

FACTORS AFFECTING HEALTH SERVICE UTILIZATION FOR CHRONIC CONDITIONS: A BIBLIOMETRIC REVIEW OF PRIMARY HEALTH CARE

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ABSTRACT

Non-communicable diseases (NCDs) such as heart disease, diabetes and cancer are significant global health challenges, particularly in developing countries. Understanding healthcare utilization for NCDs is critical to improving healthcare outcomes and patient quality of life. This study aims to analyze trends and identify research gaps in healthcare utilization for NCDs through bibliometric analysis. With this approach, this study seeks to provide a comprehensive overview of research developments in this field and identify areas that require further attention. This study used bibliometric analysis with the Publish or Perish app and a Google Scholar search using the keywords "factors," "influences," "health service utilization," "non-communicable diseases," and "basic health services." From the search results, the top 50 journals from 2017 to 2024 were selected for analysis. The data were classified by year of publication, journal type, number of citations, and researcher country, and analyzed using VOSviewer to identify research patterns and gaps. The analysis showed that research was concentrated in highly ranked journals and developed countries, with key terms such as "non-communicable disease," "factor," "use," and "health." This research identifies gaps in implementation policies, innovative approaches, and healthcare utilization factors that are not yet fully understood. Understanding research trends and gaps can guide future research and policy development efforts to improve the effectiveness of interventions and policies in the management of NCDs globally.

Keywords: Non-Communicable Diseases (NCDs), Health Service Utilization, Primary Health Care, Health Influencing Factors

INTRODUCTION

In recent decades, the world has witnessed a significant increase in the prevalence of non-communicable diseases (NCDs) such as coronary heart disease, diabetes and cancer, which are now the leading causes of death in many countries. NCDs, which are often associated with risk factors such as unhealthy diets, physical inactivity and poor living habits, pose a heavy health burden and a major

challenge to health systems. In this context, primary healthcare plays an important role as the frontline in the prevention, early detection and management of health conditions. Primary healthcare not only serves to provide affordable and accessible care, but also plays a key role in reducing the impact of NCDs and improving overall public health.

The current pattern of disease occurrence has undergone changes characterized by an epidemiological transition. Changes in disease patterns that were originally dominated by infectious or contagious diseases have shifted to non-communicable diseases (NCDs) (WHO, 2014). In 2016, 71% of the causes of death in the world were non-communicable diseases which statistically killed 36 million people per year. About 80% of these deaths occur in countries middle and low income. WHO data shows that 73% of deaths are caused by non-communicable diseases, 5% of which are due to heart and vascular diseases, 12% by cancer, 6% by chronic respiratory diseases, 6% by diabetes, and 15% by other non-communicable diseases (WHO, 2018).

The shift from communicable diseases to non-communicable diseases signifies new challenges in Indonesia's health system. The importance of prioritizing efforts to prevent and control non-communicable diseases is increasing, while still paying attention to and addressing infectious health problems (Astriani et al, 2021). This emphasizes the importance of a comprehensive and sustainable approach in maintaining the health of the Indonesian people. WHO's annual report on the status of non-communicable diseases worldwide provides comprehensive insight into the prevalence, risk factors, and prevention efforts of non-communicable diseases, including in Indonesia. (WHO, 2018). Non-communicable diseases are the leading cause of premature death globally. The stated number of 41 million people dying each year from NCDs highlights the importance of awareness of NCD risk factors and the need for more effective prevention efforts (WHO, 2020).

Health care is a concept used in the provision of health services to the community, whose main objectives are preventive (prevention) and promotional (invitation to improve health) services, aimed at the general public from various backgrounds, as well as initiatives that are carried out alone or alone in an

organization. Maintaining and improving health, preventing and curing disease, and restoring the health of individuals, families and communities (Tahir, 2017). Primary healthcare plays a key role in the health system by providing affordable and accessible services, and serving as the first line of prevention, early detection and management of health conditions. With a focus on prevention and health management, primary healthcare services can help reduce the impact of NCDs and improve overall public health. However, utilization rates of these services are influenced by a complex range of factors, from individual knowledge and attitudes to health system policies and infrastructure.

Bibliometric research offers a systematic method to evaluate trends and patterns in the existing literature, and to identify strengths and weaknesses in existing research. Through bibliometric analysis, we can uncover publication patterns, leading authors, and the development of major themes in research on factors influencing primary healthcare utilization for NCDs.

OVERVIEW

Health services are efforts organized both individuals and groups in an institution in order to maintain and improve health, prevent and cure diseases, and restore health (Savira & Subadi, 2023). This service aims to cure diseases and restore individual and family health. This effort is carried out at health care institutions. Meanwhile, public health services are health services organized by groups and communities that aim to maintain and improve health, which refers to promotive and preventive actions (Hariyoko et al., 2021).

