



The policies and strategies for prevent and control non-communicable diseases: A bibliometric analysis of global research trends

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ABSTRACT

Background: Reducing premature mortality from non-communicable diseases (NCDs) is a key target of the Sustainable Development Goals (SDGs). This study aimed to map global research trends about policies and strategies for the prevention and control of NCDs using a bibliometric approach. **Methods:** A bibliometric analysis was conducted using the Scopus database. Articles published in English between 1 January 2023 and 6 November 2025 were retrieved. Bibliometric networks of authors, institutions, countries, sources, keywords, and co-cited references were analyzed and visualized using VOSviewer. **Findings:** A total of 555 articles were included. The field is dominated by collaborative networks of authors and institutions from high-income countries, particularly the United States, the United Kingdom, Australia, and Iran. The Lancet and other leading journals in public health and medicine formed the main co-citation hubs. Frequently co-occurring keywords highlighted policy implementation, health systems, risk factors, health promotion, and prevention and control strategies for major NCDs. **Conclusion:** Global research on NCD policies and strategies is increasing, yet remains concentrated in high-income settings. Future studies should prioritize implementation and evaluation of NCD policies in low- and middle-income countries, integration of digital health technologies, development of context-specific risk-based strategies, and assessments of policy impacts on health and economic inequalities. **Novelty/Originality of this article:** This study provides one of the first up-to-date bibliometric overviews (2023–2025) of global publications on NCD prevention and control policies and strategies, offering evidence-based directions for future research and policymaking.

KEYWORDS: bibliometric; non-communicable diseases; policies and strategies.

1. Introduction

Non-communicable diseases (NCDs) are still a serious global health problem. These diseases continue to increase (Davagdorj et al., 2021). In fact, non-communicable diseases (NCDs) are known to be the leading cause of death worldwide and are responsible for a high burden of disease (Gassner et al., 2022). Around 43 million people or equivalent to 75% died from non-communicable diseases (NCDs) in the world in 2021. Around 18 million people died from NCDs before the age of 70. Of all deaths caused by NCDs, 73% are known to occur in low- and middle-income countries. Cardiovascular disease is the cause of most deaths from NCDs, namely around 19 million deaths in 2021. The next highest cause of death due to NCDs in 2021 is cancer which caused 10 million deaths, chronic respiratory

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diseases which caused 4 million deaths, and diabetes which is more than 2 million including deaths caused by kidney disease due to diabetes (World Health Organization, 2025).

Low social and economic status can impact mortality and morbidity from non-communicable diseases (NCDs) in several countries. Social and economic conditions associated with health disparities include access to healthcare and an increased risk of non-communicable Diseases (NCDs) (Lago-Peñas et al., 2021). Non-communicable diseases (NCDs) result in high and expensive healthcare needs. This situation imposes a substantial economic burden, particularly in areas with limited resources (Menon et al., 2022).

One of the Sustainable Development Goals (SDGs) requires countries to reduce the death rate from non-communicable diseases (NCDs) by one-third by 2030 compared to 2015. Some of the main non-communicable diseases are cardiovascular disease (CVD), diabetes mellitus (DM), chronic respiratory disease (CHD), and cancer (CA) (Ouyang et al., 2022). Many countries have developed national strategies for the prevention and control of non-communicable Diseases (NCDs) to improve the health of people with chronic diseases (Gassner et al., 2022). However, currently, global health is in the spotlight due to the complexity of health challenges (Erlinawati, 2024). This condition means that, despite numerous efforts to prevent and control Non-Communicable Diseases (NCDs) through policies and strategies, these efforts have not been optimal in reducing the burden of non-communicable diseases.

The focus on non-communicable diseases (NCDs) and their impact on health has increased in recent years. Effective non-communicable diseases (NCDs) management strategies are crucial for their prevention and treatment (Erlinawati, 2024). Bibliometric methods are implemented to analyze and summarize recent developments and emerging trends in related research (Erlinawati, 2024; Pamungkas & Anwariyah, 2025; H. Yang et al., 2025). Research on sustainable development and the social determinants of health has gained international attention. These trends increasingly demonstrate the importance of their contributions to health policy development (Ekinci et al., 2025). To date, there is limited research on global trends in policies and strategies for the prevention and control of Non-Communicable Diseases (NCDs) beyond 2025. Therefore, bibliometric research was conducted on policies and strategies for preventing and controlling non-communicable diseases.

2. Methods

This study used a bibliometric method to explore scientific data related to the research topic and future research directions. The data used in this study are sourced from Scopus. Scopus used as a bibliometric database because it trusted in the academic world. The Scopus database is known for its extensive journal coverage and high-quality metadata. It also provides comprehensive author and institutional profiles. It is suitable for analyzing research trends (Baas et al., 2020). The keywords used are: policies OR strategies AND prevent OR control AND "non-communicable diseases". The data obtained were 2,843 and filtered to 555 publications. The criteria were publications in 1 January 2023 to 6 November 2025, article publication type, and English language.

The obtained data were then exported in comma-separated value format. Bibliometric mapping analysis was performed using VOSviewer. VOSviewer used to assess and visualize research characteristics from various aspects, including authors, institutions, countries, sources, keywords, and references. After the research trends are depicted, the potential and direction of future research are identified.

