Original Article

# A bibliometric analysis of disability research in Saudi Arabia

## *Evolving trends, thematic mapping, and gaps*

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## ABSTRACT

**الأهداف**: تهدف هذه الدراسة إلى إجراء تحليل ببليومتري شامل لتحديد الاتجاهات الرئيسية والمؤلفين النشطين والمؤسسات المؤثرة، تخطيط الموضوعات، تطورات الأبحاث الحديثة والفجوات في أبحاث الإعاقة في المملكة العربية السعودية.

**المنهجية**: بدأت الدراسة في يونيو 2024م وتم تحليل البيانات خلال شهر يوليو 2024م في الأحساء، المملكة العربية السعودية. استخدم التحليل تقنيات ببليومترية مثل الربط الببليومتري ورسم الخرائط الموضوعية باستخدام برنامج VOSviewer وRStudio مع حزمة Bibliometrix.

**النتائج**: حدد التحليل الببليومتري إجمالي 3080 منشورًا، و معدل نمو سنوي بنسبة 13.5%. تشمل الموضوعات الرئيسية التي ظهرت بشكل بارز الإعاقة الذهنية، جودة الحياة، التأهيل، والصحة النفسية. بالإضافة إلى ذلك، كان هناك ارتفاع كبير في الدراسات التي تدمج التقنيات الحديثة مثل التعلم الآلي والذكاء الاصطناعي. وكانت التعاونات الدولية مساهمًا كبيرًا بنسبة 59.2% من البحوث. أظهر التصور الكثافي الموضوعات المركزية مثل «التصلب المتعدد» و«جودة الحياة». تعكس الموضوعات الناشئة مثل «التعلم الآلي» و«الواقع الافتراضي» الاتجاهات الحديثة في دمج التقنيات المتقدمة في أبحاث الإعاقة. حدد التحليل العديد من الفجوات، خصوصًا في الموضوعات الأساسية التي لا تزال غير متطورة وكذلك الموضوعات التكنولوجية الناشئة التي تحتاج إلى مزيد من التطبيق العملي.

**الخلاصة**: يسلط التحليل الببليومتري الضوء على مشهد متنوع لأبحاث الإعاقة في المملكة العربية السعودية، مع اتجاهات نشر متزايدة وتعاونات دولية كبيرة. ينبغي على الأبحاث المستقبلية التركيز على الفجوات واستكشاف التطبيقات العملية للتقنيات المتقدمة لتحسين جودة الحياة للأفراد ذوي الإعاقة.

**Objectives:** To identify key trends and influential authors and institutions, provide thematic mapping, and determine recent evolutions and gaps in the disability research in Saudi Arabia.

**Methods:** The study started in June 2024 and the data was analyzed during July 2024 in Al-Ahsa, Saudi Arabia. The analysis employed bibliometric techniques such as bibliometric coupling, and thematic mapping using VOSviewer and RStudio with the Bibliometrix package.

**Results:** The bibliometric analysis identified a total of 3080 publications and showed that the annual growth rate in the number of publications was 13.5%. Emerging themes included intellectual disabilities, quality of life, rehabilitation, and mental health. Additionally, there was a significant increase over the years in studies incorporating modern technologies such as machine learning and artificial intelligence. International collaborations were significant, at 59.2% of the publications. Density visualization highlighted central themes such as multiple sclerosis and quality of life. Emerging themes such as machine learning and virtual reality reflected recent trends that integrated advanced technologies into disability research. Several gaps were found, particularly in foundational themes and information on the practical applications of the emerging technologies for disabled people.

**Conclusion:** The bibliometric analysis highlighted a diverse landscape of disability research in Saudi Arabia. Future research should explore the practical applications of advanced technologies in the Saudi context to improve the quality of life for individuals with disabilities.

**Keywords:** disability, bibliometric analysis, Saudi Arabia, research themes, research trends

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A disability is a condition in which a functional ability is diminished due to a disease, disorder, injury, or other health-related problem. It may present as an impairment, activity restriction, or participation limitation.[1] According to the World Economic Forum (2021), an estimated 1.3 billion people, or 17% of the global population, live with a disability. Most of these disabilities are visual, hearing, cognitive, speech, mobility, or neural impairments.[2] People with disabilities face higher levels of social exclusion than their non-disabled counterparts.[3,4]

A study was carried out to estimate the prevalence, types, and severity of disabilities in Saudi Arabia, using data from the 2016 national demographic survey.[5] Out of 20,064,970 citizens, 667,280 reported disabilities, for a national prevalence rate of 3.3%. Higher rates were observed among individuals aged 60 and above, males, and residents of the Tabuk region, Saudi Arabia, with significant extreme disabilities in mobility and sight noted in Al-Madinah Al-Munawarah and Northern Border regions, Saudi Arabia. Saudi Arabia has become a focal point for disability research, and this reflects a growing commitment to understanding and addressing the needs of disabled individuals. In recent years, the Saudi Ministry of Health and Ministry of Education have initiated several projects, including the expansion of parks, the creation of safe walking tracks, and the provision of public health education by physicians. A key goal of Saudi Arabia's vision 2030 is to boost community participation in sports and other physical activities.[6,7] This could be beneficial in improving activity levels and minimizing the effects of a disability.

Bibliometric studies are critical tools for assessing and comprehending the research environment in a certain topic, providing information on publishing trends, significant authors and institutions, collaborative networks, and thematic evolution.[8,9] By examining massive databases of scholarly output, bibliometric studies can discover knowledge gaps and give objective indicators for evaluating the impact of research, allowing governments, funding agencies, and academics to make educated decisions regarding resource allocation and research objectives.[10] In dynamically changing domains like disability research, bibliometric studies are critical for assessing the current status and setting future research objectives.

