

Scientometric Analysis on the Assumption of Artificial Intelligence Applications in the Healthcare of Indian Perspectives

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ABSTRACT

Artificial Intelligence has emerged as a transformative technology in the Indian healthcare sector, contributing advanced solutions for effective analysis, treatment, telemedicine, healthcare organisation, and drug discovery. This study conducts a scientometric analysis of Artificial Intelligence applications in Indian healthcare research indexed in the Web of Science Core Collection database during the period 2016–2025. A total of 13,858 publications from 2,944 sources were analysed using Biblioshiny and Bibliometrix tools in RStudio to identify main research trends, productive authors, top institutions, prominent journals, collaborative countries, and keyword occurrences. The results reveal a stable annual growth rate of 7.59% in publications, demonstrating increasing research interest in Artificial Intelligence driven healthcare technologies. Main research themes involved Covid-19, machine learning, deep learning, Internet of Things, and digital healthcare systems. Institutions such as IITs, AIIMS, and ICMR emerged as significant contributors, while India demonstrated strong international research collaborations, particularly with the USA and England. The study concludes that AI has substantial potential to enhance healthcare accessibility, efficiency, and quality in India. However, challenges related to infrastructure, ethical issues, and data security require further attention for sustainable implementation of Artificial Intelligence in healthcare systems.

KEYWORDS: Artificial Intelligence, AI, Healthcare, Scientometric, Web of Science, Vosveiwier.

1. INTRODUCTION

Artificial Intelligence (AI) integration in Indian healthcare is promising, with substantial potential to address issues such as access to care, affordability, and healthcare delivery efficiency. As technology advances, collaboration between AI inventors and healthcare professionals is critical to melding the future of Indian healthcare. AI

algorithms, notably in radiology and pathology, are being used to evaluate medical images and identify problems like tumours or fractures with high accuracy. For example, Niramai employs thermal imaging and AI to detect breast cancer early, whereas Qure.ai specializes in chest X-ray processing (Kakileti et al., 2023). AI systems use patient data to anticipate disease outbreaks and individual health risks.

For example, using AI to anticipate diabetes and cardiovascular disorders allows for earlier intervention, which improves patient care. AI improves telemedicine platforms by incorporating symptom checks and virtual health assistants. These applications assist in triaging patients, managing appointments, and providing individualized health advice, which is especially useful in remote areas with limited access to healthcare specialists (Sharma et al., 2022). AI speeds drug research by analysing large datasets to uncover prospective medication candidates and forecast their efficacy. Indian pharmaceutical businesses are increasingly leveraging AI to expedite R&D and lower the time and cost of bringing new pharmaceuticals to market (Chakraborty et al., 2024). AI-powered robots help in surgeries, improving precision and reducing recovery periods. The use of robotic surgery in urban hospitals is increasing, allowing for less intrusive treatments with improved patient outcomes (Joshi & Badola, 2024).

2. REVIEW OF LITERATURE

Healthcare is the systematic delivery of medical services to maintain or improve health. It includes a wide range of services aimed at preventing, diagnosing, treating, and managing medical disorders. Culture, the economics, and technology all have an impact on healthcare systems around the world (Stewart Williams et al., 2020). Healthcare is crucial for improving quality of life, increasing life expectancy, and reducing illness load. Access to good healthcare can result in better health outcomes, higher productivity, and lower healthcare expenses (McGinnis et al., 2013). The introduction of healthcare in India is the result of a complex interaction of historical, cultural, and economic influences. India's healthcare system has evolved dramatically throughout the years, influenced by colonial legacies, socioeconomic shifts, and contemporary public health challenges. Healthcare in India during the British colonial period was limited and mostly concentrated in metropolitan areas. The British built hospitals but mostly ignored rural health needs (Bhatia et al., 2020). Following its independence in 1947, India sought to provide comprehensive healthcare to its inhabitants. The Bhoré Committee (1946) created the groundwork for a strong healthcare policy that prioritized primary care (Duggal, 1991). India has a mixed healthcare system that includes both public and commercial sectors. Despite its vast reach, the public sector frequently faces funding, infrastructure, and accessibility challenges. The private sector has expanded significantly, serving metropolitan populations and delivering modern medical services (Reddy et al., 2011). Despite gains, health measures including new-born mortality and maternal health show large discrepancies. India has made headway in areas such as vaccination, but obstacles persist in communicable and non-communicable diseases (Wright et al., 2021). This program, which began in 2018, intends to provide health coverage to economically poor communities and improve access to healthcare services (Gopichandran, 2019). The COVID-19 epidemic has pushed the development of telemedicine in India, increasing access to healthcare in remote places (Ghai et al., 2020).