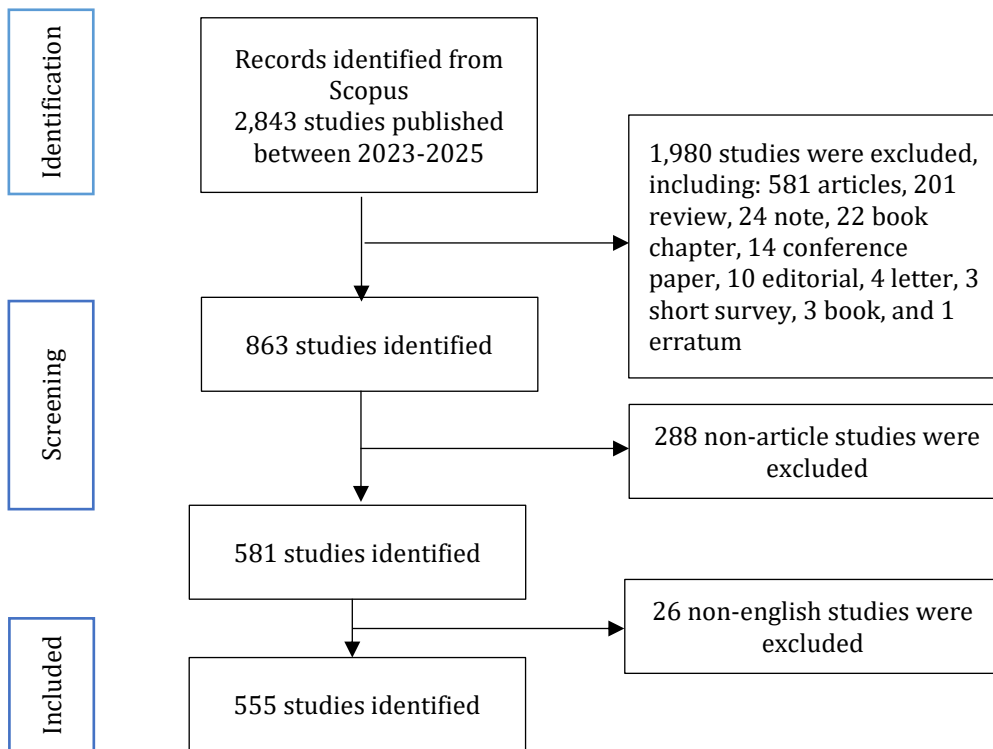


Fig. 1. Flow chart of study selection

3. Results and Discussion

3.1 Collaborative co-author network analysis

Collaborative co-author network analysis to describe the dynamics and development of authors in a particular field. Connecting lines between authors indicated collaborative relationships. Clusters with the same color indicated a strong relationship between authors. The size of the circles indicated the frequency of document publication. The larger the circle, the greater number of documents produced (W. Yang et al., 2020). In addition, authors with high collaboration strength with other authors are given the same color and grouped in one cluster (Phoobane et al., 2022).

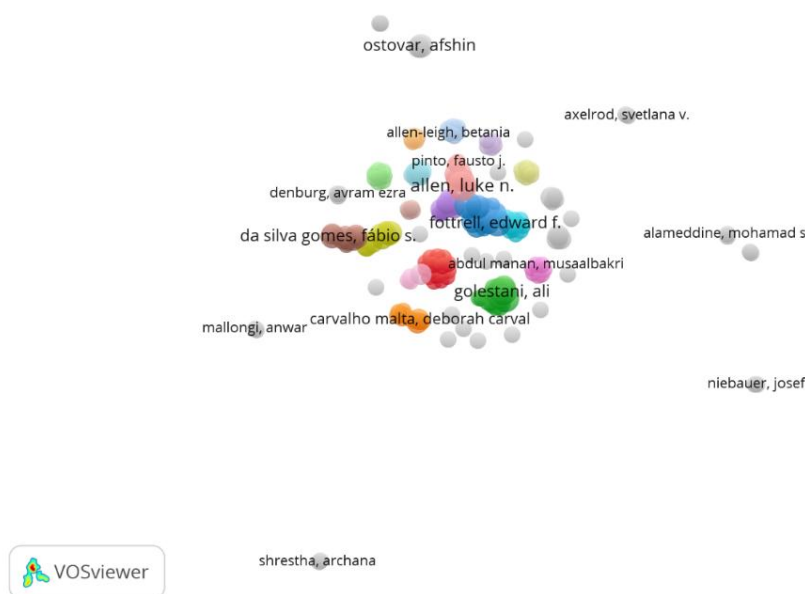


Fig. 1. Collaborative network of co-authors in the policies and strategies for prevent and control non-communicable disease

A total of 208 of the 2.526 authors were screened (minimum number of author documents 2 and minimum number of author citations 2), then analyzed, showing that there is a collaborative network of co-authorship in publications. Those who have a collaborative relationship in authorship between the core authors and other core authors are distinguished by the color of the cluster. There are 40 clusters in Fig.1 which show the relationship between core authors. Those in one cluster (same color) mean they have the same topic, thicker connecting lines indicate a stronger relationship, and the distance between items means the closeness of the relationship (closer items indicate that the items have more related topics). For example, in Fig. 2 is a picture of a specific collaborative author network showing the relationship between the core authors between Sanuade (red cluster) and Koram (red cluster) who have the same topic, have a stronger relationship or often appear together in scientific publications, and have a more related relationship when compared to the relationship between Sanuade (red cluster) and Fottrell (green cluster).

The red cluster represents the cluster with the highest number of collaborative authors compared to other clusters. Furthermore, the brighter the cluster, the more recently the author published their work. Narula, Pinto, and the other authors in the yellow cluster are the authors with the most recent work. Table 1 shows that Allen is the core author who has published the most documents, namely 6 documents. This condition can also be seen from Figure 1, where Allen has a larger item size compared to the other items. Table 1 also shows that the author with the highest total link strength among the 10 core authors with the highest number of documents is Fottrell. This condition indicates that Allen produces more documents, but Fottrell is more collaborative with other authors. Allen and Fottrell are authors whose scientific work was primarily published around 2023 between 2023 and 2025.

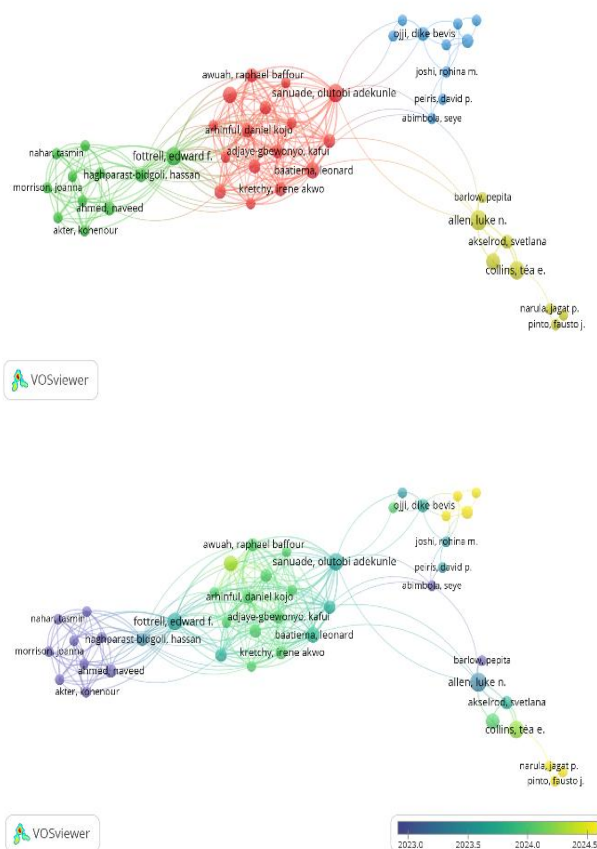


Fig. 2. Collaborative network of co-authors by year in the policies and strategies for prevent and control non-communicable disease specifically (only interrelated clusters)

There are 10 core authors who are the most productive in publishing scientific works on policies and strategies for the prevention and control of non-communicable diseases. The most productive core authors published documents in sequence namely Allen, Collins, Fottrell, Golestani, Rezaei, Sanuade, Baatiema, Berlina, Da Slilva Gomes, and Farzadfar (Table 1).