As the nation continues to pursue rapid social and health improvements, it is imperative that research concerning disabled people evolves so that the inclusion and support of these people can be ensured in the newly reformed socioeconomic framework.[11] The primary objective of this research was to identify key trends and influential authors and institutions, provide thematic mapping, and determine recent evolutions and gaps in disability research in Saudi Arabia. By analyzing publication trends from 1980 to June 2024, this study sought to highlight the evolution and current state of disability research, including its key themes and emerging topics.

**Methods.** The bibliometric study is descriptive and observational study. The study aims to describe, observe and analyze the quantity, quality, and patterns of published research in the domain of disability research in Saudi Arabia. As the study is bibliometric analysis, ethical approval was not required.

The inclusion criteria of this study included articles published between 1980 and June 25, 2024, that explicitly focused on disability research in Saudi Arabia. Only publications indexed in the Scopus database were considered to ensure comprehensive coverage and reliable bibliometric data. Eligible document types included research articles, reviews, conference papers, and book chapters. Publications written in English were included to maintain consistency and facilitate accurate bibliometric analysis. The unrelated to disability research in Saudi Arabia or those written in languages other than English were omitted. Document types such as editorials, letters, notes, and errata, as well as studies lacking full-text availability or bibliometric data, were also excluded.

The database used for this bibliometric analysis was Scopus. The study started in June 2024 and the data was analyzed during July 2024 in Al-Ahsa, Saudi Arabia. This search strategy generated a total of 3080 studies. The **Appendix 1** show the process used to collect and screen the yielded studies.

The studies were published between 1980-2024 in 1370 sources. Additionally, the dataset had an annual growth rate of 13.5%, with an average document age of 5.16 years, average number of co-authors per document of 19.9, and average number of citations per document of 58.53. The percentage of international co-authorship

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was 59.2%, implying that significant cooperation had occurred between Saudi and international institutes in this field.

The study used multiple bibliometric analysis techniques to analyze the data comprehensively, such as descriptive bibliometrics, bibliometric coupling, thematic mapping, and the recording of publication trends. Bibliometric coupling was used to identify the studies that cited common references. Thematic mapping, was used to identify and visualize themes presented in disability research over the years. Finally, the recording of publication trends provided an overview of the most prolific and influential authors and publications in the field and the numbers of article published per year.

The study used 2 primary tools: VOSviewer and RStudio with the Bibliometrix package.[12,13] VOSviewer is used to build and visualize bibliometric networks. The software builds and visualizes networks in areas such as citation, co-authorship, and bibliographic coupling networks. The second software, RStudio with the Bibliometrix package, facilitated in-depth bibliometric analysis and carried out a data-importing analysis and visualization.

***Statistical analysis.*** A descriptive analysis was carried out on the cleaned data. The descriptive analysis summarized the source information, including the authors, years of publication, document type, and subject area. This was followed by network construction. Bibliometric coupling networks were built and visualized using the VOSviewer software. Thematic and trend analyses were also carried out using Bibliometrix.

**Results.** The number of disability articles published has steadily increased since the 1980s, with notable growth beginning in the 2010s and exponential rises in the 2020s. Publications peaked at 496 in 2023, with 259 articles published by mid-2024.

The dataset demonstrated an overall mean annual growth rate of 13.5% over the study period (1980-2024). However, this growth rate was not uniform across the years. During the early years of the study period, publication numbers remained relatively low, with occasional fluctuations. A significant increase in publication output was observed starting in the 2010s, with exponential growth occurring particularly in the 2020s.

The dataset revealed an average of 19.9 co-authors per document, reflecting the collaborative nature of many studies. To provide a more representative measure, we analyzed the median number of co-authors per document, which was 6. This median value suggests that while large collaborations are present, the majority of studies involved smaller teams, highlighting a diverse range of collaboration patterns in disability research in Saudi Arabia.

The Sankey diagram illustrates international collaborations, institutional contributions, and key research themes in disability research in Saudi Arabia. Prominent countries include the United States, Iran,

