Bridging Integrative and Conventional Medicine: Global Research Patterns and Collaboration Networks From a Bibliometric Perspective

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SUMMARY

Integrative medicine, defined as an evidence-based synthesis of conventional and complementary approaches, is a growing research domain. This study presents a comprehensive bibliometric analysis of literature at the intersection of integrative and conventional medicine, mapping global trends, thematic clusters, key contributors, and collaboration patterns from 1951 to 2024.

Data were retrieved from Scopus and Web of Science using a multi-term search strategy. After deduplication and applying the PRISMA 2020 guidelines, 5290 original articles and reviews were analyzed using VOSviewer, Bibliometrix, and Excel.

Scientific output grew exponentially, particularly after 2010, reaching 524 publications in 2024. The United States dominated the research output (38%), followed by China, the United Kingdom, Australia, and Germany. A keyword co-occurrence analysis revealed five thematic clusters: mind-body interventions, medical systems, evidence-based assessment, integrative oncology, and education and practice development. The most productive author was Eran Ben-Arye (Technion), and the Journal of Alternative and Complementary Medicine was the most prolific journal. International collaboration remained limited, with single-country publications predominating.

To our knowledge, this was the first bibliometric study to simultaneously utilize both databases with full deduplication across the entire 1951–2024 period, revealing rapid growth, geographic concentration, and opportunities for broader international collaboration in the domain of integrative medicine.

KEYWORDS

Integrative medicine; Complementary and alternative medicine; Conventional medicine; Bibliometric analysis; Research trends

Introduction

Integrative medicine represents a healthcare approach that combines conventional biomedical treatments with evidence-based complementary and alternative therapies, emphasizing whole-person care that addresses physical, emotional, mental, social, and spiritual dimensions of health[1]. This paradigm is distinguished from "purely" alternative medicine by its commitment to scientific evidence, its foundation within conventional medical practice, and its emphasis on the therapeutic relationship and individualized care[2]. The Academic Consortium for Integrative Medicine & Health defined integrative medicine as the "practice of medicine that reaffirms the importance of the relationship between practitioner and patient, focuses on the whole person, is informed by evidence, and makes use of all appropriate therapeutic and lifestyle approaches, healthcare professionals, and disciplines to achieve optimal health and healing"[3]. Integrative medicine has transformed from a marginal healthcare approach to an increasingly recognized component of mainstream medical practice, with growing numbers of academic medical centers establishing dedicated integrative medicine programs and research initiatives. Integrative, holistic, and comprehensive care represents a complex theoretical ideal that is increasingly embraced as a standard in modern medicine, especially in family medicine and primary care. Integrative systems and network medicine offers novel opportunities, particularly for advancing the understanding, treatment, and prevention of multisystem diseases, multimorbidity, comorbidity, and syndemics[4-6].

Bibliometric analysis became a common and established method for reviewing and synthesizing scientific productivity[7,8], with its primary advantage being the capacity to analyze a large number of publications across global and local levels[9,10].

One branch of bibliometrics, bibliometric mapping, applies keyword analysis and clustering algorithms to visualize relationships between bibliometric units (authors, institutions, countries, etc.) as bibliometric network maps — a kind of network of bibliometric units and their links that represent relationships (which can be the proximity of units, their similarity, number of mutual occurrences, etc.). The bibliometric analysis conducted in this study aimed to uncover emerging patterns of collaboration and research within the field of integrative medicine.

Previous bibliometric investigations have explored scientific activity related to integrative medicine, complementary and alternative medicine (CAM), and related domains such as integrative oncology[11], providing insights into prevailing trends within these areas[12,13], though many have addressed only selected aspects of the field, such as productivity trends[14], or an analysis of integrative medicine studies from an Islamic perspective[15], while others have relied on preprints rather than peer-reviewed literature; however, such studies are not within the scope of the present analysis[16,17]. In contrast, the present study focused specifically on the intersection between integrative and conventional medicine, aiming to identify key research hotspots and trends that may inform future studies.

The aim of this paper was to present, as comprehensively as possible, a bibliometric presentation and analysis of integrative medicine literature indexed in Scopus and Web of Science (WoS). Research trends, scientific productivity, and the contributions of leading journals, authors, institutions, and countries were examined. Patterns of single-country and international collaboration in the field were also assessed.