Table 1. The top 10 Collaborative network of co-authors in the policies and strategies for prevent and control non-communicable disease

Rank	Author	Documents	Total Link Strenght
1	Allen, luke n.	6	15
2	Collins, téa e.	5	11
3	Fottrell, edward f.	5	60
4	Golestani, ali	5	18
5	Rezaei, nazila	5	18
6	Sanuade, olutobi adekunle	5	47
7	Baatiema, leonard	4	44
8	Berlina, daria	4	10
9	Da silva gomes, fábio s.	4	4
10	Farzadfar, farshad	4	24

3.2 Collaborative countries network analysis

Collaborative countries network analysis used to describe countries that more productive and collaborative. It is also used to describe work with recent publications by countries. A total of 128 countries were filtered, then analyzed, showing the existence of a collaborative network between countries in publications. Countries that have collaborative relationships in publications are distinguished by the color of the cluster. There are 20 clusters in Fig. 3 which illustrate the relationship between countries. Those in one cluster (the same color) mean they have similar topics, thicker connecting lines indicate stronger relationships, and the distance between items means the closeness of the relationship (closer items indicate that the items have more related topics). For example, Fig.4 is an image of a specific collaborative country network showing the relationship between America (light purple cluster) and South Korea (light purple cluster) which have the same topic, have a stronger relationship or often appear together in scientific publications, and have a more related relationship when compared to the relationship between Indonesia (red cluster) and Malaysia (red cluster). The red cluster is the cluster with the largest number of collaborative countries when compared to other clusters. In addition, the brighter the cluster, the more recently the countries published his work. Morocco is included in the yellow cluster, with country with the most recent work.



Fig. 3. Collaborative network of countries in the policies and strategies for prevent and control non-communicable disease

There are 10 top countries that publish the most documents namely United States, United Kingdoms, Australia, India, China, South Africa, Iran, Switzerland, Brazil, and Italy (Table 2).

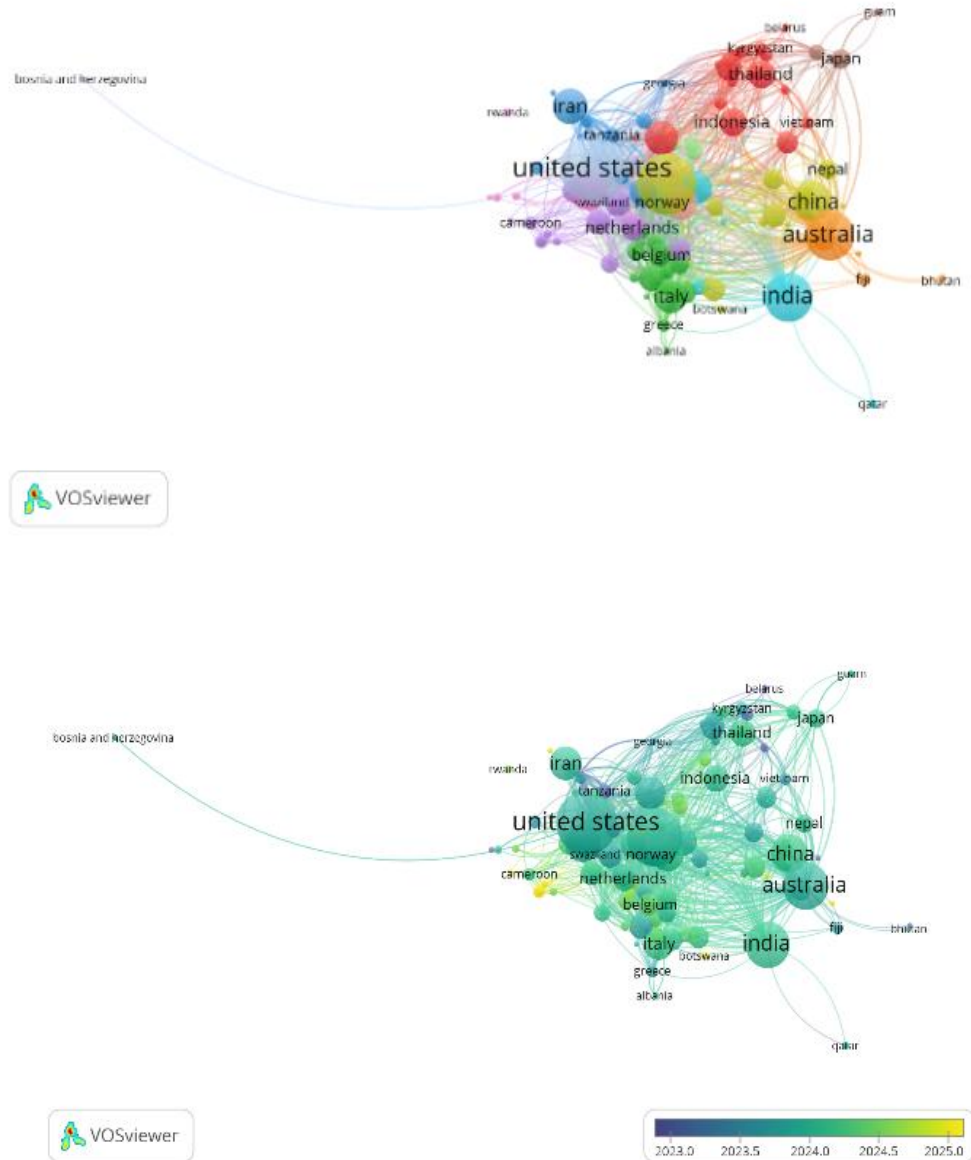


Fig. 4. Collaborative network of countries by year in the policies and strategies for prevent and control non-communicable disease specifically (only interrelated clusters)

The United States is the country with the highest number of published documents. It also has the highest total link strength (frequency of co-occurrence) of connections with other countries. This condition means that the United States is the most productive and collaborative country for publishing works in policies and strategies for prevent and control non-communicable disease. The works published in this country also started quite a long time ago (around 2023) when compared to other countries. United Kingdoms has the same condition but this country in rank-2. Similar to previous research which stated that the United States and the United Kingdom were ranked first and second in co-authorship even in all areas of disease (Fitipaldi & Franks, 2023).

Table 2 shows that the United States is the country that has published the most documents, with 116 documents. This condition can also be seen in Figure 1, which shows that the United States has a larger item size than the other items. Table 2 also shows that the country with the highest total link strength among the 10 countries with the highest number of documents is the United States. This condition indicates that the United States is the most productive and collaborative country in related publications. Most publications conducted by the United States in related fields were around 2024 between 2023 and 2025.