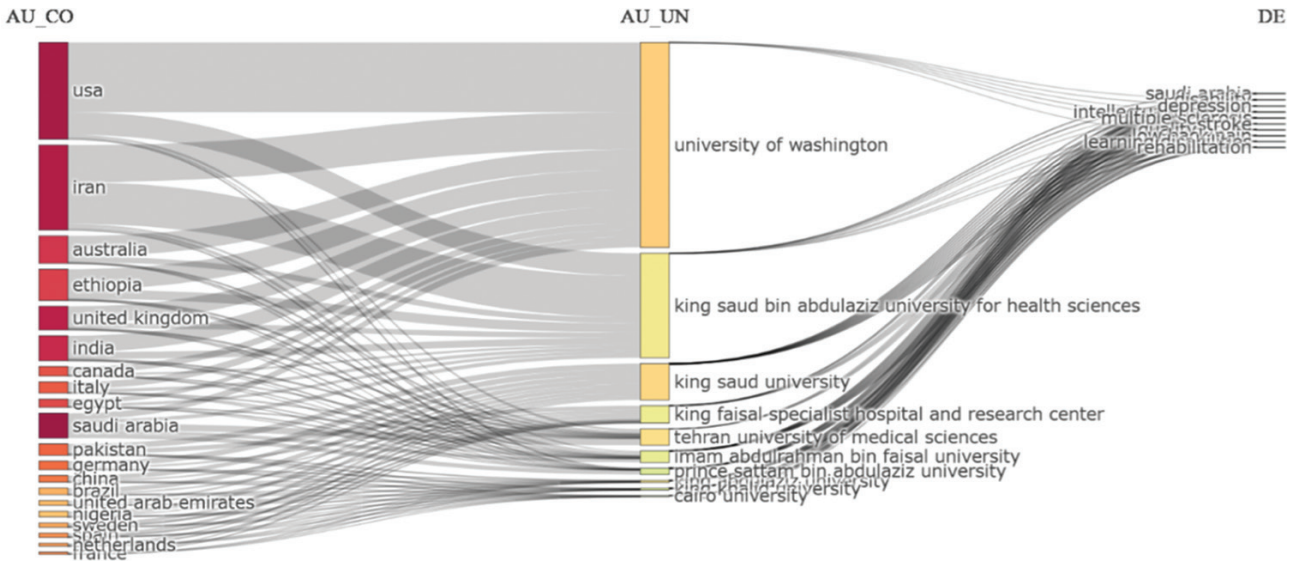


**Figure 1 -** Bibliometric analysis. Three-field graph of the studies retrieved from the Scopus database on disability research in Saudi Arabia. The data was retrieved from Scopus. The Scopus database was accessed in June 2024.

Australia, and Saudi Arabia, with leading institutions like King Saud bin Abdulaziz University for Health Sciences, King Saud University, Riyadh, Saudi Arabia, and the University of Washington, Washington, United States. Research topics such as intellectual disability, depression, and rehabilitation highlight a collaborative, multidisciplinary approach to advancing the field (**Figure 1**).

Disability research in Saudi Arabia is covered in a variety of journals. With 58 documents, the Saudi Medical Journal led the way, and other notable journals that often featured disability research in Saudi Arabia included Neurosciences (44), American Journal of Medical Genetics, Part A (43), The Lancet (34), and Annals of Saudi Medicine (33).

Bradford's law was employed to identify the core journals that significantly contribute to the literature in this field. The journals were ranked based on their frequency of publications, and the cumulative contribution was analyzed. The data was divided into 3 distinct zones: Zone 1 (core journals), Zone 2 (medium productivity journals), and Zone 3 (journals with lower contributions). Zone 1 represents a small number of journals that account for the majority of publications, including "Saudi Medical Journal," "Neurosciences," "American Journal of Medical Genetics, Part A," The Lancet, Annals of Saudi Medicine and Healthcare. These journals serve as the primary sources of knowledge dissemination within this domain, providing valuable insights and expanding the scope of scientific discourse (**Appendix 2A**).

Lotka's law describes the inverse relationship between the number of articles authored and the number of contributing authors, where a small percentage of authors contribute disproportionately to the literature (**Appendix 2B**). The analysis of the dataset confirms this principle. A total of 15,674 authors contributed to only one article, representing approximately 65.5% of the total authorship. In contrast, a significantly smaller proportion of authors (3,466 or 14.5%) authored 2 articles, and the number further diminishes as the number of articles increases. This pattern demonstrates that the majority of authors contribute to a single publication, while only a few authors produce multiple contributions. The findings highlight the dominance of a small group of highly prolific authors in advancing the field, as indicated by their multiple contributions. For instance, there were 264 single-authored articles, and a group of 6 authors produced 40 articles. This distribution underscores the critical role of these prolific contributors in shaping the knowledge base of the discipline.

A word cloud was constructed to help identify some of the keywords that repeatedly appeared in the included documents. The word cloud visualization showed that "Saudi Arabia" was the most prominent keyword, and this was expected since Saudi Arabia was the primary focus of the search. The other vital terms that stood out were "disability", "intellectual disability", "quality of life", "children with disabilities", "epilepsy", "physical activity", "lower back pain", and "multiple sclerosis".

The results showed that "Saudi Arabia" was the most common keyword, as it was found in 199 documents. This represented a 10% relative frequency of the keyword (199 documents, 10%). The other keywords that were frequently used were "disability" (152, 8%), "intellectual disability" (131, 7%), "multiple sclerosis" (94, 5%), "quality of life" (82, 4%), "stroke" (56, 3%), "low back pain" (47, 2%), "depression" (46, 2%), "learning disabilities" (44, 2%), and "rehabilitation" (44, 2%).

A bibliometric analysis was carried out to identify the trending topics in disability research in Saudi Arabia. In 2014, mental retardation" and "outcome" were increasingly used to describe the covered topics, with the word frequency for each being below 50. In 2015 and 2016, "childhood blindness", "breast cancer", "dizziness", "aging", and "arthritis" were the significant words. The frequency for each term remained below 100. Between 2017 and 2020, "rehabilitation", "epilepsy", "epidemiology", and "autism" were under focus. In later years, the dominant terms were "Saudi Arabia" (in 2022), "disability" (in 2021), "intellectual disability" (in 2021), and "multiple sclerosis" (in 2021). In 2023 and early 2024, terms related to the media and artificial intelligence appeared, with relevant keywords such as "machine learning", "deep learning", "convoluted neural network", and "social media" (**Figure 2**).

Thematic mapping in disability research in Saudi Arabia visualized keywords across 4 quadrants based on density (development) and centrality (relevance). Motor themes like "osteoarthritis" and "epilepsy" are well-developed and relevant, while niche themes like "physical disability" and "machine learning" are advanced but less widely used. Emerging/declining themes include "deep learning" and "oxidative stress," while basic themes like "quality of life" and "autism" are foundational yet underdeveloped.