Methods

This study was guided by four research questions formulated to provide a comprehensive framework for understanding the structural, thematic, and

collaborative dimensions of integrative medicine research: how global scientific production in integrative medicine has evolved over time (1951–2024) in terms of publication volume and growth patterns (RQ1); what the dominant thematic clusters and research hotspots are, and how these themes have developed temporally (RQ2); who the most influential authors, institutions, journals, and countries are, and how scientific productivity is distributed across them (RQ3); and what the prevailing patterns of international collaboration are, and how single-country and multiple-country publications differ across regions (RQ4).

Bibliographic database and data source

Prior to data extraction, preliminary searches of the Scopus and WoS databases were conducted in September and October 2025 to assess the relevance of the available literature and to define and refine the final search strategy. Data extraction was performed on October 20, 2025, and the analysis and exploration of the received data took place in October 2025. Data from existing literature were obtained and exported from Scopus (Scopus, Elsevier, Amsterdam, The Netherlands) and WoS (Clarivate, London, United Kingdom), with the entirety of the WoS database included[18] and with the goal of having a wide coverage of publications based on bridging integrative and conventional medicine. These peer-reviewed bibliographic databases were selected for their comprehensive coverage, systematic organization, and compatibility with bibliometric tools[19].

The search (original articles, review articles, proceedings articles, editorials, letters, book chapters, notes, short surveys, retracted articles and corrections) covered the period from 1951, when the first paper/publication on the topic was indexed, to December 31, 2024.

The search was limited to publications indexed up to December 31, 2024, rather than the exact date of data retrieval, to ensure temporal consistency and dataset completeness. This fixed cut-off minimized the inclusion of partially indexed records and supported a stable, reproducible dataset. To our knowledge, no previous bibliometric study has simultaneously included data from both Scopus and WoS with a completed deduplication process.

Search strategies

A comprehensive search string was developed iteratively based on terminology extracted from relevant articles, guidelines, and recommendations, combining synonyms and variations to maximize coverage and minimize the omission of relevant records. The final search queries were constructed using the Scopus TITLE-ABS-KEY (title-abstract-keywords) and WoS TS (topic search) filters, encompassing each paper's title, abstract, and keywords, as follows:

TITLE-ABS-KEY("integrative medicine" OR "integrative health" OR "integrative healthcare" OR "integrative health care" OR "integrative therapy" OR "integrative therapies" OR "integrative oncology" OR "functional medicine" OR ("complementary therapy" OR "complementary therapies" OR "complementary medicine" OR "CAM" OR "alternative medicine") AND "conventional medicine") and TS=("integrative medicine" OR "integrative health" OR "integrative healthcare" OR "integrative health care" OR "integrative therapy" OR "integrative therapies" OR "integrative oncology" OR "functional medicine" OR ("complementary therapy" OR "complementary therapies" OR "complementary medicine" OR "CAM" OR "alternative medicine") AND "conventional medicine")

Given the conceptual breadth and terminological diversity of integrative medicine, the search string included synonymous expressions such as integrative health, integrative healthcare, integrative therapy, integrative oncology, and functional medicine, alongside CAM-related terms (complementary

therapy, alternative medicine, CAM) to capture earlier and international literature. The term "conventional medicine" was combined with these terms via the Boolean AND operator to ensure the retrieval of literature explicitly addressing the intersection between complementary and biomedical approaches, rather than alternative practices in isolation.

The core of the search strategy was constructed around the primary descriptors of integrative medicine and its direct terminological variants. The term integrative medicine represents the standardized and most widely recognized concept, formally indexed in the Medical Subject Headings (MeSH) thesaurus by the U.S. National Library of Medicine as "the discipline concerned with using the combination of conventional allopathic medicine and alternative medicine to address the biological, psychological, social, and spiritual aspects of health and illness"[20]. To reflect lexical and regional diversity, additional expressions such as integrative health, integrative healthcare, and integrative health care were incorporated, as these variants are prevalent in both North American and European academic discourse and institutional naming conventions (e.g., Osher Centers for Integrative Health/Medicine)[21]. Moreover, integrative therapy and integrative therapies were included to capture literature emphasizing multimodal treatment programs, especially in rehabilitation, oncology, and psychology. The term integrative oncology was added as it represents a mature and distinct subfield applying integrative principles in cancer care, and functional medicine was incorporated to encompass literature aligned with systems biology, personalized interventions, and holistic clinical models.

Since integrative medicine evolved historically from the CAM movement, complementary medicine, complementary therapy, complementary therapies, alternative medicine, and the acronym CAM were also included to ensure retrieval of earlier literature predating the widespread adoption of the integrative framework.