Table 2. The top 10 Collaborative network of countries in the policies and strategies for prevent and control non-communicable disease

Rank	Country	Documents	Total Link Strenght
1	United states	116	319
2	United kingdom	98	284
3	Australia	67	159
4	India	64	89
5	China	43	50
6	South africa	40	130
7	Iran	34	25
8	Switzerland	32	135
9	Brazil	31	53
10	Italy	29	78

Advances in public health in developed countries like the United States have reduced the burden of various diseases, although the burden of non-communicable diseases (NCDs) has also increased. These advances in health care have also helped more people live longer (Hambleton et al., 2023). Using research findings as a basis for policy-making is an important effort because it has an impact on improving health (Erismann et al., 2021). Based on this, one effort to achieve progress in the field of public health is research on policies and strategies for preventing and controlling non-communicable diseases. Countries with low levels of productive and collaborative need to increase scientific publications both in quantity and quality also collaborate other countries in producing publications in policies and strategies for preventing and controlling non-communicable diseases. According to Yang et al. (2020), countries with high levels of collaboration such as the United States and the United Kingdom are considered to have high levels of education. Countries with high levels of education have the potential to improve the quality of scientific research and encourage cooperation with other countries.

As the number of contributing factors increases, the threat of NCDs also increases. Policy priorities and funding allocations need to be aligned more effectively and efficiently to address this threat (Jailobaeva et al., 2021). Non-communicable diseases (NCDs) are known to be the cause of a high disease burden (Gassner et al., 2022). According to Morales et al. (2024), non-communicable diseases (NCDs) cause negative impacts such as social, economic and public health burdens in the world. The chronic nature of Non-Communicable Diseases (NCDs) and the costs of long-term care result in significant healthcare expenditures. This situation pushes poor communities deeper into poverty and exacerbates societal inequality (Kazibwe et al., 2021).

Based on this, countries with high levels of productivity and collaboration (such as United States and United Kingdom) have the potential to encourage international cooperation with other countries in the world, especially countries with productivity and collaboration that still need to be improved (such as Ukraine, Kazakhstan and Papua New Guinea) to increase the quality and quantity of research so that it can have an impact on improving the results of policies and strategies to prevent and control Non-Communicable Diseases (NCDs).

3.3 Collaborative institutions network analysis

Collaborative institutions network analysis used to describe institutions that more productive and collaborative. It is also used to describe recent publications by institutions.

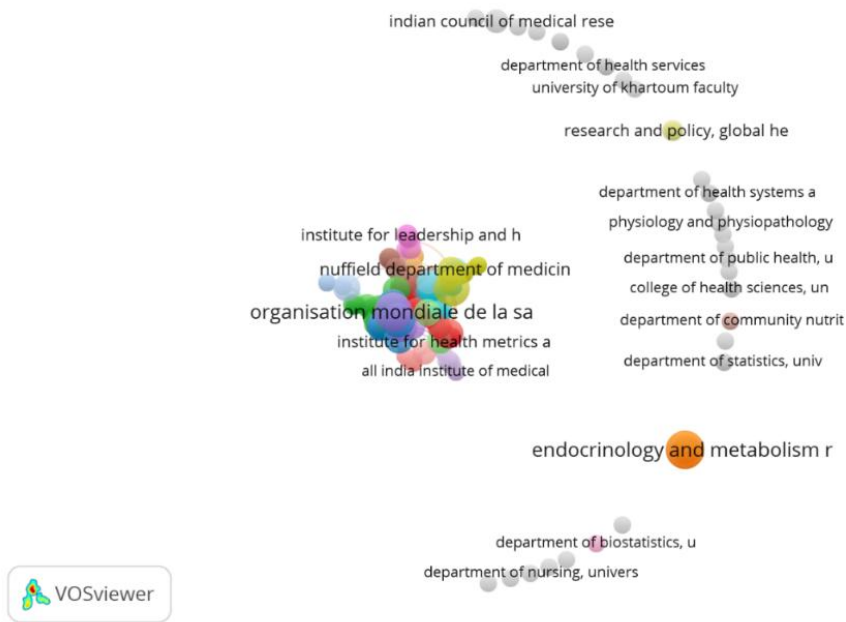
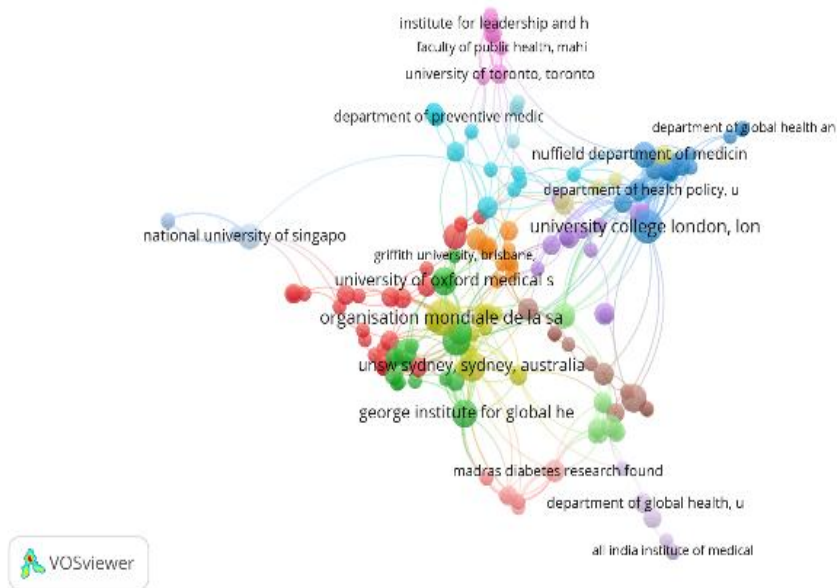


Fig. 5. Collaborative network of institutions in the policies and strategies for prevent and control non-communicable diseases

A total of 241 of the 2.262 organizations were filtered, then analyzed, showing the results that there is a collaborative network between organizations in publications (the number of author documents is at least 2). Organizations that have collaborative relationships in publications are distinguished by the color of the cluster. There are 44 clusters in Fig. 5 which illustrate the relationship between organizations. Those in one cluster (the same color) mean they have similar topics, thicker connecting lines indicate stronger relationships, and the distance between items means the closeness of the relationship (closer items indicate that the items have more related topics).