The most cited article was James et al,[14] with 8917 citations. The next most cited studies were Vos et al[15] with 8717 citations, and Vos et al,[16] with 8255 citations. This shows that the seminal publication series denoted by the term "global, regional, and national incidence, prevalence" by the most cited articles.[14-16]

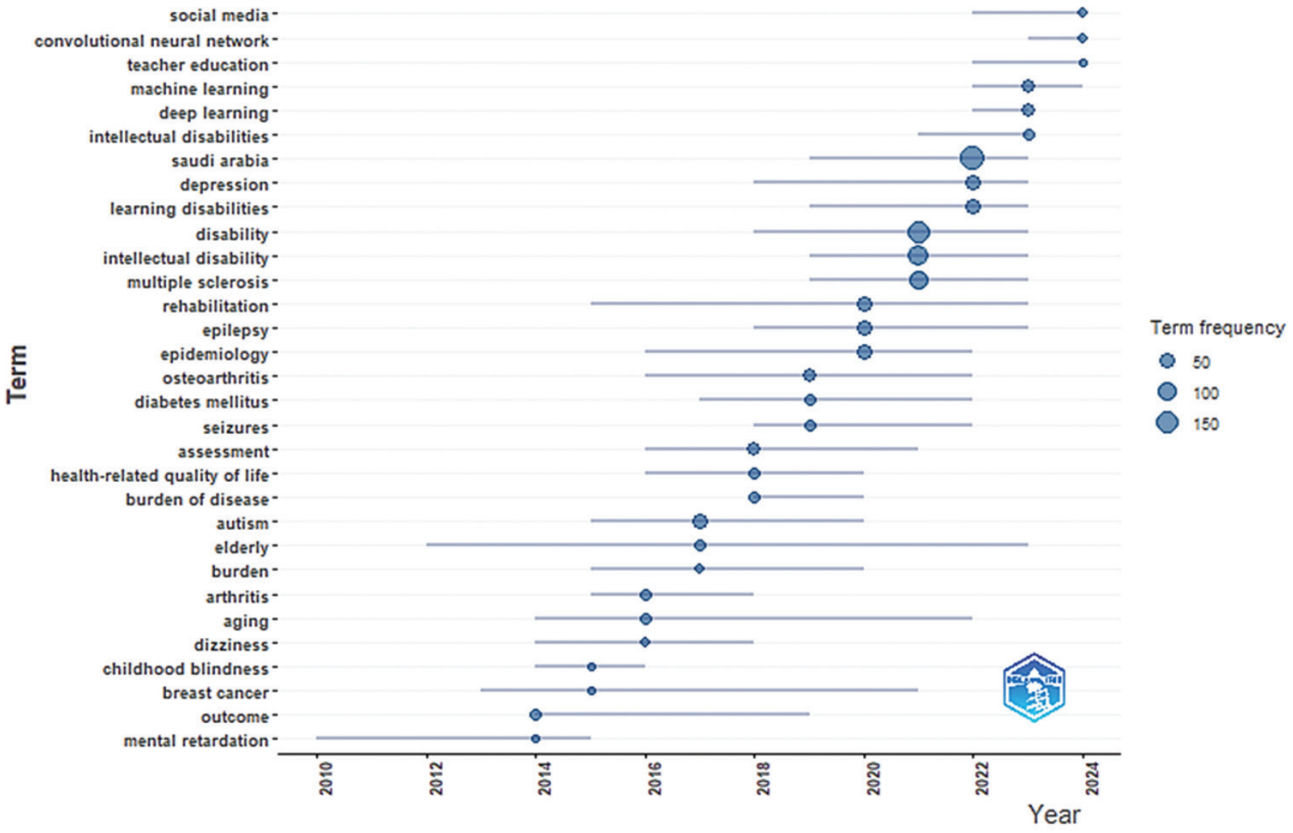


**Figure 2 -** Trending topics of disability research in Saudi Arabia. The data was retrieved from Scopus. The Scopus database was accessed in June 2024.

had a significant impact on disability research in Saudi Arabia and globally.

Bibliometric coupling analysis identified top journals and organizations contributing to disability research in Saudi Arabia. The Saudi Medical Journal had the highest number of articles (n=58), while the Lancet led in citations (n=94,270). Co-authorship analysis revealed Fowzan Alkuraya as the leading author with 67 documents and 2086 citations. The co-authorship analysis was based on the total link strength of the publications associated with each leading organization. Based on the total link strength, number of documents, and number of citations, the leading organization was the Department of Anatomy and Cell Biology, College of Medicine, Alfaisal University, Riyadh, Saudi Arabia, with a total link strength of 74, 48 documents, and 1863 citations. Other notable organizations (with total link strength) were the Department of Genetics, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia (n=74); College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Jeddah (n=40); College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Riyadh (n=35); and King Abdullah International Medical Research Center, Jeddah (n=35).

VOSviewer was used to create density visualizations of the key themes of disability research in Saudi Arabia. These visualizations demonstrate the interconnectedness and frequency of research themes. Based on the density visualization in **Figure 3**, the themes of "disability", "Saudi Arabia", "multiple sclerosis", "quality of life", and "disability" were the central themes that appeared as red areas on the heat map. Other themes that were moderately common were "stroke", "prevalence", "depression", "osteoarthritis", "learning disabilities", "autism", "Covid-19", and "artificial intelligence", as illustrated by their locations in the orange-yellow areas of the heat map.

The overlay visualization from VOSviewer in **Appendix 2C** presents the evolution of different themes over time. The blue color indicates the early (established) themes, while the yellow color indicates the recent (emerging) themes. The established themes included "epidemiology", "physical disability", "rehabilitation", "elderly", "autism", and "cerebral palsy". The emerging themes in the field included "machine learning", "deep


**Figure 3 -** Density visualization map of disability research in Saudi Arabia. The data was retrieved from Scopus. The Scopus database was accessed in June 2024.

learning", "virtual reality", "inclusive education", and "physical activity".