The scientometric analysis is engaged to recognise important research fields, prominent authors, most relevant institutions, most relevant keywords, and most leading sources in the Indian healthcare area. It also affords comprehensions into the progress of the assumption of Artificial Intelligence (AI) applications in the healthcare. The

scientometric analysis is engaged to find the statistical and measureable analysis of accessible literature of a particular area of study for a certain era. It is comparable an evaluation method that increases the important research field, authors, or their affiliation over published documents. It also offers the scholars with an indication of the work growth of particular research areas. The study's highest contribution acmes the most relevant authors, most prolific journals, most prominent organisations, relevant keywords, and states in emerging the Artificial Intelligence (AI) area in healthcare.

3. OBJECTIVES OF THE STUDY

This study is shown to find the importance of Artificial Intelligence (AI) in Indian healthcare and the following study objectives.

- To examine the annual growth rate of Artificial Intelligence in Indian healthcare research outputs;
- To identify the most productive authors, and most relevance sources of AI in Indian healthcare research;
- To find out the most leading countries and institutions of AI in Indian healthcare research;
- To show the keyword occurrences of Artificial Intelligence in Indian healthcare Research.

4. METHOD AND MATERIALS

This descriptive study employed scientometric approaches to analyse scholarly articles on AI in Indian healthcare that were indexed in the Web of Science Core Collection database. The Web of Science is the most trusted and widely used citation indexing database in academic domains. The Web of Science, created in 1900, is the world's leading citation database, known for its prestige, popularity, and longevity. Compared to other databases, it delivers superior cited reference indexing and a wide range of relevant and comprehensive papers for download across multiple scientific disciplines (Birkle et al., 2020).

This database has been used in numerous studies to undertake scientometric and bibliometric analyses (Gupta & Dhawan, 2018; Mahadevagouda & Pavithrabai, 2022; Mondal & Surendran, 2024). On October 6th 2024, the search strategy focused on Mesh keywords. The search technique is as follows. TS= ((“Healthcare” OR “E-Health” OR “Electronic Health” OR “Digital Health” OR “Mobile Health” OR “Smart Health” OR “Remote Health” OR “Healthcare Informatics” OR “Medical Informatics”)), AND TS= ((“AI” AND “Artificial Intelligence” AND “Machine Learning” AND “ML” AND “Deep Learning” AND “Deep Neural Networks” AND “Neural Networks” AND “Fuzzy Logic”) AND (“English”) (Language)) AND (“India”) (Country)). TS= ((“Articles” OR “Review Articles” OR “Meeting Abstract” OR “Early Access” OR “Editorial Materials”) Document Types)), AND TS= ((“SCI-EXPANDED” OR “SSCI” OR “A&HCI”) (Web of Science Index)).

To analyse the collected data, the scholars engaged Biblioshiny, a graphical interface tool based on the Bibliometrix package in RStudio programming language. This tool endorsed for visualizing information related to scientific fabrications and articles in numerous types such as nations and regions, most prolific journals, most productive authors, articles, keywords, and research organisations. Furthermore, the scholars used author keywords to draw keywords occurrence, yearly cumulate occurrences maps in each article and create thematic maps. Inclusive, the study was aimed in three core parts: data collection, data scrutiny and visualization, and data explanation.

In this study, 2944 articles are involved in this study are sources (journals and books) written by 52745 authors. It is also start that the publications a single author wrote are less in number (295). The percentages between the document average age to the average citations per doc and vice versa were noted as 3.26 and 20.08, respectively. The total number of co-authors of sample publications was formed as 6.85. Inclusive, the international co-authorships was calculated as 48.46. From 2016 to 2025, the annual growth rate is 7.59. With time, the total average citation on each document and year-wise average citation per document is recorded as 18.81 and 4.015, respectively. From the document subject's outlook, the number of keywords performing in the titles of the orientations of publications is 19030. Furthermore, 31760 keywords were found associated to the authors of articles. The outline of screened publications is revealed in Table 1.