The inclusion of the term "conventional medicine" served a critical methodological and conceptual function, delineating the boundary between integrative approaches and independent alternative practices. Integrative medicine is inherently defined by the synthesis, coordination, or comparison between conventional biomedical systems and complementary approaches. Therefore, combining CAM-related terms with "conventional medicine" using the Boolean operator AND (e.g., ("complementary medicine" OR "alternative medicine") AND "conventional medicine") refined the search toward studies that explicitly address integrative contexts, such as comparative effectiveness research, co-treatment models, or institutional integration frameworks. Without this relational term, the query would have risked retrieving literature limited solely to alternative therapies practiced in isolation from the biomedical paradigm, thereby compromising conceptual precision. Thus, "conventional medicine" operated as a semantic anchor within the search strategy, ensuring that the retrieved records corresponded to genuine integration or interaction between distinct medical paradigms — the core definitional feature of integrative medicine.

Original research articles and review papers were included in the bibliometric analysis. Other publication types (conference papers, editorials, letters, case reports, technical notes, book chapters, short surveys, retracted publications and errata) were excluded. The selection process of publications adhered to the PRISMA 2020 guidelines and the PRISMA flowchart was used to illustrate the identification, screening, eligibility, and inclusion stages of the bibliometric dataset (Figure 1)[22]. No additional inclusion or exclusion criteria were applied.