The themes of research on disabilities in Saudi Arabia are well connected across the landscape of the field, and the color-coded cluster shows how the themes are related. There were several overlapping terms among the clusters, which indicated the extensive reuse of keywords for the themes. Five clusters of themes and keywords for disability research in Saudi Arabia were found (Appendix 2D). The first (red) cluster (Disability and Inclusion) included themes such as disability, learning disability, public health, inclusive education, and assistive technology. The second (green) cluster (Mental Health and Neurological Conditions) included themes associated with mental health, such as depression, anxiety, neuroinflammation, traumatic brain injury, autism, multiple sclerosis, and stroke. The third (blue) cluster (Pediatric and Developmental Disabilities) contained themes such as developmental delay, children, cerebral palsy, and intellectual disability, reflecting the importance of early diagnosis and intervention. The fourth (olive) cluster (Public Health) included risk factors, systematic review, and prevalence, reflecting the importance of early diagnosis and intervention. The fifth (purple) cluster (Quality of Life) included pain, psychometric properties, and quality of life.

The funding landscape for disability research in Saudi Arabia demonstrates a robust blend of local and international collaboration. This diverse funding profile highlights the Kingdom's commitment to address disability-related challenges through innovative research and global partnerships. Further details can be found in Appendix 3.

**Discussion.** The steady increase in disability research publications, particularly from 2010 onward, indicated a heightened focus on this critical area in Saudi Arabia. The exponential growth observed in the 2020's suggested a robust response to the global call for inclusive and comprehensive research on disabilities.[17,18] This trend aligned with Saudi Arabia's Vision 2030, which emphasizes community participation and the well-being of individuals with disabilities.[19,20]

A Sankey diagram and co-authorship analyses revealed that institutions such as King Saud University, King Faisal Specialist Hospital, and the University of Washington were playing pivotal roles in advancing disability research. The strong linkages between Saudi and international institutions underscored the global nature of this research, which is fostering knowledge exchange and collaborative efforts to address complex disability issues. Several countries had strong associations with Saudi Arabia in Saudi Arabian publications, and this showed that there is extensive global and regional cooperation in this field and that it is increasing. This was affirmed by the high numbers of multinational publications and citations.[14-16]

An analysis of keywords and thematic mapping showed that intellectual disability, quality of life, rehabilitation, and mental health were predominant themes in the literature. The prominence of terms such as "intellectual disability", "depression", and "rehabilitation" indicated a comprehensive approach to understanding and addressing various aspects of disabilities in Saudi Arabia. Emerging themes such as "machine learning", "deep learning", and "social media" reflected the integration of modern technologies in disability research in Saudi Arabia. Such advancements in technology were focuses of recent research on disabilities and of discussions on the implementation of applications such as e-health, telerehabilitation, telemedicine, and digital health.[21,22] Recently, deep learning and machine learning were key advancements in artificial intelligence algorithms for various applications in the field of disability.[23,24] The inclusion of recent technological terms in the emerging themes of disability research in Saudi Arabia reflected the determination of researchers in the country to stay current with advanced technologies and continuously monitor new developments in the field.

Bibliometric analysis is inherently a quantitative method that relies on publication and citation data to uncover patterns, trends, and networks within a specific research field. While this approach provides valuable insights into the volume and growth of research, as well as the collaborative networks and thematic evolutions, it is limited in its ability to capture the qualitative aspects of research, such as the depth, context, and practical implications of the studies analyzed. This inherent limitation restricts our capacity to evaluate the substantive contributions of the publications beyond their quantitative metrics, such as citation counts or co-authorship patterns. Despite these methodological constraints, efforts were made to incorporate qualitative interpretations where feasible. For instance, the thematic mapping revealed emerging topics such as "machine learning" and "virtual reality," which were further explored in terms of their potential applications in disability research.

The high rate of international collaboration (59.2%) was another significant finding that warranted qualitative interpretation. This collaboration underscores the global nature of disability research and highlights the strong connections between Saudi Arabia and international institutions. Such partnerships not only enhance the research output but also facilitate knowledge exchange and the adoption of advanced methodologies. Additionally, the prominence of themes such as "intellectual disability" and "quality of life" was discussed in the context of their societal importance and the need for further exploration to address critical gaps in understanding and application.

In order to get deeper insights into the themes and trends across time, we analyzed the data across 5-time slices (1980-2010, 2011-2018, 2019-2020, 2021-2023, and 2024-2024) using co-word analysis and thematic evolution techniques. The Walktrap clustering algorithm was applied to identify and group themes based on keyword co-occurrence networks, and results were visualized using Sankey diagrams and network graphs (**Appendix 2E**). The analysis revealed a clear progression of themes over time, from foundational topics like "disability" and "learning disabilities" in earlier periods to more advanced and interdisciplinary themes such as "deep learning" and "convolutional neural networks" in later periods. The results demonstrate a shift from descriptive studies toward applied and technologically integrated research, with a growing emphasis on rehabilitation and addressing societal challenges in the most recent time slice. However, topics as "learning disabilities" and "intellectual disabilities" remain in focus across the years.

Certain themes, such as "intellectual disabilities," "quality of life," and "rehabilitation," exhibit higher productivity because they align closely with societal and healthcare priorities in Saudi Arabia. These themes address prevalent challenges faced by individuals with disabilities and resonate with national policies. Additionally, these themes are often supported by targeted funding and institutional priorities, driving a higher volume of research output. In contrast, emerging themes like "machine learning" and "virtual reality," while promising, are less productive due to their novelty and limited application in the Saudi context.