Table 1: Summary of screened publications

Sl. No.	Indicators	Results
1	Timespan	2016:2025
2	Sources (Journals, Books, etc.)	2944
3	Documents	13858
4	Annual Growth Rate %	7.59
5	Document Average Age	3.26
6	Average citations per doc	20.08
7	Keywords Plus (ID)	19030
8	Author's Keywords (DE)	31760
9	Authors	52745
10	Authors of single-authored docs	295
11	Single-authored docs	345
12	Co-Authors per Doc	6.85
13	International co-authorships %	48.46

5. DATA ANALYSIS AND RESULTS

The Web of Science core collection database was searched for documents from January 2015 to December 2024 with important keywords, including “Healthcare”, “E-Health”, “Digital Health”, “Smart Health”, “Mobile Health”, “Remote Health”, “Medical Informatics”, “Healthcare Informatics”, “Artificial Intelligence”, “AI”, “ML”, “Machine Learning”, “Deep Learning”, “Deep Neural Networks”, “Neural Network”, and “Fuzzy Logic”. The scientometric analysis is engaged to identify important research field, prominent authors, most productive countries, most relevant institutions, and most leading sources in the Indian healthcare system. It also affords comprehensions into the advance of the embracing of Artificial Intelligence (AI) assumptions in the Indian healthcare research.

5.1 Year wise annual publications and average total citations per article, and year

During the period 2016-2025, India healthcare research has collected a total of 13858 Indian publications and recorded an average annual growth rate of 7.59 percent, and the highest annual growth rate is 23.58 in the year 2025.

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However, the highest registered 40.01 percent average total citations per articles in the year 40.01 and 6.98 percent average total citations per year in the year 2022 (Table 2).

Table 2: Yearly research outputs of Indian healthcare

Year	Articles	Percent	Mean TC Per Art	Mean TC Per Year	Citable Years
2016	229	1.65	34.58	3.14	11
2017	366	2.64	31.14	3.11	10
2018	482	3.48	31.63	3.51	9
2019	571	4.12	40.01	5.00	8
2020	891	6.43	37.53	5.36	7
2021	995	7.18	31.32	5.22	6
2022	1578	11.39	34.90	6.98	5
2023	2390	17.24	22.17	5.54	4
2024	3088	22.28	12.22	4.07	3
2025	3268	23.58	5.82	2.91	2

5.2 List of prominent authors

According to present study, an outline of the authors' articles published on Indian healthcare research from 2016 to 2025 was found, as revealed in Table 3 amongst the representative researchers the professor was distributed. These 13858 publications were contributed by 555876 authors. These authors were placed by a number of publications of their published articles on Indian healthcare research. Figure 1 displays the top 10 authors, it analysed the distribution of the number of authors per article, as well as the total number of authors included in the records. The study found that the number of journals of each article, the h-index, and the g-index for the top 10 most prolific authors. The utility h-index and g-index applied in the Biblmetrix RStudio package was used with the production and citation information of individual author.

Top 10 authors have been recognised as a most prolific, who have published in respective sources. The study shown that Kumar A is the most relevant author in this area with 333 article, received the total citations (6466), and also got an h-index (38) and g-index (65). Kumar S has the second maximum publications (293) published with 7274 citations and received an h-index (43) and g-index (75). Gupta A is the bottom publication contributed with 142 records, got deepest citations (2384), and also received the bottom h-index (26) and g-index (44) in the area of Indian healthcare research.

Table 3: Top ten ranked list of prominent author of their productivity

Rank	Authors	Articles	TC	H-Index	G-Index
1	Kumar A	333	6466	38	65
2	Kumar S	293	7274	43	75
3	Singh S	214	4636	31	61
4	Kumar R	201	5164	39	64

5	Sharma S	188	2957	27	46
6	Sharma A	186	3828	32	54
7	Singh A	178	3474	28	53
8	Kumar N	167	7837	51	84
9	Kumar P	151	3315	28	53
10	Gupta A	142	2384	26	44