Based on Anderson's theory in (Rini, 2015), health service utilization is influenced by predisposing factors, supporting factors, and individual needs for health services. There are also factors that are included in the predisposing component, namely as follows:

1. Demographic factors (age, gender and marital status), social structure (education level, occupation and race), beliefs (beliefs, attitudes or views about health services and information).
2. Supporting factors, family resources (income, insurance coverage), service quality and distance.
3. Demand factors are price, facilities, employee service, location,
4. speed of service and transportation.

There are factors that can influence a person to utilize health services according to Lawrence Green in Notoatmodjo (2012) consisting of predisposing factors (knowledge, attitudes, beliefs, values, traditions, and so on); enabling factors (availability of facilities and infrastructure / health facilities for the community); reinforcing factors (attitudes and behavior of health workers). Anderson identified factors that have the potential to influence a person in utilizing health services into 3 main categories, namely predisposing characteristics consisting of gender, age, education level, occupation, beliefs/culture; ability characteristics consisting of economic status, health insurance, health service facilities, availability of health workers, waiting time for services, affordability of services; need characteristics consisting of individual assessment and clinical assessment of a disease (Notoatmodjo, 2014).

Non-communicable diseases are the leading cause of death and physical disability suffered by the people of Indonesia and the world. According to the World Health Organization (WHO), deaths from non-communicable diseases (NCDs) are expected to continue to rise worldwide, with the largest increase occurring in middle-income and poor countries. More than two-thirds (70%) of the global population will die from non-communicable diseases such as cancer, heart disease, stroke and diabetes. Globally, regionally and nationally by 2030 the epidemiologic transition from communicable diseases to non-

communicable diseases is becoming clearer. It is projected that the number of morbidity due to non-communicable diseases and accidents will increase and communicable diseases will decrease. NCDs such as cancer, heart disease, DM and chronic obstructive pulmonary disease, as well as other chronic diseases will experience a significant increase in 2030 Ministry of Health, 2012).

As part of the 2030 Agenda for Sustainable Development (UN, 2015), governments have committed to developing national responses to reduce premature deaths from NCDs by a third by 2030 through better management of NCDs (SDG target 3.4). Progress towards this goal has been slow, especially in contexts affected by vulnerability (Atun, 2013). Vulnerability is a multidimensional concept that encompasses political, economic, security, environmental and societal risks, and the lack of coping capacity of states, systems or communities to manage, absorb or mitigate these risks (OECD, 2020).

In fragile contexts, public institutions often lack the ability, willingness and/or resources to address vulnerability triggers (e.g., economic crises, civil unrest, armed conflicts, disease outbreaks), which tend to manifest dynamically over time, destabilizing the environment and society (OECD, 2018). Fragility, therefore, makes populations vulnerable to various threats, e.g. poverty, insecurity, health and economic inequalities (OECD, 2020).

The experience of these threats often leads to a decline in legitimizing interactions and erosion of trust between residents and public institutions, including health systems, with implications for health-seeking efforts and individuals' ability to maintain their health and well-being (Diaconu et al., 2020).

Riskesdas data in 2018 showed that 95.5% of Indonesians did not consume enough vegetables and fruits. Then 33.5% of people lack physical activity, 29.3% of people of productive age smoke every day, 31% have central obesity and 21.8% have

adult obesity (Kemenkes RI, 2019c). Various "evidence based" states that the leverage to reduce premature mortality due to non-communicable diseases is focused on 4 preventable shared risk factors, namely tobacco / cigarette use, unhealthy diet (nutritionally unbalanced diet, lack of consumption of vegetables and fruit and high consumption of sugar, salt and fat), lack of physical activity (physical inactivity), alcohol abuse (harmful use of alcohol) and other physiological risk factors namely high blood pressure, high blood sugar and obesity which play a key role to be found and controlled (Directorate of P2PTM, 2015).

The significant increase in NCD cases is expected to increase the burden on society and the government because its handling is costly and requires high technology. This can be seen from the data of the Health Social Security Organizing Agency (BPJS) in 2017, where as many as 10,801,787 million people or 5.7% of JKN participants received services for catastrophic diseases and spent health costs of 14.6 trillion rupiah or 21.8% of all health service costs with the composition of heart disease ranking 50.9% or 7.4 trillion, chronic kidney disease 17.7% or 2.6 trillion rupiah (Kemenkes RI, 2019).

The increasing trend of non-communicable diseases is followed by a shift in disease patterns from the elderly, which now threatens the productive age group. This threat has a major impact on Indonesia's human resources and economy in the future. If the trend of non-communicable diseases among young people increases, then Indonesia's efforts to produce a healthy and intelligent next generation towards an advanced Indonesia in 2045 will be difficult to achieve. Therefore, early detection is important, with a minimum of 6 months to 1 year screening. In addition, early detection must be done proactively by visiting the target (Tirtasari & Kodim, 2019).