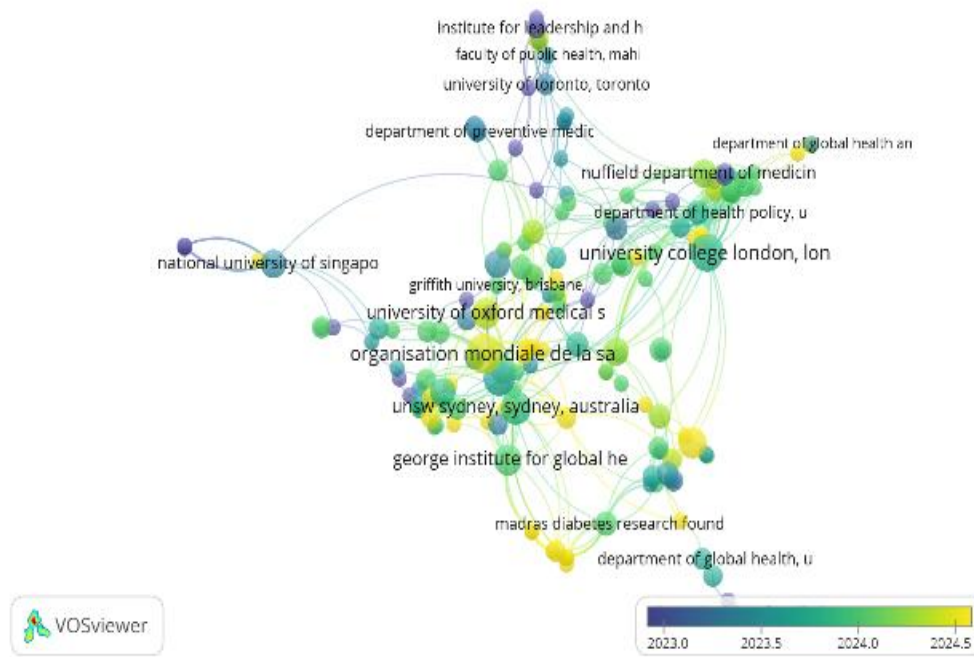


Fig. 6. Collaborative network of institutions by year in the policies and strategies for prevent and control non-communicable disease specifically (only interrelated clusters)

For example, Fig. 6 is an image of a specific collaborative country network showing the relationship between The University of Sydney School (green cluster) and the Chinese Center for Diseases Control (green cluster) which have the same topic, have a stronger relationship or often appear together in scientific publications, and have a more related relationship when compared to the relationship between The University of Sydney School (green cluster) and the University of Utah of Medicine (purple cluster). The red cluster is the cluster with the highest number of collaborative institutions compared to other clusters. Furthermore, the brighter the cluster, the more recently the institutions has published their work. The Department of Family and Community includes institutions with recent work in the yellow cluster.

Table 3. The top 10 Collaborative institutions of countries in the policies and strategies for prevent and control non-communicable disease

Rank	Institution	Documents	Total Link Strenght
1	Endocrinology and Metabolism Research Institute (Tums), Tehran, Iran	10	28
2	Non-Communicable Diseases Research Center, Tehran, Iran	10	25
3	Organisation Mondiale De La Santé, Geneva, Switzerland	10	15
4	University College London, London, United Kingdom	9	40
5	The University of Sydney School Of Public Health, Sydney, Australia	8	26
6	UNSW Sydney, Sydney, Australia	7	22
7	George Institute for Global Health, Sydney, Australia	6	19
8	Istituto Superiore Di Sanita, Rome, Italy	6	6
9	University of Oxford Medical Sciences Division, Oxford, United Kingdom	6	15
10	Chinese Center for Disease Control and Prevention, Beijing, China	5	5

Table 3 shows that the Endocrinology and Metabolism Research Institute, Tehran, Iran, is the organization that has published the most documents, namely 10 documents. This condition can also be seen from Figure 3, where the Endocrinology and Metabolism Research Institute, Tehran, Iran has a larger item size than the other items. Table 3 also shows that the organization with the highest total link strength among the 10 organizations with the highest number of documents is University College London, London, United Kingdom. This condition indicates that the Endocrinology and Metabolism Research Institute, Tehran, Iran is the most productive organization, but University College London, London, United Kingdom is the most collaborative organization in related publications.

There are 10 top institutions that publish the most documents namely Endocrinology and Metabolism Research Institute, Non-Communicable Diseases Research Center, Organisation Mondiale De La Santé, University College London, The University of Sydney School of Public Health, Unsw Sydney, George Institute for Global Health, Istituto Superiore Di Sanita, University of Oxford Medical Sciences Division, and Chinese Center for Disease Control and Prevention (Table 3).

Endocrinology and Metabolism Research Institute (Tums), Tehran, Iran is the organization that has published the most documents. Non-communicable diseases (NCDs) in Iran are driving up healthcare costs and contributing to declining productivity. This study examined the return on investment (ROI) for implementing NCD prevention programs in Iran across four disease groups, including cardiovascular disease, diabetes, cancer, and respiratory disease. The highest return on investment (ROI) was observed for implementing physical activity policies, salt or tobacco reduction, and clinical interventions. The results indicate that investments in NCD prevention in Iran have a significant economic impact (Yousefi et al., 2022). In addition, the study aimed to investigate trends and project the main risk factors for Non-Communicable Diseases (NCDs) in Iran showed that the prevalence of risk factors for obesity, hypertension, and diabetes is increasing in Iran (Farzadfar et al., 2024). This situation indicates a significant national need due to the burden of NCDs, thus encouraging research into disease prevention and control policies or strategies.

The organization with the highest total link strength is University College London, London, United Kingdom. This situation demonstrates that University College London, London, United Kingdom have a high level of collaboration. Developed countries like the United Kingdom have numerous researchers and authors across all disease fields (Fitipaldi & Franks, 2023). Furthermore, there are many professional scientific research institutions in developed countries. This allows for the provision of extensive disease data to other institutions prompting many institutions to collaborate in this area (W. Yang et al., 2020).

In addition, the United Kingdom facilitates collaborative global research centers with institutions in developing countries. The Global NIHR, a partnership led by Imperial College London and The George Institute India, is working to address the dual challenges of the rapidly increasing burden of non-communicable diseases (NCDs) and global environmental change in low and middle-income countries. Low and middle-income countries face challenges in providing equitable and high-quality primary care services for the prevention and treatment of NCDs such as diabetes, kidney disease, hypertension, cardiovascular disease, and mental health. These efforts are carried out in populations affected by environmental risks and exposures, including air pollution, flooding, and heat waves. Furthermore, the center's efforts focus on populations in Bangladesh, India, and Indonesia, as these countries are most vulnerable to the impacts of climate change and its impact on health (The George Institute for Global Health, 2022). The Global Diet and Activity Research Network (GDAR) is a global partnership network led by the United Kingdom. We describe this network as working with parties committed to controlling upstream determinants of non-communicable diseases (NCDs), such as healthy diets and physical activity, in low and middle-income countries. This international partnership was established to strengthen capacity and exchange research and policies. It also aims to assess the relevance of policy practices across various sectors (Oni et al., 2020).