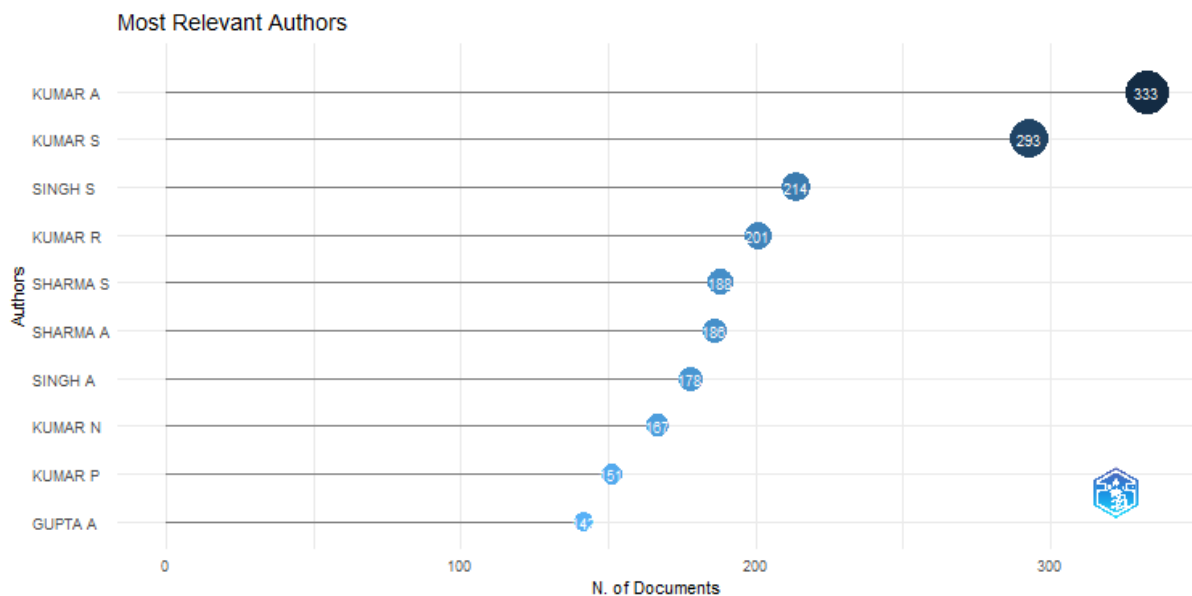


Figure 1: Most productive author of Indian healthcare research

5.3 Sources with the major publications

All scientific sources recorded in the Web of Science core collection database were observed with esteems to their different healthcare research production and total citations; H-index, G-index, and Impact Factor of relevant articles were ascertained. The recognised 13858 records on healthcare were published in 2944 different sources. In Table 4 and figure 2 shows the top 10 most cited publications in the area of healthcare research to time. The journal of PLOS One (United States) was recognised as the most prolific source (N=233) with the total citations (5009) and received h-index (36), and g-index (60). In difference, Indian Journal of Psychiatry (India) had the bottom publications (N=98) with total citation (575) and received an h-index (13), and g-index (20).

Table 4: Most relevant sources of Indian healthcare research

Rank	Sources	Articles	TC	H-Index	G-Index	Country
1	PLOS One	233	5009	36	60	United States
2	Multimedia Tools and Applications	216	2541	25	43	Netherlands
3	IEEE Access	210	8352	48	86	United States
4	Wireless Personal Communications	177	2226	24	38	Netherlands

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5	BMJ Open	164	2062	23	36	United Kingdom
6	Frontiers in Public Health	151	1764	20	36	Switzerland
7	Indian Journal of Medical Research	108	1518	21	34	India
8	Value in Health	102	146	4	11	United Kingdom
9	National Medical Journal of India	100	516	11	18	India
10	Indian Journal of Psychiatry	98	575	13	20	India