Non-communicable diseases have become a difficult group of diseases to define. The term non-communicable

diseases is an irony because some of the diseases included such as cervical cancer, stomach cancer, and liver cancer are partly caused by infectious organisms. However, four behaviors such as tobacco use, alcohol consumption, poor diet, and physical inactivity are risk factors and are closely associated with the four major non-communicable diseases (cardiovascular disease, cancer, chronic respiratory disease, and diabetes) that account for 80% of deaths from the non-communicable disease group (Sudayasa IP, 2020). The increase in non-communicable diseases is in line with the increase in risk factors. This disease trend is followed by a shift in disease patterns, which starts with the dominance of infectious diseases and ends with the dominance of non-communicable diseases (Kalsum et al, 2019).

RESEARCH METHODOLOGY

The research method used in this study is a bibliometric method that aims to analyze the factors that influence health service utilization for chronic conditions in the context of primary health care. Research data was collected using the Publish or Perish application with the keywords "Factors", "Influences", "Health Service Utilization", "Non-Communicable Diseases", and "Basic Health Services" on the Google Scholar database. The search was conducted for publications published between 2017 and 2024. From the results of this search, 50 journals with the highest rankings based on the number of citations were selected.

After data collection, the journals were classified based on several criteria. First, the distribution of journals by year of publication was analyzed to see the publication trend during the study period. Second, the journals were classified based on the type of journal, such as health journals, public health journals, and health-related social science journals. Third, the number of citations for each journal was counted and analyzed to determine the influence

and relevance of the research in the field. Fourth, the country of origin of the researchers was identified to see the geographical distribution of relevant research.

Furthermore, the classified data was analyzed using the VOSviewer application. This application is used to visualize and analyze the network of interrelationships between studies based on keywords and terms that often appear. In this analysis, the parameters used were the occurrence of keywords at least three times and at least 18 relevant terms. The analysis with VOSviewer helped in identifying linkages between various factors affecting health service utilization for chronic conditions.

The results of this analysis are then used to identify under-researched research gaps. VOSviewer's term map visualization shows how relevant terms and concepts are interconnected, providing a comprehensive overview of related research trends. From this analysis, areas that still require further research were found, which can form the basis for future studies. This method

is expected to provide a deep insight into the factors that influence healthcare utilization for chronic conditions as well as identify opportunities for further research.

RESULTS RESEARCH

Publication Trends by Year

Based on available data, the trend of journal publications on healthcare utilization for chronic conditions in the context of primary healthcare shows significant fluctuations from 2017 to 2024. In 2017, the number of publications recorded was 4, which is relatively low. This may be due to the fact that this topic had not received significant attention from researchers at that time. However, in 2018, the number of publications doubled to 8 and remained stable at the same number in 2019. This increase reflects the growing interest in the issue of healthcare utilization for chronic conditions.

Table 1. Number Of Documents Published By Year Of Publication

Years	Total
2017	4
2018	8
2019	8
2020	15
2021	5
2022	8
2023	2
2024	0
	50



Figure 1. Related Publication Trends from Google Scholar databases using PoP application

The year 2020 saw the highest number of publications with 15, likely due to increased awareness and urgency towards chronic condition management during the COVID-19 pandemic. After the peak in 2020, the number of publications decreased to 5 in 2021, possibly due to a shift in research focus or changes in funding priorities. In 2022, the number of publications increased again to 8, indicating continued interest in the topic. However, in 2023, the number of publications dropped dramatically to just 2, possibly reflecting research challenges or a focus on other more pressing topics. Interestingly, no publications were recorded for 2024, possibly due to incomplete data or changes in policy and research priorities.

This analysis of publication trends also revealed some research gaps that deserve further attention. First, while many of the studies are from developed countries, there is a gap in research examining

healthcare utilization for chronic conditions in developing countries. Different socio-economic contexts may influence healthcare utilization, so further research is needed to understand these dynamics in different regions. Second, despite a surge in publications in 2020, long-term research on how the COVID-19 pandemic changed healthcare utilization for chronic conditions is lacking. More in-depth studies on the long-term impact of the pandemic on chronic disease management are urgently needed.

By identifying these gaps, future research can be directed towards answering unanswered questions and making a more comprehensive contribution to the understanding of healthcare utilization for chronic conditions. This analysis provides insight into how attention to this issue has evolved and changed, and points to areas that require further research.

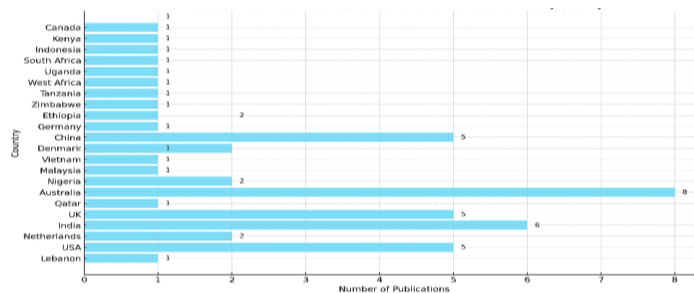


Figure 2. List of journal publishers by country

Publications By Country Of Publication

Based on the available data, the number of publications on healthcare utilization for chronic conditions in the context of primary healthcare is spread across different countries with different levels of activity. Australia recorded the highest number of publications with a total of 8 publications, indicating that research

on this topic is very active in Australia, likely due to strong support for health research and specific attention to chronic condition management.

