with 8.9% and Canada with 4.8%. In addition, English was the language of publication for 91% of the documents, while Spanish and Portuguese accounted for 6.3% and 2.7%, respectively.

Table 1. Publication of documents by country

N°	Country	Number of documents	%	N°	Country	Number of documents	%
1	United States	385	35.9 %	17	Argentina	9	0.8%
2	United Kingdom	95	8.9%	18	Brazil	8	0.7%
3	Canada	51	4.8%	19	Russian Federation	7	0.7%
4	Italy	50	4.7%	20	Iran	6	0.6%
5	Germany	46	4.3%	21	Israel	6	0.6%
6	India	42	3.9%	22	Portugal	6	0.6%
7	Australia	41	3.8%	23	Greece	5	0.5%
8	France	31	2.9%	24	Mexico	5	0.5%
9	Spain	25	2.3%	25	New Zealand	5	0.5%
10	China	24	2.2%	26	Norway	5	0.5%
11	Japan	21	2.0%	27	Cuba	4	0.4%
12	Netherlands	19	1.8%	28	Denmark	4	0.4%
13	Turkey	13	1.2%	29	Poland	4	0.4%
14	Sweden	11	1.0%	30	Romania	4	0.4%
15	Switzerland	11	1.0%	31	Indefinite	118	11.0%
16	Belgium	10	0.9%	**Total**		**62**	

Source: Scopus data (2024)

A total of 36 academic sources were used to form this assessment. Table 2 provides a summary of all the data collected for this study. It also shows the overall count of papers published in other journals and sources, such as Neuroscientist and Neuromethods, both with ten publications. While seven papers were published in the Journal of Undergraduate Neuroscience Education. Likewise, these sources have had a significant impact in their respective fields.

Table 2. Publication of documents by source or journal

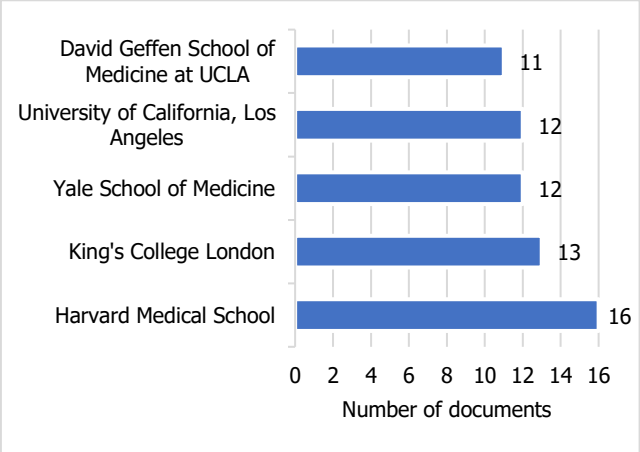
Source or Magazine	Number of documents	Source or Magazine	Number of documents	Source or Magazine	Number of documents
Neuromethods	10	Annals of Operations Research	2	Advanced Materials Interfaces	1
Neuroscientist	10	Biosocieties	2	Advanced Sciences and Technologies for Security Applications	1
Journal of Undergraduate Neuroscience Education	7	Complexity International	2	Advances in Neurotoxicology	1
Journal of Neuroscience Nursing	5	Diseases of the Nervous System	2	Alcohol Research And Health	1

Scientometrics	5	Ethics and Medicine	2	Allelopathy Journal	1
American Psychologist	4	Journal of Applied Biobehavioral Research	2	American Ethnologist	1
Poiesis Und Praxis	4	Polito Springer Series	2	American Journal of Physics	1
Contemporary Clinical Neuroscience	3	Psychology of Learning and Motivation Advances in Research and Theory	2	American Mathematical Monthly	1
Journal of Visualized Experiments	3	Studies in Computational Intelligence	2	Annals of Movement Disorders	1
Library Philosophy and Practice	3	Supplements to Clinical Neurophysiology	1	Arpn Journal of Engineering and Applied Sciences	1
Acta Neurobiologiae Experimentalis	2	AJOB Neuroscience	1	Indefinite	2
Advances in Medical Sociology	2	Acta Neuropsychologica	1	**Total journals**	**36**

Source: Scopus data (2024)

These 867 publications are the result of collaboration between researchers from more than 130 different universities. Figure 2 shows the universities that generated the largest number of academic articles during the research period. These include Harvard Medical School (16 publications), King's College London (13 papers) and Yale School of Medicine and University of California, with 12 publications each.