Journals such as the Saudi Medical Journal and Annals of Saudi Medicine show greater cooperation and

productivity because they cater to regional and local research needs, offering a platform for studies with a specific focus on Saudi Arabia. These journals prioritize themes of national relevance, facilitating the publication of research addressing local health challenges. On the other hand, international journals like the Lancet and American Journal of Medical Genetics, Part A attract researchers due to their high impact. These journals often foster collaborations between Saudi and international institutions, reflecting the global nature of disability research and enhancing the visibility and impact of Saudi studies.

The bibliometric analysis of disability research in Saudi Arabia identified several key research gaps. Foundational themes such as "quality of life", "low back pain", "intellectual disability", and "autism" were essential yet underdeveloped themes, highlighting the need for comprehensive exploration in these areas. Emerging themes, such as "deep learning" and "oxidative stress", and declining themes, such as "mortality", indicated fluctuating levels of interest, suggesting the need for sustained investigation to understand the themes' relevance and impact. The integration of modern technologies, such as "machine learning" and "virtual reality", into disability research is promising, but there is a gap in their practical application in the Saudi context. Additionally, mental health and neurological conditions, including "depression" and "multiple sclerosis", require further detailed studies to develop effective intervention strategies.

***Study limitations.*** The study's exclusive reliance on the Scopus database may have resulted in the exclusion of other relevant research published in other databases or non-indexed journals. The focus on English-language publications may also have caused significant contributions in other languages to be overlooked. Additionally, the study provided a static snapshot of the research landscape up to the early months of 2024, which may not have accounted for ongoing developments and trends. Finally, the use of a broader search strategy, which, while maximizing inclusivity, may have excluded some articles with relevance to disability research.

In conclusion, this bibliometric analysis of disability research in Saudi Arabia reveals a significant increase in scholarly output over the years, reflecting the growing attention to this field. Beyond the quantitative growth, this study provides several novel insights into the research landscape. First, it highlights the thematic evolution of disability research, with emerging areas such as machine learning and virtual reality suggesting a promising integration of advanced technologies in addressing disability-related challenges. Second, the analysis underscores the pivotal role of international collaborations in driving innovation and fostering cross-disciplinary approaches. The strong ties between Saudi and global institutions signal a move toward more cohesive and impactful research efforts, which are essential for addressing the multifaceted nature of disabilities. Moreover, this study identifies critical gaps in foundational themes such as quality of life and intellectual disability, underscoring the need for deeper exploration and practical application of research findings. Future studies should focus on operationalizing emerging technologies and fostering inclusive practices to ensure that research translates into tangible benefits for individuals with disabilities.