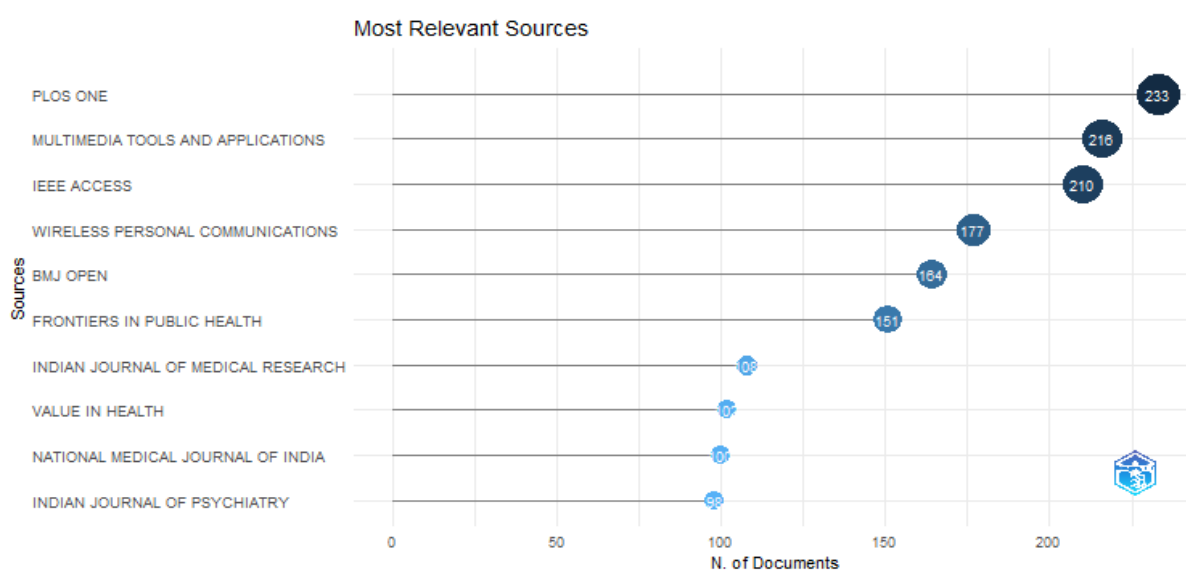


Figure 2: Most relevant sources of Indian healthcare research

5.4 Most prominent country

According to the analysis, the country of connected authors who have cooperated on AI applications of healthcare research through the study era. There are a total of 1503 records published by research collections from 178 countries from 2016 to 2025 in Indian healthcare research. Certain of them were together published by various countries, but it calculated it into countries respectively in this research area. Table 5 exposes, India took the major place with a total of 272299 citations from 13809 contributed articles. USA positions second with 63335 citations, followed by England, Saudi Arabia, Australia and so on.

Table 5: Top 10 leading countries in the area of Indian healthcare research

Rank	Country	Articles	Citations	Total Link Strength
1	India	13809	272299	15279
2	USA	2375	63335	7485
3	England	1451	45497	5580
4	Saudi Arabia	956	20112	2526
5	Australia	832	27616	3636
6	Peoples r China	737	31900	3431

7	Canada	565	20101	3024
8	South Korea	451	18554	1630
9	Italy	384	15779	2384
10	Malaysia	364	11133	1722

Country co-authorship study is a significant system of co-authorship analysis in a scientometric study. It can replicate these countries, the most powerful ones, and the collaboration among them, a network was built using VOS viewer in Figure 3. The links between nodes represent the accommodating relations amongst the academies. The distance between the nodes and the width of the links signifies the level of co-operation amongst countries. This network covers 50 nodes, 3 clusters, 1221 links, and 44085 total link strength. There are three colours (red, green, and blue) in the map, which demonstrates the variation of research guidelines. To count the above declaration in map, India contributed the major share (13809) of global collaborative articles with total link strength = 15279 times (Table 5), followed by USA with 2375 publications (total link strength 7485), England with 1451articles (5580 total link strength), Saudi Arabia with 956 publications (2526 total link strength), and Australia with 832 articles (3636 total link strength). It was decent to see that countries like India and the USA, which are developed countries, were share of this international collaboration.