India came in second place with a total of 6 publications. This reflects the high research activity in the country, perhaps influenced by the high burden of chronic diseases in India's large population and the need to develop effective solutions in the

primary healthcare system. The United States (USA), United Kingdom (UK), and China recorded 5 publications each. These three countries have advanced health research systems and supportive infrastructure, allowing researchers to focus on various aspects of chronic condition management in

primary healthcare. The Netherlands and Nigeria had 2 publications each. This number suggests there is interest, albeit smaller, in this topic in both countries. Research in these countries may focus on specific challenges faced in their local contexts.

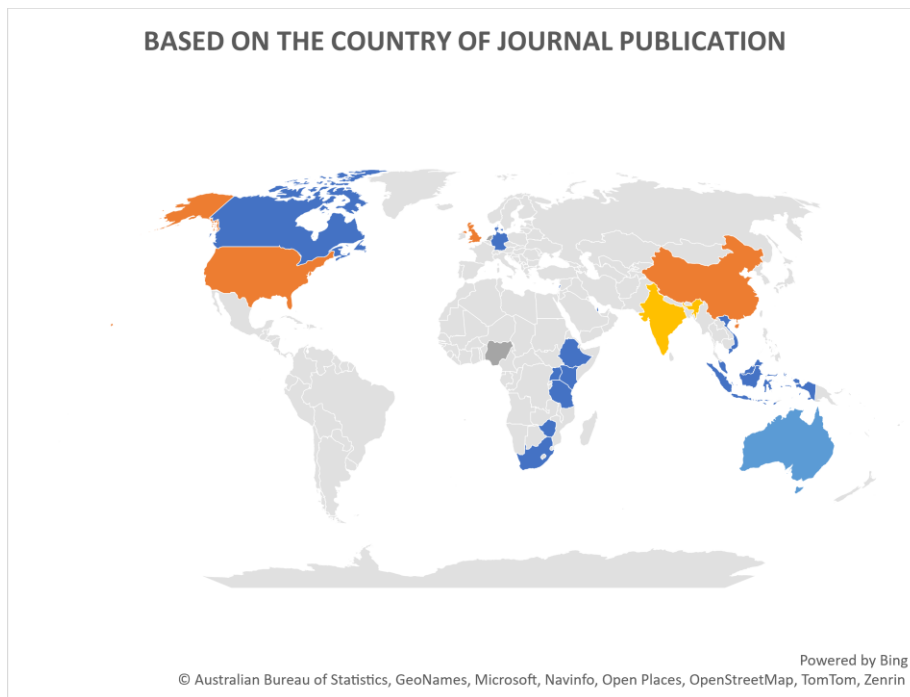


Figure 3. Distribution Of Countries That Publish Related Research

Most other countries, including Lebanon, Qatar, Malaysia, Vietnam, Denmark, Germany, Ethiopia, Zimbabwe, Tanzania, West Africa, Uganda, South Africa, Indonesia, Kenya, and Canada recorded 1 publication each. This number indicates a more limited contribution from these countries to the topic. Fewer publications could be due to various factors such as limited research resources, lack of focus on the topic, or challenges in accessing relevant data and research populations.

This analysis reveals several important research gaps that need further attention. First, in-depth research in developing countries is needed to understand the dynamics of healthcare utilization in different socio-

economic contexts, as much of the current research has focused on developed countries. Second, there is a lack of evaluation of the effectiveness of policy interventions to improve health service utilization for chronic conditions, making it difficult to determine the most effective policies. Third, the role of technology and innovation, such as telemedicine and digital health apps, in chronic condition management needs to be further explored to improve access and quality of care. Finally, a deeper understanding of patient behavior and effective health education strategies to change patient behavior are needed, as these factors strongly influence healthcare utilization.

By identifying these gaps, future research can be directed towards answering unanswered questions and

contributing more comprehensively to the understanding of healthcare utilization for chronic conditions.

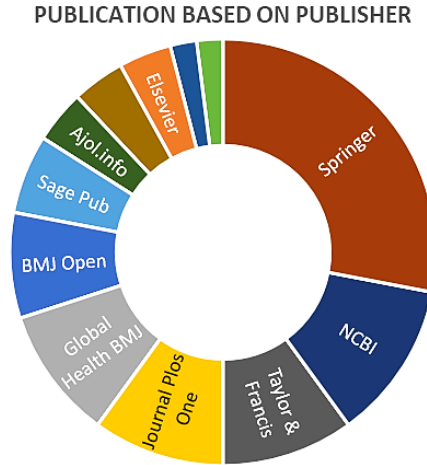


Figure 4. Distribution Of Publishers That Publish Related Research

Publication Based on publisher

Based on the available data, publications on healthcare utilization for chronic conditions are spread across different types of journals. Springer recorded the highest number of publications with a total of 14 publications, indicating that it is a major platform for researchers in this field. NCBI came in second with 6 publications, followed by BMJ Global Health and Plos One Journal with 5 publications each. BMJ Open and Taylor & Francis had 4 and 5 publications respectively, while Sage Pub recorded 3 publications. Elsevier, The Lancelot,

and Ajol.info had 2 publications each, while NPJ Digital and African Journal of Primary Health recorded 1 publication each.