Figure 2. Documents published by institution



Source: Scopus data (2024)

The authors of the academic papers chosen were 145. Table 3 shows that, of all the writers, Farooqui, A.A. had the highest number of citations (n=105). Following him was Hof, P.R., who had 95 citations in his four publications.

Table 3. Published papers by author

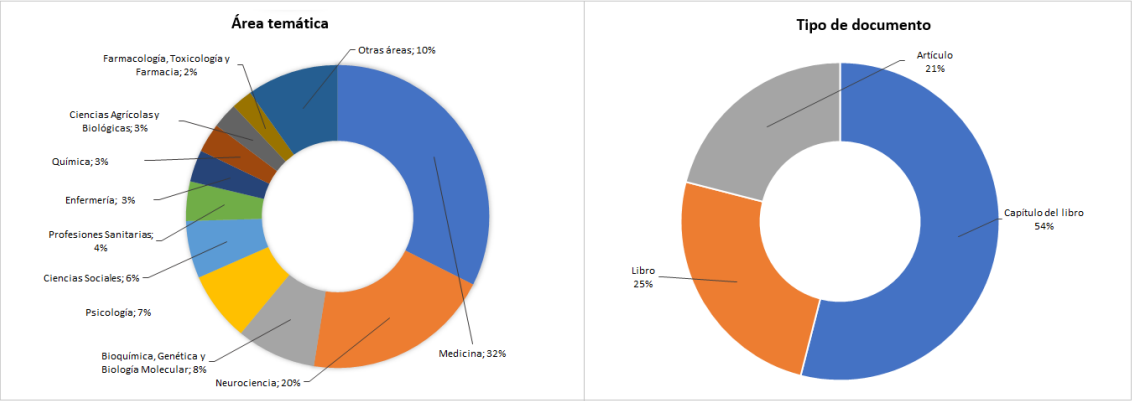
By author	Quantity	Total citations	By author	Quantity	Total citations
Costa, A.	9	0	Michaelides, M.	4	1

Villalba, E.	9	0	Giordano, J.	3	29
Carter, A.	7	61	Hof, P.R.	3	95
Hall, W.	7	61	Howard, R.	3	39
Duffau, H.	5	2	Kolb, B.	3	4
Clarke, C.	4	40	Martin, C.	3	6
Farooqui, A.A.	4	105	Meyer-Lindenberg, A.	3	0
Gendelman, H.E.	4	4	Pascual, J.M.	3	19

Source: Scopus data (2024)

Figure 3 presents a summary of studies related to neuroscience and non-communicable diseases for the years 2003-2023. The field of medicine accounts for 32% of the most recent discoveries in this area, while neuroscience ranks second with 20% and biochemistry, genetics and molecular biology third with 8%. Furthermore, if we look at the production by type of document, we see that 54% corresponds to book chapters, 25% to books and 21% to scientific articles.