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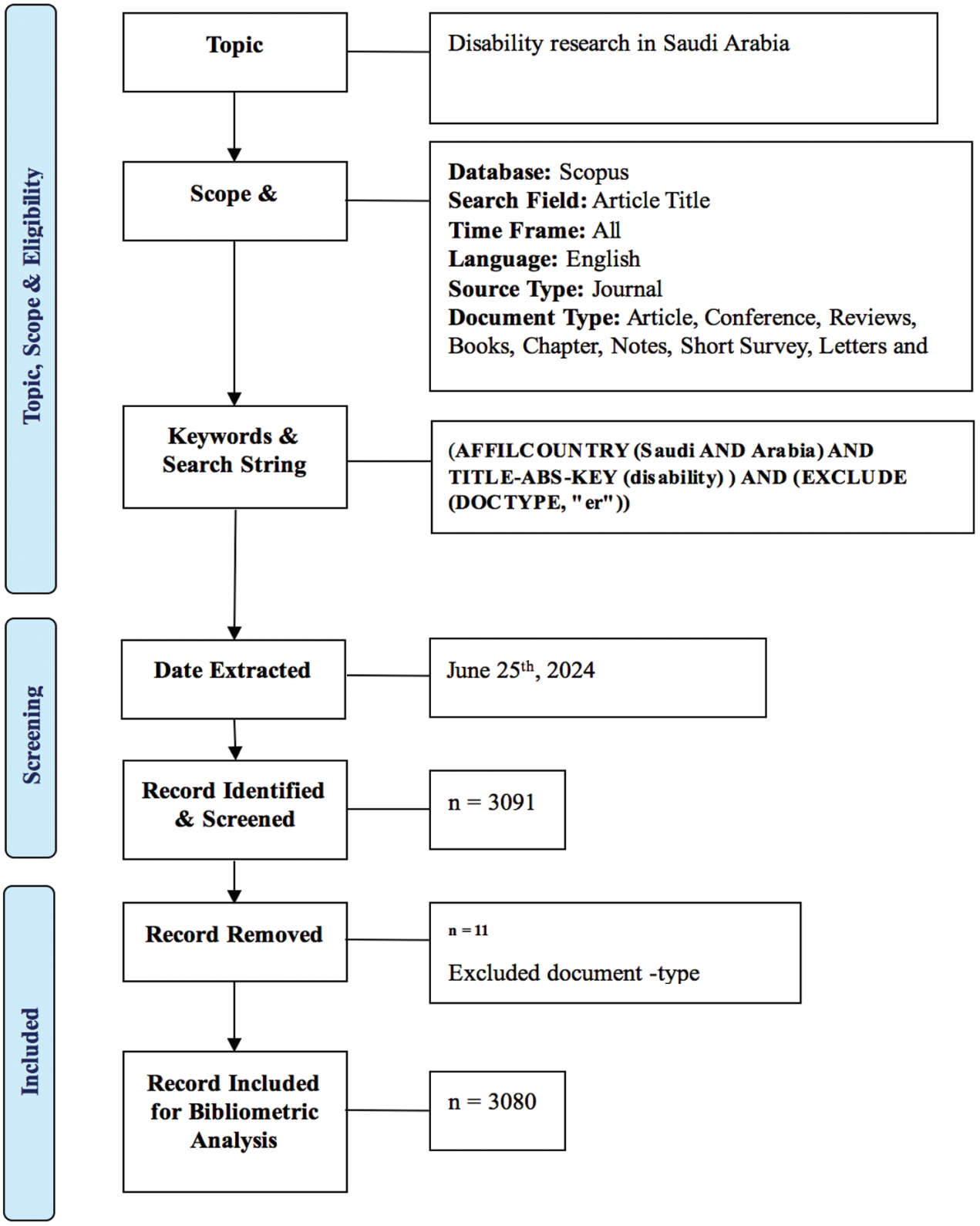
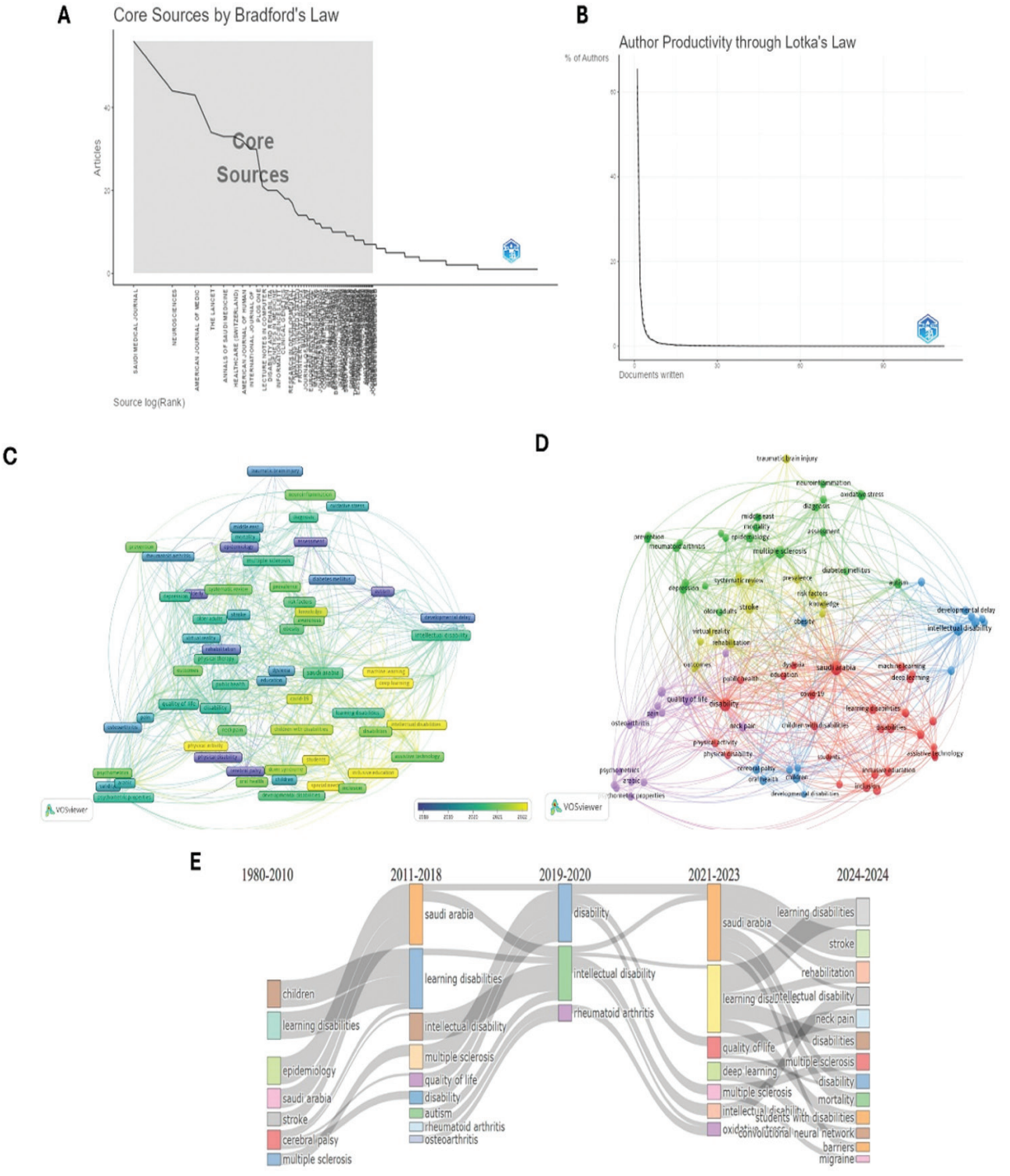
## References

1. Agaronnik N, Campbell EG, Ressalam J, Iezzoni LI. Exploring issues relating to disability cultural competence among practicing physicians. ***Disabil Health J*** 2019; 12: 403-410.
2. Forum TWE. The Valuable 500 - Closing the disability inclusion gap. [Accessed 2024/8/5]. Available from: https://www.weforum.org/projects/closing-the-disability-inclusion-gap/
3. Sabatello M. Cultivating inclusivity in precision medicine research: disability, diversity, and cultural competence. ***J Community Genet*** 2019; 10: 363-373.
4. Kandeel M, Morsy MA, Alkhodair K, Alhojaily S. Digital health interventions for individuals with disabilities and their impacts on health, quality of life, and social participation. ***Digital Health*** 2024; 10: 20552076241294190.
5. Bindawas SM, Vennu V. The national and regional prevalence rates of disability, type, of disability and severity in Saudi Arabia-analysis of 2016 demographic survey data. ***Int J Environ Res Public Health*** 2018; 15: 419.
6. Zahra A, Hassan MS, Park JH, Hassan SU, Parveen N. Role of environmental quality of life in physical activity status of individuals with and without physical disabilities in Saudi Arabia. ***Int J Environ Res Public Health*** 2022; 19: 4228.
7. Al-Hazzaa HM, AlMarzooqi MA. Descriptive analysis of physical activity initiatives for health promotion in Saudi Arabia. ***Front Public Health*** 2018; 6: 329.
8. Kandeel MK. Bibliometric analysis of camel research in China: research trends and thematic evolution. ***EJVS*** 2024; 0: 1-16.
9. Kandeel M. Trends in camel research in South Asia: a bibliometric approach. ***Vet World*** 2024; 17: 2763-2773.