This distribution suggests that most research is published in large, well-known journals. However, there are opportunities to increase the number of publications in journals that currently have low contributions. Increasing the diversity of journals that publish this research can help disseminate findings to a wider audience and improve the accessibility of research results.

Table 2. Publication Trends by Citation

No.	Author	Title	Citation	Type
1	Gursimer Jeet, JS Thakur, S Prinja, M Singh	Community health workers for non-communicable diseases prevention and control in developing countries: Evidence and implications	225	Research Article
2	N Akseer, S Mehta, J Wigle, R Chera, ZJ Brickman	Non-communicable diseases among adolescents: current status, determinants, interventions and policies	141	Research Article

3	M Haque, T Islam, NAA Rahman	Strengthening Primary Health-Care Services to Help Prevent and Control Long-Term (Chronic) Non-Communicable Diseases in Low- and Middle-Income Countries	96	Literature Review
4	F Shiferaw, M Letebo, A Misganaw, Y Feleke	Non-communicable Diseases in Ethiopia: Disease burden, gaps in health care delivery and strategic directions.	91	Research Article
5	MA Elias, MK Pati, P Aivalli, B Srinath	Preparedness for delivering non-communicable disease services in primary care: access to medicines for diabetes and hypertension in a district in south India	84	Research Article
6	M Kassa, J Grace	The Global Burden and Perspectives on Non-Communicable Diseases (NCDs) and the Prevention, Data Availability and Systems Approach of NCDs in Low-resource Countries	76	Books
7	L Brumana, A Arroyo, NR Schwalbe, S Le	Maternal and child health services and an integrated, life-cycle approach to the prevention of non-communicable diseases	68	Research Article
8	Mari Armstrong-Hough, Sandeep P. Kishore, Sarah Byakika, Gerald Mutungi,	Disparities in availability of essential medicines to treat non-communicable diseases in Uganda: A Poisson analysis using the Service Availability and Readiness Assessment	67	Research Article
9	K Jayanna, N Swaroop, A Kar, S Ramanaik	Designing a comprehensive Non-Communicable Diseases (NCD) program for hypertension and diabetes at primary health care level: evidence and experience from urban Karnataka, South India	65	Research Article
10	AG Tesema, WS Ajisegiri, S Abimbola, C Balane	How well are non-communicable disease services being integrated into primary health care in Africa: A review of progress against the World Health Organization's African regional targets	63	Research Article

Discussion of Publication Trends by Citation

Based on the available data, publications on healthcare utilization for chronic conditions have varying numbers of citations. The following is a detailed analysis of publication trends based on citations:

Highest Cited Publications:

- a. Gursimer Jeet, JS Thakur, S Prinja, M Singh with the title "Community health workers for non-communicable diseases prevention and control in developing countries: Evidence and implications" has the highest number of citations at 225. This shows that this article is very

influential and is often referred to in research related to the prevention and control of non-communicable diseases in developing countries.

- b. N Akseer, S Mehta, J Wigle, R Chera, ZJ Brickman with the title "Non-communicable diseases among adolescents: current status, determinants, interventions and policies" has 141 citations. This article highlights the importance of addressing non-communicable diseases among adolescents, who are a critical age group.
- c. M Haque, T Islam, NAA Rahman in the article "Strengthening Primary Health-Care Services to Help Prevent and Control Long-Term (Chronic) Non-Communicable Diseases in Low- and Middle-Income Countries" which has 96 citations. This article is a literature review that focuses on strengthening primary health care services to prevent and control chronic non-communicable diseases in low- and middle-income countries.

Medium-citation publications:

- a. F Shiferaw, M Letebo, A Misganaw, Y Feleke with the title "Non-communicable Diseases in Ethiopia: Disease burden, gaps in health care delivery and strategic directions" has 91 citations, showing significant relevance in the Ethiopian context.
- b. MA Elias, MK Pati, P Aivalli, B Srinath in the article "Preparedness for delivering non-communicable disease services in primary care: access to medicines for diabetes and hypertension in a district in south India" with 84 citations. This article discusses the preparedness of primary health care services in addressing non-communicable diseases in South India.
- c. M Kassa, J Grace with the book "The Global Burden and Perspectives on Non-Communicable Diseases (NCDs) and the Prevention, Data

Availability and Systems Approach of NCDs in Low-resource Countries" has 76 citations. The book provides a global perspective on the burden of non-communicable diseases and a systems approach to prevention in low-resource countries.