3.4 Sources co-citation analysis

Sources of co-citation analysis used to describe the relationships between documents that frequently cited together in academic literature. Co-citation analysis sources were used to describe the relationships between documents frequently cited together in academic literature. A total of 190 of the 670 sources were filtered and then analyzed, showing the existence of a collaborative network between sources in publications. Sources that have collaborative relationships in publications are distinguished by the color of the cluster. There are 29 clusters in Fig. 7 which illustrate the relationship between sources. Those in the same cluster (same color) mean they have the same topic, thicker connecting lines indicate a stronger relationship, and the distance between items indicates the closeness of the relationship (closer items indicate that the items have a more related topic). For example, Fig. 8 is an image of a specific collaborative country network showing the relationship between The Lancet (light brown cluster) and the European Heart Journal (light brown cluster) which have the same topic, have a stronger relationship or often appear together in scientific publications, and have a more related relationship when compared to the relationship between The Lancet (light brown cluster) and the Journal of Dental Research (purple cluster). The red cluster represents the cluster with the highest number of sources compared to other clusters.

Table 4 shows that The Lancet is the most cited journal, with 122 citations. This condition can also be seen in Figure 4, where The Lancet has a larger item size than the other items. Table 4 also shows that The Lancet is the journal with the highest total link strength among the other 10 journals, with 140. This condition indicates that The Lancet is the source that produces the most publications and is the most frequently used source.

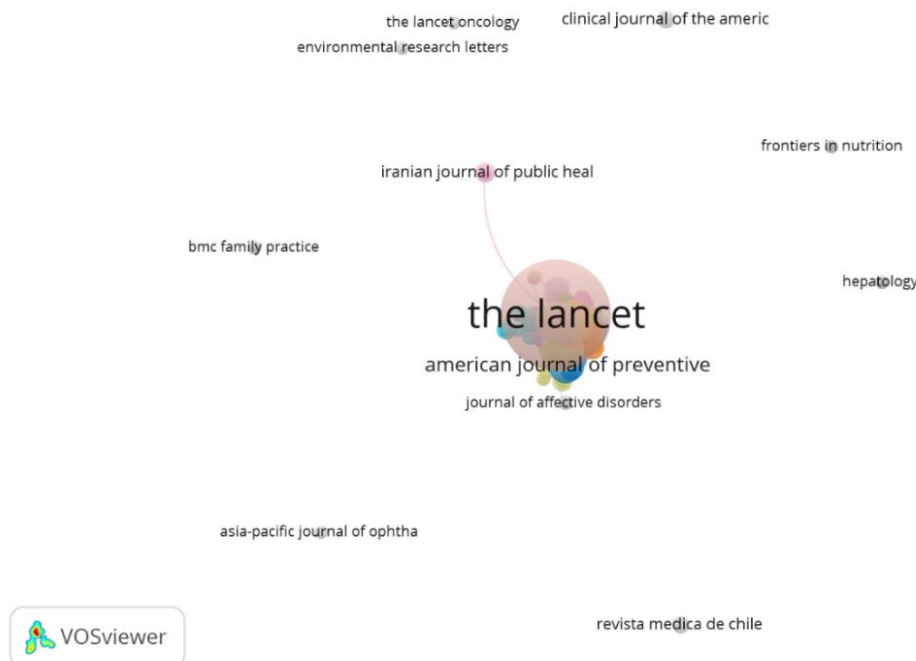


Fig. 7. Sources of co-citation in the policies and strategies for prevent and control non-communicable disease

The top 10 most cited sources namely The Lancet, BMC Public Health, JAMA, New England of Medicine, BMJ, Plos One, American Journal of Preventive Medicine, BMJ Open, Journal of The American College of Cardiology, and Diabetes Research and Clinical Practice (Table 4). The Lancet is the source with the highest number of citations. The lancet also the highest total link strength (frequency of co-occurrence) of connections with other sources. Most of the sources cited are from the United Kingdom and the United States. According to

Yang et al. (2020), If a country's journal has a large number of publications, then that country's journal is still worthy of recognition. Authors or researchers can study publications and publish scientific works with the help of these journals. The Lancet is the source with the highest number of citations. The lancet also the highest total link strength (frequency of co-occurrence) of connections with other sources. An articles published in The Lancet on policies and strategies for the prevention and control of non-communicable diseases (NCDs) is NCD Countdown 2030: efficient pathways and strategic investments to accelerate progress towards Sustainable Development Goal 3.4 in low and middle income countries (The Lancet, 2022). Another articles also published in The Lancet on policies and strategies for the prevention and control of non-communicable diseases (NCDs) is non-communicable diseases: can research implementation change the game of policy and practice (The Lancet, 2024).

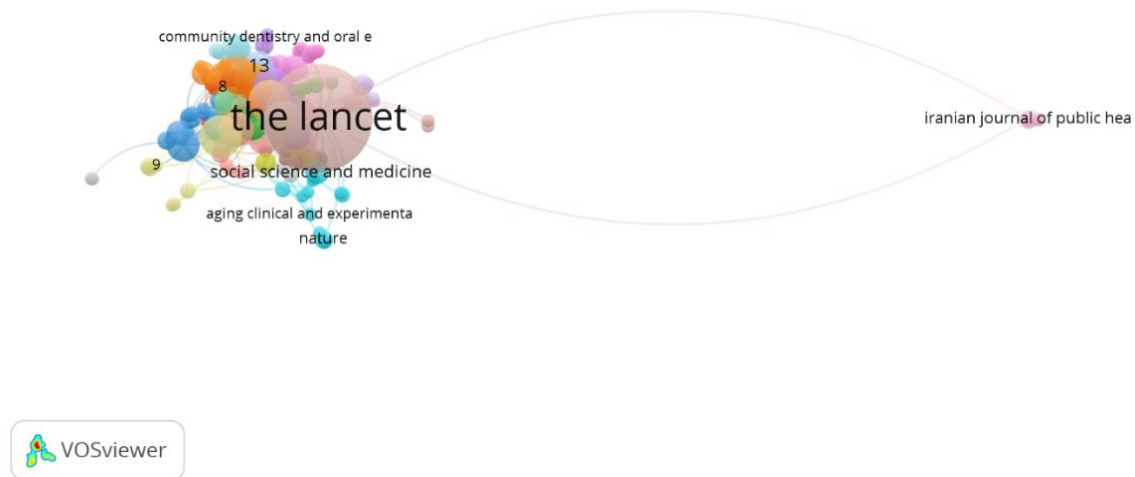


Fig. 8. Sources of co-citation in the policies and strategies for prevent and control non-communicable disease specifically (only interrelated clusters)

Table 4. The top 10 Sources of co-citation in the policies and strategies for prevent and control non-communicable disease

Rank	Source	Citation	Total Link Strenght
1	The Lancet	122	140
2	BMC Public Health	20	33
3	JAMA	19	36
4	New England Journal of Medicine	19	32
5	BMJ	16	31
6	Plos One	15	26
7	American Journal of Preventive Medicine	12	29
8	BMJ Open	12	24
9	Journal of The American College of Cardiology	11	22
10	Diabetes Research and Clinical Practice	10	13

The Lancet receives numerous citations related to policies and strategies for the prevention and control of non-communicable diseases. This demonstrates that publications within The Lancet network provide global data that can drive policy pressure.