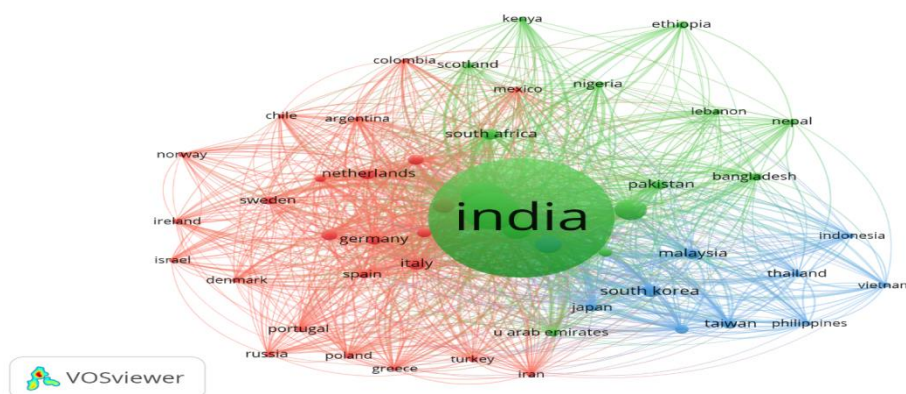


Figure 3: Most leading countries of Indian healthcare research

5.5 Most productive affiliation

Table 6 shows that the top 10 most relevant affiliations were selected organisations for the current study. It has been seen that from the table, the top number of 1491 publications contributed by Indian Institute of Technology System (IIT System) has assumed the top position followed by National Institute of Technology (NIT System) with 840 articles, University of London with 823 publications, and All India Institute of Medical Sciences (AIIMS) New Delhi with 762 articles. It is interesting to view that the lowest contribution of the Council of Scientific and Industrial Research (CSIR) - India have 471 publications. Table 6 and Figure 4 illustrations the top 10 most relevant affiliations in terms of the number of articles in Indian Healthcare Research at the national level.

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Table 6: Top 10 Affiliations in the Area of Indian Healthcare Research

Rank	Affiliation	Articles	Citations	Total Link Strength
1	Indian Institute of Technology System (IIT System)	1491	9877	99
2	National Institute of Technology (NIT System)	840	4389	52
3	University of London	823	4950	430
4	All India Institute of Medical Sciences (AIIMS) New Delhi	762	7942	438
5	Indian Council of Medical Research (ICMR)	707	2204	113
6	Manipal Academy of Higher Education (MAHE)	703	3303	187
7	Post Graduate Institute Of Medical Education and Research (PGIMER), Chandigarh	613	2082	143
8	Harvard University	551	2892	309
9	Vellore Institute of Technology (VIT)	524	6054	87
10	Council of Scientific and Industrial Research (CSIR) - India	471	2743	137