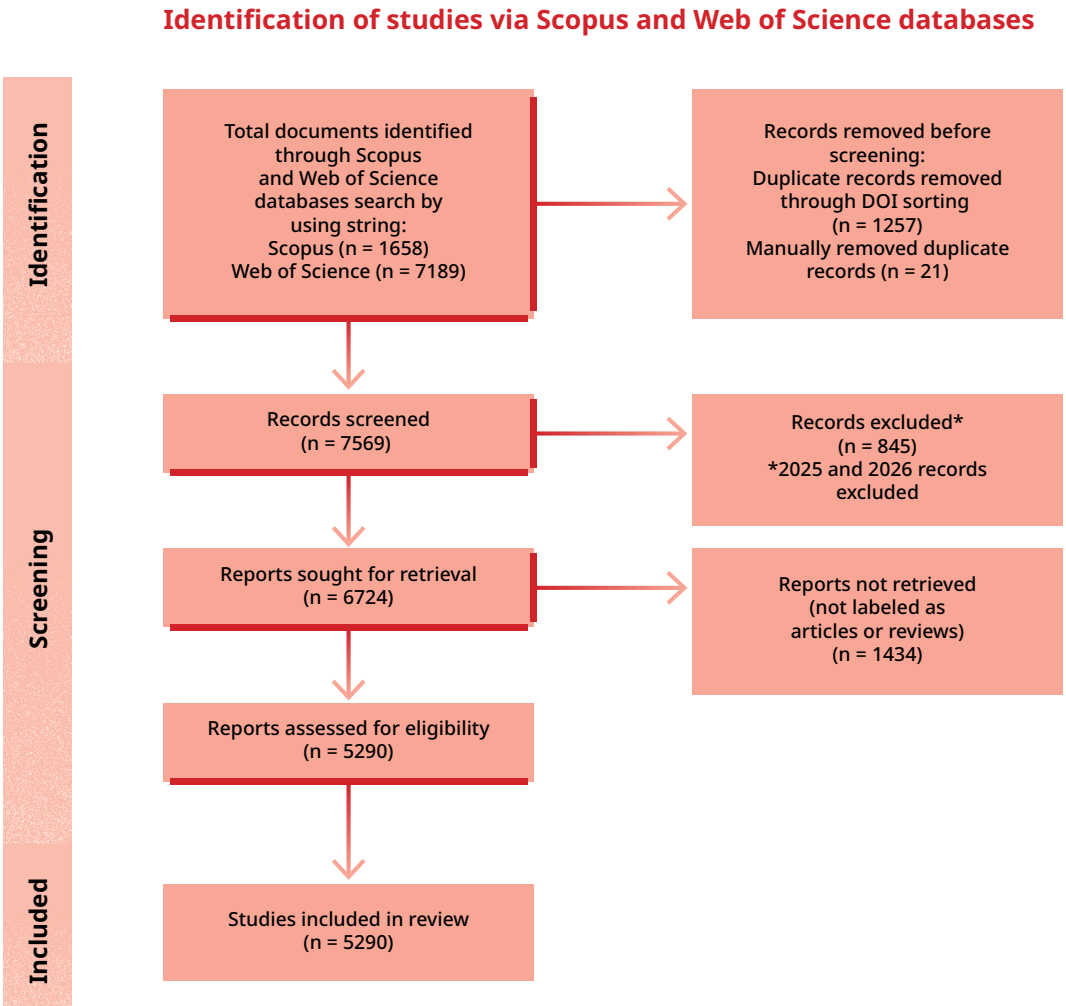


Figure 1. PRISMA flowchart of bibliometric review

Data extraction and analysis

Metadata of the selected corpus of publications were extracted and loaded into VOSViewer (Leiden University, Leiden, The Netherlands)[23], Bibliometrix (University of Naples Federico II, Naples, Italy)[24] and Excel (Microsoft Office, Microsoft Corporation, Redmond, WA, USA).

Results

The search results were 1658 articles for Scopus and 7189 articles for WoS, making a sum total of 8847 articles. All the articles were retrieved, extracted and listed in Excel and coded based on whether the article was found in WoS (W + running number) or Scopus (S + running number). From this dataset, duplicates (1257 articles) were identified by sorting the articles by DOI identifiers and author names,

and then manually comparing whether two articles with similar details existed. This resulted in the exclusion of another 21 articles from the initial results. After excluding records from 2025 and 2026 (n = 845) and records not labeled as articles or reviews (n = 1434), a total of 5290 articles were retrieved and extracted from the Scopus and WoS databases. The types of included documents, sorted by frequency, included: articles (n = 4231; 79.98%) and reviews (n = 1059; 20.02%).

Keywords

The minimum occurrence threshold for a keyword was established at 50, a value selected to balance network interpretability with thematic coverage in a large-scale corpus, employing the full fraction counting method to ensure consistency across analyses. Out of 8366 author keywords, 43 met this criterion. For each of these 43 keywords, the total strength of co-occurrence links with other