Low-Citation Publications:

- a. L Brumana, A Arroyo, NR Schwalbe, S Le with the article "Maternal and child health services and an integrated, life-cycle approach to the prevention of non-communicable diseases" has 68 citations, highlighting the life-cycle approach in the prevention of non-communicable diseases.
- b. Mari Armstrong-Hough, Sandeep P. Kishore, Sarah Byakika, Gerald Mutungi in the article "Disparities in availability of essential medicines to treat non-communicable diseases in Uganda: A Poisson analysis using the Service Availability and Readiness Assessment" has 67 citations, examining disparities in the availability of essential medicines in Uganda.
- c. K Jayanna, N Swaroop, A Kar, S Ramanaik with the article "Designing a comprehensive Non-Communicable Diseases (NCD) program for hypertension and diabetes at primary health care level: evidence and experience from urban Karnataka, South India" has 65 citations, focusing on the design of non-communicable disease programs at the primary health care level in India.

From this analysis, it can be concluded that articles with high citation counts usually offer significant contributions and are often referred to in further research. Medium- and low-citation publications remain important as they provide valuable insights in specific contexts. These citation trends demonstrate the importance of the topic of non-communicable disease prevention and control across different

geographic and socio-economic contexts, as well as the need to continue strengthening primary health care to

effectively address the burden of non-communicable diseases.

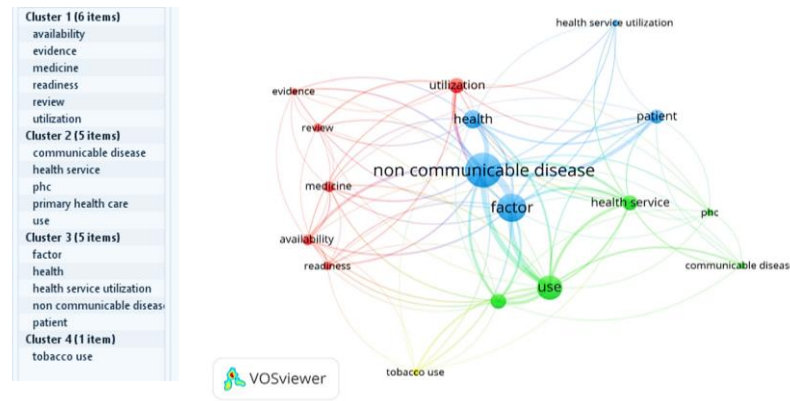


Figure 5. Network Visualization Overview Publications

Related Vos Viewer Network Visualization Publication Overview

The figure above shows a visualization of the publication network using VOSviewer, which maps the interrelationships between terms that frequently appear in research on health service utilization for non-communicable diseases (NCDs). Based on this visualization, several key clusters can be identified:

Cluster 1 (6 items):

- Keywords: *availability, evidence, medicine, readiness, review, utilization.*
- Description: This cluster is concerned with the availability and readiness of health services, as well as evidence and reviews that support health service utilization. These terms indicate a focus on the evaluation and availability of medical resources and system readiness in addressing NCDs.

Cluster 2 (5 items):

- Keywords: *communicable disease, health service, PHC, primary health care, use.*
- Description: This cluster is concerned with the use of health services for both communicable

and non-communicable diseases and the role of primary health care. These terms indicate the importance of primary healthcare in the management of NCDs.

Cluster 3 (5 items):

- Keywords: *factors, health, health service utilization, non communicable disease, patient.*
- Description: This cluster focuses on factors that influence healthcare utilization by patients with NCDs. These terms include general health factors, healthcare utilization, and the patient at the center of the study.

Cluster 4 (1 item):

- Keywords: *tobacco use.*
- Description: This cluster consists of only one item, tobacco use, which is a major risk factor in NCDs. This suggests a particular focus on the influence of tobacco use on health.

This network visualization shows how various concepts and terms related to NCDs are interconnected in the literature. These clusters indicate the dominant research areas and relationships between factors such as healthcare readiness, the role of primary healthcare, factors influencing

healthcare utilization, and tobacco use risk. By understanding these relationships, researchers can identify

under-explored research gaps and direct their research efforts towards areas that require further attention.

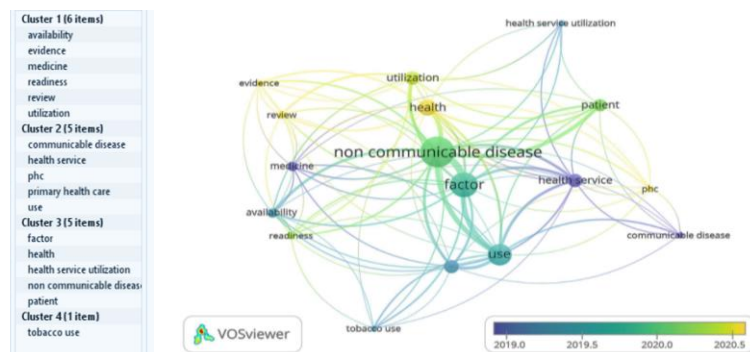


Figure 6. Overlay Visualization Overview Publications

VOSviewer Overlay Visualization Publication Overview

The figure above shows an overlay visualization of the publication network using VOSviewer, which illustrates the interrelationships between terms that frequently appear in research on health service utilization for non-communicable diseases (NCDs). The colors in this visualization show the temporal progression of the terms appearing in the research.