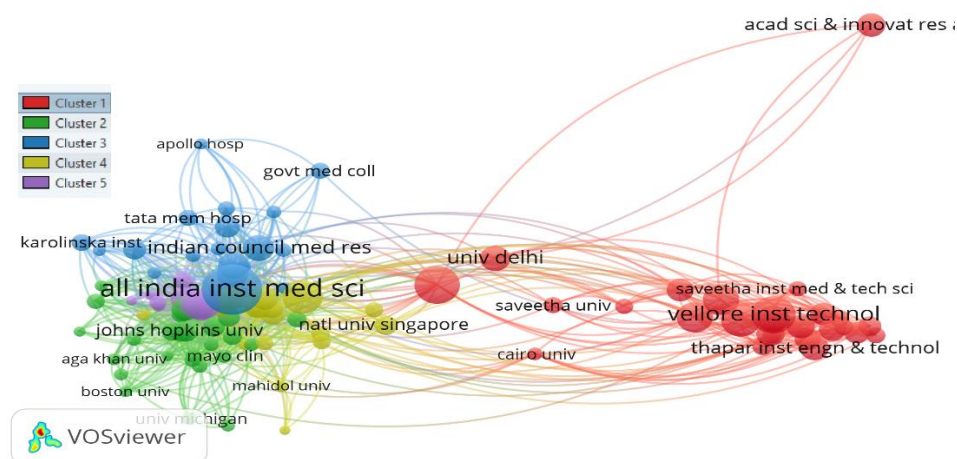


Figure 4: Most productive institutions of Indian healthcare research

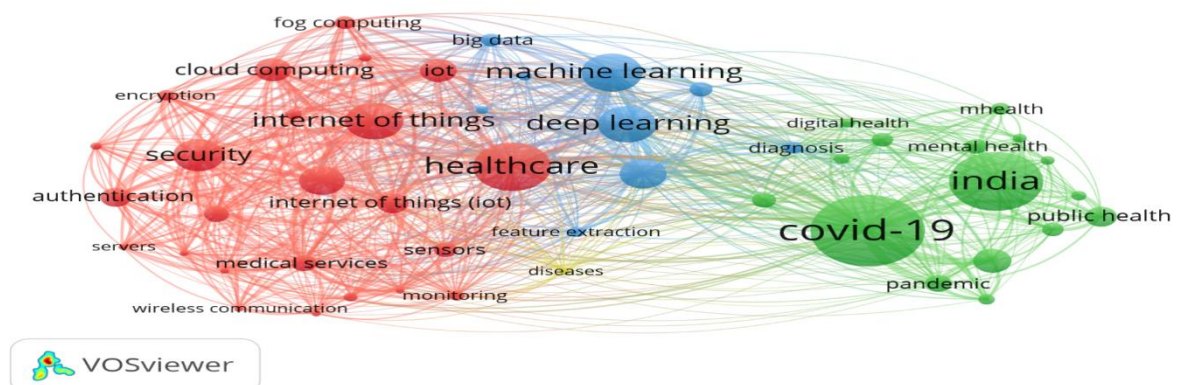
5.6 Keywords analysis and co-occurrence network

This segment offers an in-depth analysis of the content complete the scrutiny of keyword distribution in the framework of Artificial Intelligence (AI) assumptions in Indian healthcare research. The co-occurrence network of the top 10 keywords, derived from the Web of Science core collection database, is presented in Table 7. This author keywords co-occurrence network was made using VOS viewer software. From the dataset, a total of 25942 author keywords were taken out. To be elaborate in the network, a keyword had to encounter a smallest occurrence threshold, and for this study, a rank of 10 keywords was selected.

Table 7: Keywords occurrences of AI assumption in the Indian healthcare research

Rank	Keywords	Occurrences	Total Link Strength
1	Covid-19	968	891
2	India	747	269
3	Healthcare	589	728
4	Machine Learning	440	580
5	Deep Learning	424	496
6	Internet of Things	413	663
7	Security	361	710
8	Artificial Intelligence	319	486
9	Block Chain	308	537
10	Sars-Cov-2	235	263

Figure 5 displays the co-occurring keyword network, linking of four different clusters, 751 links, and total link strength of 5957. The network visualization engagements numerous colours green, red, blue, and yellow—to distinguish different modules. Mainly, the keyword “Covid-19” holds the highest frequency at 968 occurrences. Other keywords of significant occurrence embrace “India” (747), “Healthcare” (589), “Machine Learning” (440), “Deep Learning” (424), “Internet of Things” (413), “Security” (361), “Artificial Intelligence” (361), “Block Chain” (308), and “Sars-Cov-2” (235). These author keywords recommend an esteemed means of finding essential fields and aspects within study across disciplines. They contribution as a tool for discovery essential themes and features within a given field. Moreover, the figure describes the recurrent use of the keyword ‘Covid-19’ by authors in their research pursuits.

**Figure 5:** Keywords occurrences of Indian healthcare research

5.7 Thematic map of Indian healthcare research

Figure 6 shows the strategic illustration of the thematic map to reveal the importance and progress of research areas. Furthermore, it displays the thematic map based on density (y-axis) and centrality (x-axis). The centrality events the significance of the selected theme, and density measures the growth of the selected theme. In Figure 6, the upper-

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right quadrant expressions the motor themes. They are considered by both high centrality and density. “Covid-19,” “India,” and “Sars-Cov-2” are the more advanced and important terms in artificial intelligence in Indian healthcare research area. In the upper left quadrant, the niche themes are noticed, which are central and particular subjects for the research area. “Public Health,” “Health Policy,” and “Health Systems” are in this quadrant. The basic themes are revealed in the lower right quadrant. These are basic, common, and transversal subjects in the research area. “Healthcare,” “Machine Learning,” and “Internet of Things” keywords are basic themes in the AI assumptions in the Indian healthcare research area. Lastly, there are emerging or declining themes in the minor left quadrant. “Antimicrobial Resistance,” “Nanoparticles,” and “Antibiotics” are in this quadrant.