3.5 Keywords co-occurrence analysis

A total of 101 of the 4.412 keywords were filtered (the minimum number of keyword occurrences is 20), then analyzed, showing the existence of a collaborative network between keywords in the publication of policies and strategies for the prevention and control of non-communicable diseases. Keywords that have a collaborative relationship in the publication are distinguished by the color of the cluster. There are 4 clusters in Fig. 9 that illustrate the relationship between keywords. Keywords in one cluster (the same color) mean they have

the same topic, thicker connecting lines indicate a stronger relationship, and the distance between items means the closeness of the relationship (closer items indicate that the items have a more related topic). For example, Fig. 9 shows a specific collaborative keyword network showing the relationship between the keywords “non-communicable disease” (red cluster) and “prevention and control” (red cluster) which have the same topic, have a stronger relationship or often appear together in scientific publications, and have a more related relationship when compared to the relationship between the keywords “non-communicable disease” (red cluster) and “smoking” (green cluster). The red cluster is the cluster with the most collaborative keywords when compared to other clusters. Fig. 10 shows that the brighter the cluster, the newer the keyword. Prevention and control is included in the yellow cluster and is the newest keyword.

Table 5 shows that the keyword that appears most frequently in publications about policies and strategies for preventing and controlling non-communicable diseases is “non-communicable disease” with 277. This condition can also be seen in Fig. 9 and Fig. 10 which show that the keyword item “non-communicable disease” has the largest size among other keyword items.

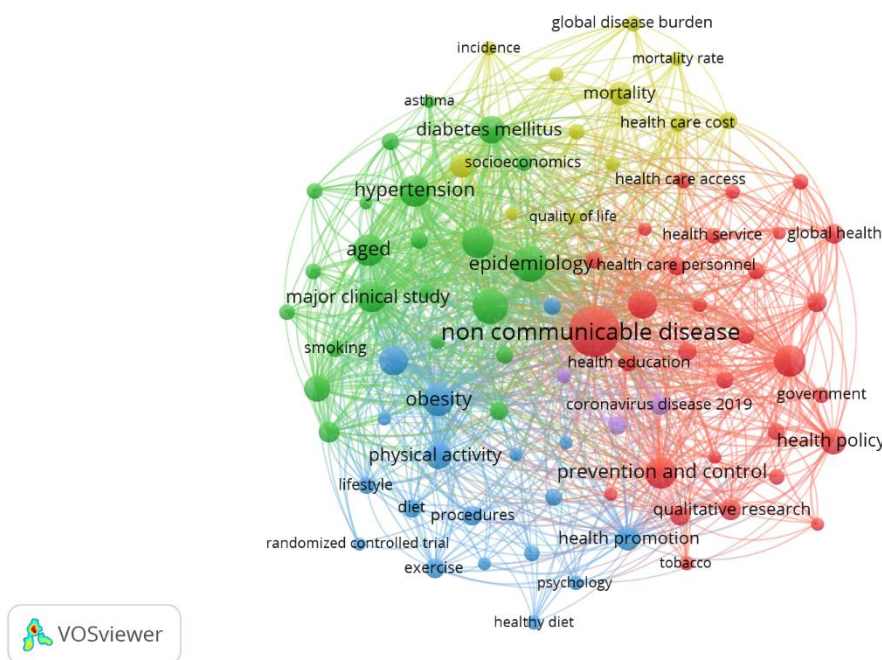


Fig. 9. Keywords of co-occurrence in the policies and strategies for prevent and control non-communicable disease

Keywords play a crucial role in a publication. They refer to words that represent research focus or purpose, theoretical background of a scientific work, and methods. Keywords are useful for providing valuable information for researchers searching for articles related to a particular field or conducting surveys on a specific topic. Keywords can also improve the appeal and indexing of a publication (Corrin et al., 2022; Pottier et al., 2024). Keywords that appear in the same document at the same time are called keyword co-occurrence (Narong & Hallinger, 2023). Analyzing keyword co-occurrence can identify research trends. Detecting research trends can support decision-making in quickly identifying and analyzing research topics (Gupta, 2023; Lu et al., 2021).

There are 20 top keywords founded namely non communicable disease, epidemiology, risk factor, hypertension, prevention and control, aged, prevalence, health care policy, obesity, major clinical study, controlled study, public health, diabetes mellitus, cross-sectional study, physical activity, health policy, health promotion, cardiovascular disease, mortality, and qualitative research (Table 5).

In addition, the keyword "risk factors" is closely related to several other keywords, including epidemiology, socioeconomics, smoking, alcohol consumption, blood pressure, body mass, aged, cross-sectional study, and major clinical study. One of the studies related to health behavior and socioeconomic factors that are risk factors for NCDs was conducted by Sakaria & Indongo (2025). The global burden of disease is shifting from infectious diseases to non-communicable diseases (NCDs). NCDs are becoming a trend in developing countries. This study analyzed risk factors for NCDs in people aged 30 years and older in selected urban areas in Namibia. Age and education level were found to be risk factors for NCDs. Additionally, taking medication, regular check-ups, and maintaining a healthy diet were also risk factors for NCDs.

As the number of contributing factors increases, the threat of NCDs also increases. Policy priorities and funding allocations need to be aligned more effectively and efficiently to address this threat (Jailobaeva et al., 2021). Using research findings as a basis for policy-making is an important effort because it has an impact on improving health (Erismann et al., 2021).

3.6 References co-citation analysis

A total of 30 of the 4.397 citations were filtered (the minimum number of citations from a cited reference is 5). Analysis revealed a collaborative network between citations in the publications. This analysis identifies documents frequently cited by other documents.



Fig. 11. References of co-citation in the policies and strategies for prevent and control non-communicable disease

Seven clusters are shown in Fig. 11, depicting the relationships between frequently cited documents. Each cluster is distinguished by color: red, blue, and green. Items within a cluster (the same color) share the same research topic. For example, in Fig. 12, Abbafati, Afshin, and Cohen are all in the same cluster (the same color). Closer items indicate a more related topic than items with greater distances.

Table 6 shows that the most cited document among the ten most cited documents is Abbafati in 2020. This is also evident in Fig. 11 and Fig. 12 which shows the largest item image compared to other items is Abbafati 2020. The global agenda emphasizes non-communicable diseases and injuries. The GBD is used to estimate the incidence, prevalence, mortality, years of life lost (YLL), years lived with disability (YLD), and disability-adjusted life years (DALY) due to 369 diseases and injuries in 204 countries and territories. The results show that disability is a component of the increasing burden of disease. Disability is also a component of increasing healthcare expenditure. Therefore, greater investment in research and development is needed to identify new, more effective intervention strategies. As the global population grows, there is a growing demand for healthcare services to address the impact of disability. This situation requires policymakers to anticipate the

impact. Reporting on the various factors that contribute to disease can provide a basis for assisting policymakers in more effective disease control (Abbafati, 2020).