Figure 3. Publication of documents by thematic area and type



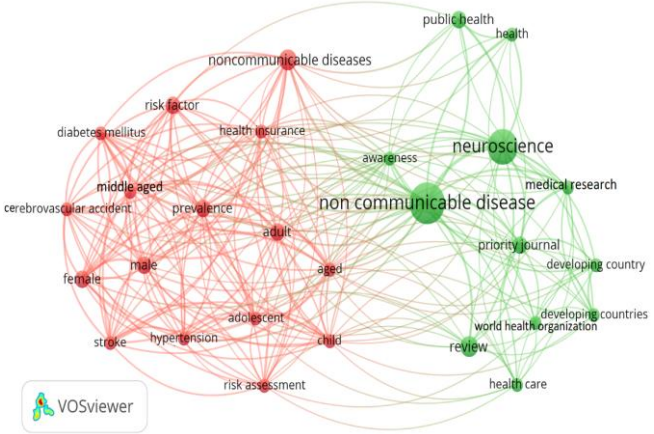
Source: Scopus data (2024)

Figure 4 shows the phrases present in the titles, abstracts and keyword lists of the articles examined. In addition, Visual Object Sense (VOSviewer) uses colors to indicate the degree of correlation between terms, which facilitates the observation of groups of linked words.

- Green cluster. "neuroscience" (n=61 occurrences), clusters the following words: public health, awareness, health, health, medical research, priority journal, developing country, world health organization, review, health care.
- Red cluster. "noncommunicable diseases" (n=35 occurrences), groups the following words: disease insurance, prevalence, age, adult, child, risk assessment, hypertension, male, stroke, female, middle-aged, diabetes mellitus, risk factor.

According to this grouping method, most of the terms used in the study have their origin in the subject analyzed.

Figure 4. Map of keyword co-occurrence



Source: Results in VOSviewer (2024)

4. Results

This study examines records from the years 2003 to 2023. Also, neuroscience and topics related to noncommunicable diseases had the highest concentration of research papers between 2015 and 2023, according to the statistics (19).
According to the background analyzed, several studies, states that a person's health is a crossroads where many different domains-biological and social, personal and community, public and private-and information and action come together (20). Similarly, Ruiz-Ramirez et al. (21) agree that finding the physiological mediators underlying the association between social variables and health has been an area of research for neuroscience.
Likewise, Rivera et al. point out that social neuroscience is a vital field of study that investigates the role played by the central and peripheral neurological systems, the endocrine system and the immune system in relation to sociocultural processes (22). In any case, Pino-Loza and Granja-Pino (23) assert that a field that deals with the study of the brain basis of social cognitive processes, which are the processes that allow members of the same species to interact with each other, helps individuals to receive and interpret information that is generated by themselves or by others (24) (25).
In addition, Abanto-Reyes et al. (1) point out that more research is needed on the complexity of diseases in light of the findings of health-related neuroscience studies. Finally, Sarrias-Arrabal et al. states that the field of neuroscience needs to move forward with new avenues of research, shifting its emphasis to disease prevention and treatment (26). Because of this, it is necessary to determine their connection in order to have a more complete picture of these processes.

5. Conclusions

Research on neuroscience and noncommunicable diseases increased from 2003 to 2023, which is consistent with the objective of the study. According to the bibliometric analysis, the peak publication period was 2015-2023. During that time, there were 503 more papers indexed in Scopus, an increase of 58%. Of the 62 countries considered, the United States accounts for 35.9% of the global output (n=385) and more than 91% of all publications (789 in total) are published in English. Likewise, Farooqui, A.A. has four publications and 105 citations, making him the most referenced author. Similarly, sixteen papers from Harvard Medical School are among the most significant sources.
In turn, 21% of the publications were academic articles. The field of medicine accounted for 32%, neuroscience for 20% and biochemistry, genetics and molecular biology for 8%. The keyword study conducted by VOSviewer revealed that the term "*neuroscience*" was among the most relevant terms, with 61 occurrences. However, the term "*noncommunicable diseases*" also plays an important role. Moreover, the 867 publications reviewed underscore the importance of neuroscience and noncommunicable diseases, as research could be useful in getting to the bottom of diseases with major public health effects and finding effective ways to treat them. Finally, it is concluded that there has been progress in the field of neuroscience and noncommunicable diseases, with a wider range of topics covered, more recognized authors, and crucial information available. Consequently, the study provides a solid foundation on which future research can be built.

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