Color Interpretation:

- Blue to Green Colors: Terms that emerged early in the research period (around 2019).
- Yellow Color: Newer or more frequently used terms in current research (around 2020-2021).

Term Linkage:

- Non-communicable disease: This term is central to the network, indicating that much research focuses on NCDs.
- Factor: This term is also very important and is often associated with NCDs, indicating the various factors that influence these conditions.
- Health Service Utilization: This term indicates how health services are used in the context of NCDs, and is closely related to the terms "patient" and "health service".

- Use: Indicates a focus on the use of health services and medicines to manage NCDs.

Cluster Terms:

- Blue Cluster (2019): Includes terms such as "medicine", "availability", and "readiness", indicating an initial focus on medicine availability and health system readiness to address NCDs.
- Green Cluster (2019.5): Includes terms such as "use", "health service", and "primary health care", which describe attention to primary health care and its use.
- Yellow Cluster (2020-2021): Includes terms such as "health service utilization", "patient", and "health", indicating the current focus on patient utilization of health services and general health factors.

From this, it can be concluded that this overlay visualization shows the temporal progression of the focus of research related to NCDs. Initially, research focused more on drug availability and health system readiness, while more recent research has highlighted patient utilization of healthcare services and various health factors. By understanding these temporal trends, researchers can identify areas that are growing rapidly and direct their research efforts

towards areas that still require further attention.

Research Gaps:

- Policy Implementation in Different Geographical Contexts:** More research is needed on the effectiveness of interventions in different countries, especially in developing countries.
- Innovative Approaches:** Further exploration of innovative approaches in the prevention and management of NCDs.
- Healthcare Utilization:** Further research on factors that influence healthcare utilization by patients with NCDs.

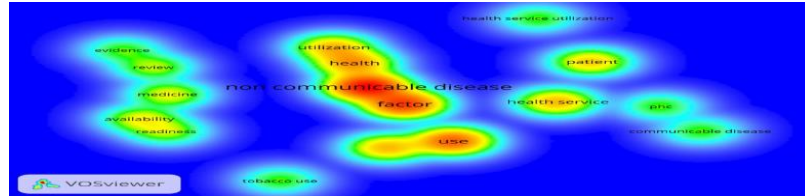


Figure 7. Density Visualization Overview Publications

VOSviewer Density Visualization Publication Overview

The figure above shows a density visualization of the publication network using VOSviewer, which maps terms that frequently appear in research on healthcare utilization for non-communicable diseases (NCDs). This density visualization uses color to show the frequency and strength of relationships between terms in the study. Below is the interpretation of the figure:

Color Interpretation:

- Red Color:** Indicates areas with a very high density of terms, where they appear frequently and have many relationships with other terms.
- Yellow Color:** Indicates areas of medium density, where the terms appear quite frequently and have a significant relationship.
- Green Color:** Indicates areas of lower density, where the terms appear with lower frequency.
- Blue color:** Indicates areas of very low or no density, where the terms appear rarely or not at all.

Term Density:

- Non-communicable disease:** Located in the center and marked in red, indicating that it is the most common term and has many relationships with other terms in the study.
- Factor:** Also marked in red, indicating the high density and importance of factors affecting NCDs in the study.
- Use and Health:** These two terms are also highlighted in red, indicating that healthcare use and health factors in general are key topics in research on NCDs.
- Health service utilization and Patient:** Marked in yellow, indicating that these terms appear quite frequently and are important in the context of health service utilization for NCDs.
- Other terms include availability, readiness, medicine, and tobacco use:** Marked in green, indicating that although these terms are important, they appear with a lower frequency compared to the main term.

This density visualization reveals the key terms that frequently appear in research on health service utilization

for NCDs and shows the relationships between them. Terms such as "non-communicable disease", "factor", "use", and "health" are the main focus of this research, while other terms such as "health service utilization" and "patient" are also important but with lower frequency.

Research Gaps:

- a. Policy Implementation: Further research is needed to understand how health policies are implemented across different geographical and socio-economic contexts.
- b. Innovative Approaches: There is a need to explore new and innovative approaches in the prevention and management of NCDs.
- c. Healthcare Utilization: More in-depth studies on factors affecting healthcare utilization by patients with NCDs are needed.

By understanding the density distribution of these terms, researchers can identify areas that have been extensively researched as well as direct their research efforts towards areas that still require further attention.