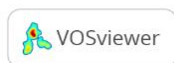
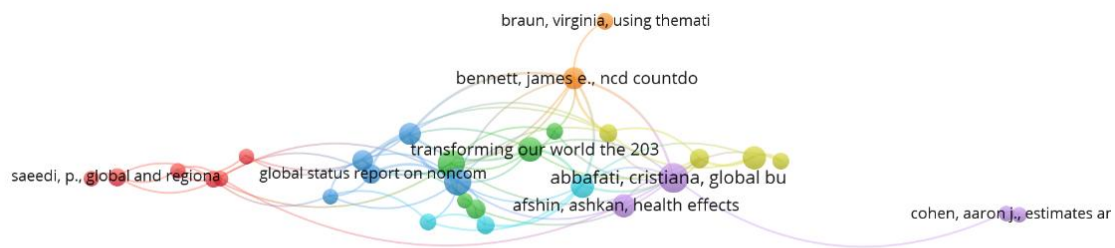


Fig. 12. References of co-citation in the policies and strategies for prevent and control non-communicable disease specifically (only interrelated clusters)

It is important to conduct co-citation analysis to find development trends and specific research opportunities (Ritchie et al., 2008). Abbifati's research, published in 2020, made a significant contribution to research on policies and strategies for preventing and controlling non-communicable diseases. In addition, based on table 6, there are several other publications including with core writer Murray (2020), Afshin (2019), Budreviciute et al. (2020), Bennett (2018), and Roth (2018) which also contribute to research on policies and strategies for preventing and controlling non-communicable diseases. Most of the reference citations used are scientific articles. This condition may be due to the fact that scientific articles are more formal than other types, so it is not surprising that developed countries give more consideration to scientific articles (Phoobane et al., 2022). Based on this, these articles have contributed greatly to related research so that they can encourage more effective policies and strategies.

Table 6. The top 10 References of co-citation in the policies and strategies for prevent and control non-communicable disease

Rank	Cited References	Citation	Total Link Strenght
1	Abbafati, cristiana, global burden of 369 diseases and injuries in 204 countries and territories, 1990–2019: a systematic analysis for the global burden of disease study 2019, the lancet, 396, 10258, pp. 1204-1222, (2020)	17	6
2	Global action plan for the prevention and control of noncommunicable diseases 2013-2020, (2013)	15	9
3	Murray, C. J., Aravkin, A. Y., Zheng, P., Abbafati, C., Abbas, K. M., Abbasi-Kangevari, M., ... & Borzouei, S. (2020). Global burden of 87 risk factors in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019. <i>The lancet</i> , 396(10258), 1223-1249.	14	4
4	Transforming our world the 2030 agenda for sustainable development, (2015)	12	8
5	Afshin, ashkan, health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the global burden of disease study 2017, the lancet, 393, 10184, pp. 1958-1972, (2019)	11	2
6	Budreviciute, aida, management and prevention strategies for non-communicable diseases (ncds) and their risk factors, <i>frontiers in public health</i> , 8, (2020)	11	1

7	Ncd countdown 2030: pathways to achieving sustainable development goal target 3.4, the lancet, 396, 10255, pp. 918-934, (2020)	11	7
8	Bennett, james e., ncd countdown 2030: worldwide trends in non-communicable disease mortality and progress towards sustainable development goal target 3.4, the lancet, 392, 10152, pp. 1072-1088, (2018)	10	8
9	Noncommunicable diseases country profiles 2014, (2014)	10	8
10	Roth, gregory a., global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries and territories, 1980–2017: a systematic analysis for the global burden of disease study 2017, the lancet, 392, 10159, pp. 1736-1788, (2018)	9	3

3.7 Future research direction

Based on the results of the bibliometric analysis, several directions for future research can be identified. First, there is a need to increase both the quantity and quality of research, as well as strengthen academic collaboration in the field of non-communicable disease (NCD) prevention and control policies and strategies. This opportunity is supported by the growing number of publications in reputable journals in recent years. In addition, international collaboration among authors, institutions, and countries is considered important to enhance research productivity and broaden the exchange of knowledge and experiences.

Future studies should also focus more on the implementation and evaluation of NCD prevention and control policies in developing countries. Previous studies have predominantly concentrated on developed countries such as the United States and the United Kingdom, leaving a research gap in developing contexts such as Indonesia, India, Kenya, and other low- and middle-income countries. Comparative cross-country studies may help identify key success factors and barriers in policy implementation and effectiveness.

Another important research direction involves the integration of digital technology into NCD prevention and control strategies. Future research may develop digital surveillance models and integrated data systems that support reporting, monitoring, and evidence-based decision-making related to NCD policies. Technology-based approaches remain relatively underexplored in the existing literature and therefore provide substantial opportunities for innovation and policy improvement.

In addition, future research can focus on developing local risk factor-based strategies for NCD prevention and control. Such studies may involve the construction of population-based risk prediction models that incorporate socioeconomic, behavioral, and environmental determinants. The findings are expected to contribute to the development of more effective and context-specific evidence-based policies at the local level.

Lastly, future studies should examine the impact of NCD prevention and control policies on health and economic inequality. The burden of NCDs is closely associated with social and economic disparities; therefore, understanding how prevention and control strategies affect health equity and the economic burden experienced by communities is essential for developing more inclusive and equitable public health policies.

This study is strengthened by its use of up-to-date (2023–2025) Scopus data and comprehensive visualization of co-authorship, institutional, national, and thematic networks in NCDs policy and strategy research. However, it is limited by the exclusive use of a single database (Scopus) and English-language publications, which may omit relevant evidence from other databases and non-English literature. However, it is limited by the exclusive use of a single database (Scopus) and English-language publications, which may omit relevant evidence from other databases and non-English literature.

4. Conclusions

Global research on NCDs prevention and control policies and strategies has expanded and is driven mainly by authors, institutions, and countries in high-income settings. The identified collaboration networks, key sources, and thematic clusters highlight strategic actors and evidence hubs that can inform policy dialogue. To strengthen global progress SDGs, future research should focus on implementation and evaluation of NCDs policies in low- and middle-income countries, leverage digital health innovations, develop locally tailored risk-based strategies, and systematically examine the equity and economic impacts of NCDs-related policies.

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Declaration of Generative AI Use

During the writing of this work, the author used Mendeley to assist with citations and bibliography. The author also used Dimension AI to collect data for analysis in VOSviewer.

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