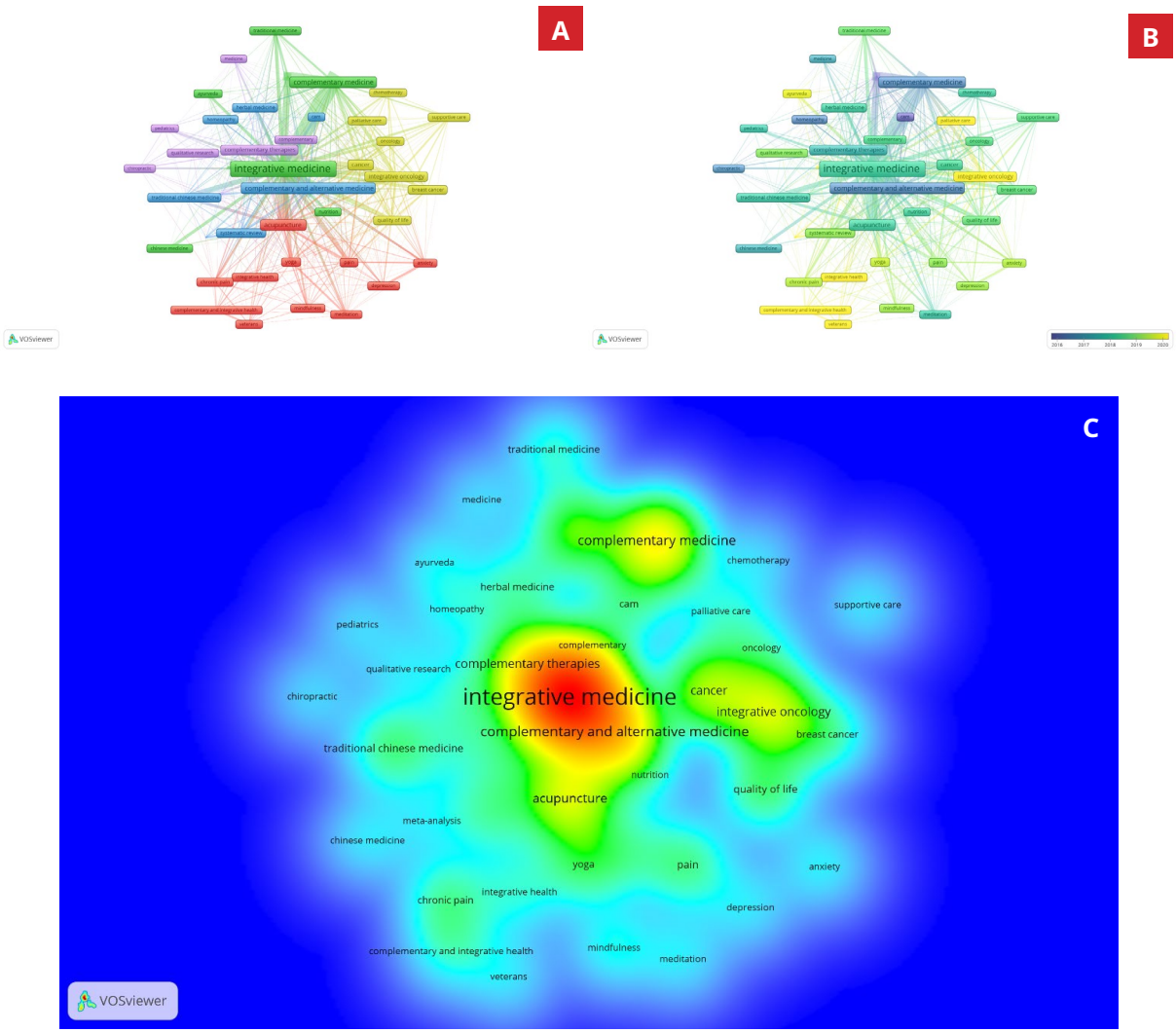


Figure 2. Bibliometric map of the research by author keywords (A), trend topics by average year of publication (B), density map (C)

keywords was calculated, and those with the highest total link strengths were identified.

The ten author keywords with the highest relevance included: “integrative medicine”, “complementary medicine”, “complementary and alternative medicine”, “acupuncture”, “integrative oncology”, “cancer”, “alternative medicine”, “complementary therapies”, “quality of life” and “yoga”. The highest co-occurrence was between “integrative medicine” and “complementary medicine”. An analysis with VOSviewer confirmed the relevance of the search terms and enabled the construction of Figure 2, which displays keyword co-occurrence (Figure 2A), average publication year per keyword (Figure 2B), and a density map (Figure 2C). The colors in Figure 2A indicate clusters formed according to the co-occurrence of keywords, while line thickness shows the number of documents in which they appear. Color in Figure 2B shows trend topics as in the average year of the documents in which the keywords appear, and color in Figure 2C depicts the frequency of documents for each keyword, where larger sizes and more intense colors indicate a higher frequency.

Publication year

The graph depicting the annual scientific production in the integrative medicine research field reveals pronounced exponential growth in publication output over the past six decades. Annual scientific production in integrative medicine showed consistently low output from the 1950s through the early 1990s, followed by a modest increase in the early 2000s. Publication output accelerated sharply after 2010, surpassing 100 articles annually, with a steep upward trajectory from 2015 onward, culminating in 524 publications in 2024 (Figure 3).

Table 1 summarizes the top 10 most cited publications in the field of integrative medicine, highlighting both the thematic focus and citation impact