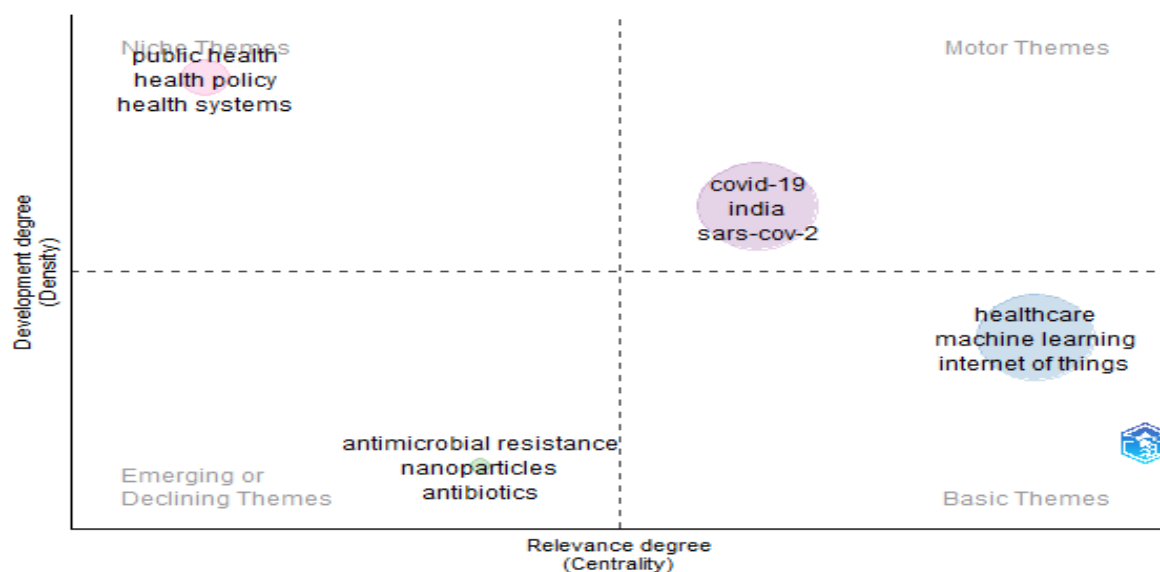


Figure 6: The strategic illustration of the thematic map of Indian healthcare research

DISCUSSION AND CONCLUSIONS

The current scientometric study highlights the growing importance and transformative possible of Artificial Intelligence in the Indian healthcare area. The results expose that AI technologies such as machine learning, deep learning, Internet of Things, blockchain, and predictive analytics are gradually being adopted to recover healthcare availability, diagnostic accuracy, patient management, telemedicine services, and drug discovery. Artificial Intelligence -driven revolutions have become mainly relevant in addressing critical healthcare challenges in India, including unable healthcare access, shortage of medical professionals, and growing disease loads. The analysis of 13,858 publications indexed in the Web of Science database during 2016–2025 reveals a steady progress in research output, with an annual growth rate of 7.59%. The growing number of publications and citations reproduces the expanding academic and professional importance in Artificial Intelligence applications in healthcare. The study also recognizes top authors, organizations, journals, and countries contributing expressively to this research field. Indian institutes such as IITs, AIIMS, ICMR, and NITs developed as productive contributors, while international collaborations with countries such as the USA, England, and Australia indicate the worldwide relevance and collaborative nature of Artificial Intelligence -based healthcare research.

Keyword and thematic analyses reveal that “Covid-19,” “Machine Learning,” “Deep Learning,” “Healthcare,” and “Artificial Intelligence” are among the most dominant research themes, emphasizing the crucial role of Artificial Intelligence during the pandemic period and beyond. The thematic mapping further indicates that healthcare informatics, public health, and AI-enabled digital health systems are becoming central and mature areas of research, whereas topics such as antimicrobial resistance and nanotechnology remain emerging domains.

The study completes that Artificial Intelligence has the possible to transform the Indian healthcare environment by attractive efficiency, decreasing costs, civilizing scientific decision-making, and associate adapted healthcare facilities. But, experiments such as data privacy, moral fears, digital structure gaps, lack of experienced professionals, and unsatisfactory technological access must be addressed to confirm sustainable and inclusive application of Artificial Intelligence technologies.

Overall, this research provides valuable insights into the research trends, collaboration patterns, and emerging themes in Artificial Intelligence -driven Indian healthcare research. The findings may assist policymakers, healthcare professionals, researchers, and academic institutions in understanding the current landscape and identifying future directions for research and innovation in Artificial Intelligence permitted healthcare systems in India.

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