CONCLUSIONS

In conclusion, visualization analysis using VOSviewer revealed important findings related to healthcare utilization for non-communicable diseases (NCDs). Articles with high citation counts, such as the work of Gursimer Jeet and colleagues, show significant influence in research on prevention and control of NCDs in developing countries. High-citation articles indicate that the research is frequently referenced, signaling the relevance and importance of the topics covered.

The network visualization highlights the close linkages between terms such as "availability", "health

service utilization", "patient", and "health", indicating dominant research areas. These terms form several major clusters that indicate a focus on drug availability, health system readiness, health service utilization, and factors affecting NCDs. The close relationship between these terms indicates interrelated and important research areas.

The overlay visualization shows the temporal progression of research focus. Early studies focused more on drug availability and health system readiness, while more recent studies have highlighted patient health service utilization and various health factors. The colors in this visualization show the progression of terms over time, with newer terms such as "health service utilization" and "patient" appearing more frequently in recent studies.

The density visualization reveals key terms that frequently appear in research on NCDs. Terms such as "non-communicable disease", "factor", "use", and "health" are the main focus of research, marked in red indicating high density. Other terms such as "availability", "readiness", and "medicine" are also important but appear with lower frequency.

Identified research gaps include the need for further understanding of health policy implementation across different geographical and socio-economic contexts. Exploration of innovative approaches in the prevention and management of NCDs is also needed. In addition, in-depth studies on factors that influence health service utilization by patients with NCDs are needed to improve the effectiveness of health interventions and policies.

By identifying areas that have been extensively researched as well as directing research efforts to areas that still require further attention, research in this area can make a greater contribution to improving the quality of healthcare and management of NCDs globally.

LITERATURE

- Astriani, D., Duma, K. and Sihotang, F. A. (2021). Factors Affecting Utilization of the Integrated Coaching Post for Non-Communicable Diseases (Posbindu Ptm). *Journal Of Health Stikes Muhammadiyah Ciamis*, 7(2), pp. 8-15.
- Diaconu, K., Falconer, J., Vidal, N., O'May, F., Azasi, E., Elimian, K., Bou-Orm, I., Sarb, C., Witter, S., & Ager, A. (2020). Understanding fragility: implications for global health research and practice. *Health policy and planning*, 35(2), 235-243. <https://doi.org/10.1093/heapol/czz142>
- Hariyoko, Y., Jehaut, Y.D., & SUsiantoro, A. (2021). Effectiveness of Public Health Services by Puskesmas in Manggarai Regency. *Journal of Good Governance*, 169-178.
- Indonesian Ministry of Health. (2019a). *Noncommunicable Disease Management Guidebook*. Ministry of Health RI
- Kalsum U, Lesmana O, Pertiwi DR. Patterns of Non-Communicable Disease and Risk Factors of Anak Dalam Ethnic Group in Nyogan Village Jambi Province. 2019;(Ci):338-48.
- Ministry of Health RI. (2012). *Non-communicable diseases*. *Bulletin Jendela Data Informasi Kesehatan*
- Riley, L., Guthold, R., Cowan, M., Savin, S., Bhatti, L., Armstrong, T., & Bonita, R. (2016). The World Health Organization Stepwise Approach To Noncommunicable Disease Risk Factor Surveillance: Methods, Challenges, and Opportunities. *American Journal of Public Health*, 106 (1): pp. 74-78.
- Rini, Asep Setya. (2015). Utilization of Health Services for Community Health Insurance Participants. January 20, 2021. *Journal J Agromed Unila*.
- P2PTM Directorate. (2015). *Technical Guidelines for Non-Communicable Disease Surveillance*. Ministry of Health RI.
- Savira, W.D. & Subadi, W. (2023). Quality of Health Services Viewed from the Tangible Aspect in Order to Improve Health Services at the Hikun Health Center, Tanjung District, Tabalong Regency. *JAPB*, 749-762.
- Sudayasa IP, Rahman MF, Eso A. Early Detection of Risk Factors for Non-Communicable Diseases in the Community of Andepali Village, Sampara District, Konawe Regency. 2020;3(1).
- Sun, X., Tang, W., Ye, T., Zhang, Y., Wen, B., & Zhang, L. (2014). Integrated care: a comprehensive bibliometric analysis and literature review. *International Journal of Integrated Care*, 14.
- Tahir, Muchlas, Ahmad Harakan. (2017). Innovation of the 24-Hour Health Program in Realizing Good Health Care Governance in Bantaeng Regency. *Muqaddimah Scientific Journal* Volume 2, Number 1.
- Tirtasari, S., & Kodim, N. (2019). Prevalence and Characteristics of Hypertension in Young Adults in Indonesia. *Tarumanagara Medical Journal*, 1(2), 395-402.
- WHO. 2020. *Global status report on noncommunicable diseases 2014*. World Health, p.176, 2020.
- WHO. *World Health Statistics: 2018*. Geneva; 2018.
- World Health Organization. (2018). *Noncommunicable Disease: Country Profiles 2018*. In *Heart of Africa: Clinical Profile of an Evolving Burden of Heart Disease in Africa*. World Health Organization.