10. Hussain F, Tsang D, Rafique Z. Policy advisory systems and public policy making: bibliometric analysis, knowledge mapping, operationalization, and future research agenda. ***Rev Policy Res*** 2023; 41: 713-739.
11. Rahman R, Qattan A. Vision 2030 and sustainable development: state capacity to revitalize the healthcare system in Saudi Arabia. ***Inquiry*** 2021; 58: 46958020984682.
12. Derviş H. Bibliometric analysis using bibliometrix an R package. ***J Scientometric Res*** 2019; 8: 156-160.
13. Arruda H, Silva ER, Lessa M, Proença D Jr, Bartholo R. VOSviewer and bibliometrix. ***J Med Libr Assoc*** 2022; 110: 392-395.
14. James SL, Abate D, Abate KH, Abay SM, Abbafati C, Abbasi N, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 354 diseases and injuries for 195 countries and territories, 1990-2017: a systematic analysis for the Global Burden of Disease Study 2017. ***Lancet*** 2018; 392: 1789-1858.
15. Vos T, Lim SS, Abbafati C, Abbas KM, Abbasi M, Abbasifard M, et al. 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. ***Lancet*** 2020; 396: 1204-1222.
16. Vos T, Abajobir AA, Abate KH, Abbafati C, Abbas KM, Abd-Allah F, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. ***Lancet*** 2017; 390: 1211-1259.
17. Bailie J, Fortune N, Plunkett K, Gordon J, Llewellyn G. A call to action for more disability-inclusive health policy and systems research. ***BMJ Glob Health*** 2023; 8: e011561.
18. Saia T, Yaghmaian R, Cuesta R, Mueller C, Pebdani RN. A call to action for disability and rehabilitation research using a DisCrit and Disability Justice framework. ***Disabil Rehabil*** 2024; 46: 3189-3195.
19. Nasser AO, Al-Gharaibeh F. Empowering Saudi women with disabilities according to Saudi vision 2030: an analytical study. ***Inf Sci Lett*** 2023; 1: 3167-3176.
20. Al Rubaie NAM. A proposal to activate the role of early intervention programs for the rehabilitation of mothers of children with Down syndrome, in light of the Saudi vision 2030. ***J Educ Health Promot*** 2022; 11: 18.
21. Baroni MP, Jacob MFA, Rios WR, Fandim JV, Fernandes LG, Chaves PI, et al. The state of the art in telerehabilitation for musculoskeletal conditions. ***Arch Physiother*** 2023; 13: 1.
22. Choukou M-A, Zhu X, Malwade S, Dhar E, Abdul SS. Digital Health Solutions Transforming Long-Term Care and Rehabilitation. In: Kiel JM, Kim GR, Ball MJ, editors. Healthcare Information Management Systems: Cases, Strategies, and Solutions. Cham: Springer International Publishing; 2022. p. 301-16.
23. Falet JR, Durso-Finley J, Nichyporuk B, Schroeter J, Bovis F, Sormani MP, et al. Estimating individual treatment effect on disability progression in multiple sclerosis using deep learning. ***Nat Commun*** 2022; 13: 5645.
24. Lakhan A, Hamouda H, Abdulkareem KH, Alyahya S, Mohammed MA. Digital healthcare framework for patients with disabilities based on deep federated learning schemes. ***Comput Biol Med*** 2024; 169: 107845.




**Appendix 1 -** The PRISMA chart showing data collection and screening process for the studies retrieved from Scopus database for disability research in Saudi Arabia. The data was retrieved from Scopus. The Scopus database was accessed in June 2024.




**Appendix 2 -** Bibliometric analysis of disability research in Saudi Arabia. **A)** Bradford's law analysis of journals contributing to the field, illustrating the cumulative frequency of articles across ranked journals. **B)** Distribution of authorship based on Lotka's law, showing the inverse relationship between the number of articles authored and the number of contributing authors. **C)** Overlay visualization of disability research in Saudi Arabia. **D)** Cluster analysis of disability research in Saudi Arabia. **E)** Thematic evolution of research topics from 1980-2024, generated using Bibliometrix. The Sankey diagram illustrates the progression and transitions of themes across 5 time slices: 1980-2010, 2011-2018, 2019-2020, 2021-2023, and 2024-2024. The data was retrieved from Scopus. The Scopus database was accessed in June 2024.

**Appendix 3 -** The top 10 funding agents for disability research in Saudi Arabia.

| Funding agents | Number of funds |
|---|---|
| King Saud University | 299 |
| National Institutes of Health | 142 |
| King Salman Center for Disability Research | 76 |
| Bill and Melinda Gates Foundation | 73 |
| Medical Research Council | 73 |
| National Health and Medical Research Council | 69 |
| King Abdulaziz City for Science and Technology | 67 |
| U.S. Department of Health and Human Services | 67 |
| European Commission | 63 |
| King Abdulaziz University | 62 |