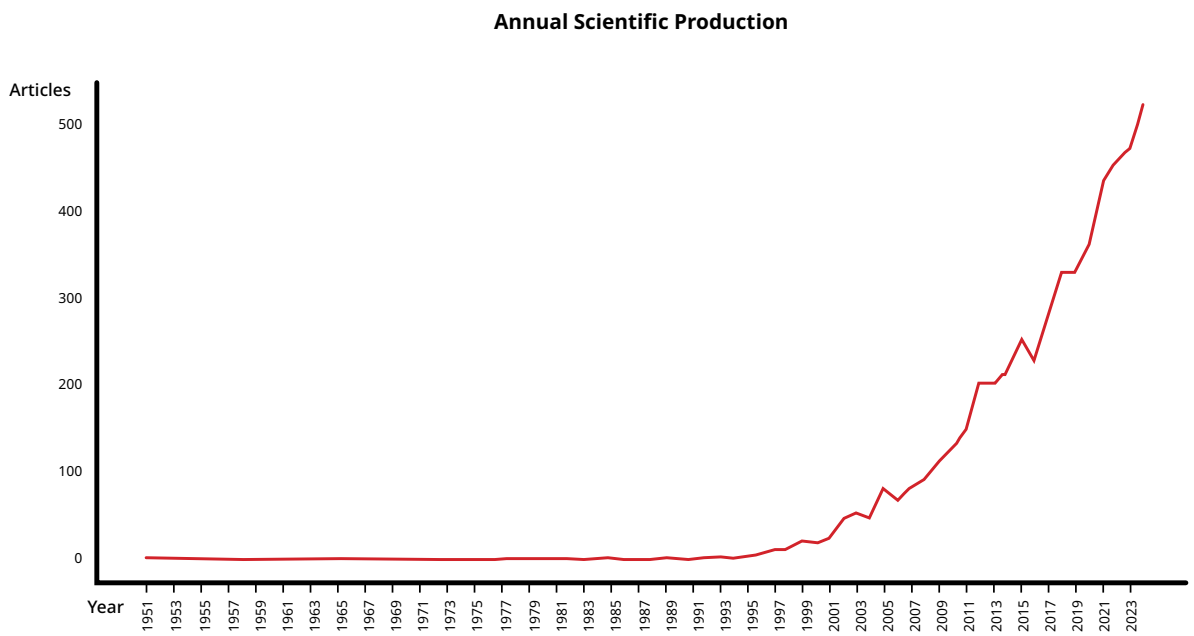


Figure 3. Annual scientific production

Table 1. Top 10 cited literature items

Rank	First author	Citations	Article title	Journal abbreviation	Date	Article type
1	Astin JA	2487	Why patients use alternative medicine: results of a national study	JAMA	1998	Article
2	Seidman MD	679	Clinical practice guideline: Allergic rhinitis	Otolaryngol Head Neck Surg	2015	Article
3	Mitchell JM	622	MDMA-assisted therapy for severe PTSD: a randomized, double-blind, placebo-controlled phase 3 study	Nat Med	2021	Article
4	Chan KKC	545	Some aspects of toxic contaminants in herbal medicines	Chemosphere	2003	Review
5	Greenlee H	539	Clinical practice guidelines on the evidence-based use of integrative therapies during and after breast cancer treatment	Ca-Cancer J Clin	2017	Review
6	Trevelyan EG	496	Delphi methodology in health research: how to do it?	Eur J Integr Med	2015	Article
7	Committee on the Use of Complementary, & Alternative Medicine by the American Public	422	Complementary and Alternative Medicine in the United States	N/A	2005	Review
8	Berman BM	408	Effectiveness of acupuncture as adjunctive therapy in osteoarthritis of the knee: a randomized, controlled trial	Ann Intern Med	2004	Article
9	Hansen MM	390	Shinrin-Yoku (Forest Bathing) and Nature Therapy: A State-of-the-Art Review	Int J Environ Res Public Health	2017	Review
10	Garland E	387	The role of mindfulness in positive reappraisal	Explore-J Sci Heal	2009	Article

within the discipline. The leading article by Astin, with 2487 citations, investigates patient motivations for using alternative medicine, representing a foundational work in understanding patient-centered factors driving integrative medicine use. The remaining highly cited works encompassed a mix of clinical practice guidelines, randomized controlled trials and methodological or review articles, reflecting the interdisciplinary and evidence-based nature of research in this area. Notably, some publications focused on emerging holistic therapies, such as mindfulness and nature-based interventions, indicating evolving research trends toward psychophysiological and lifestyle-oriented interventions.

Table 2 presents the top 10 most productive authors in the field of integrative medicine, based

Table 2. Top 10 authors distributed by publications

Rank	Author	Publications	Country	Institution	H-index	PY_Start
1	Ben-Arye Eran	114	Israel	Technion – Israel Institute of Technology	22	2007
2	Schiff, Elad	63	Israel	Technion – Israel Institute of Technology	19	2008
3	Samuels, Noah	61	Israel	Technion - Israel Institute of Technology	16	2013
4	Witt, Claudia M.	41	Switzerland	University of Zurich	16	2009
5	Ng, Jeremy Y.	40	Germany	University Hospital Tübingen	13	2016
6	Cohen, Lorenzo	39	United States	MD Anderson Cancer Center (Houston)	18	2008
7	Cramer, Holger	38	Germany	University of Tübingen	14	2012
8	Lopez, Gabriel	35	United States	MD Anderson Cancer Center (Houston)	12	2017
9	Vohra, Sunita	35	Canada	University of Alberta	11	2005
10	Adams, Jon L.	33	Australia	University of Technology Sydney	15	2000

on the total number of publications. The leading author, Ben-Arye Eran (Israel, Technion - Israel Institute of Technology), has contributed 114 publications since 2007, reflecting both prolific output and substantial influence in the field (H-index 22). Other highly productive authors are similarly affiliated with prominent institutions, including Schiff and Samuels from Technion, Witt from the University of Zurich, and Cohen and Lopez from MD Anderson Cancer Center, highlighting the international distribution of research activity across Israel, Europe, North America, and Australia.

The co-occurrence network analysis identified five major thematic areas that define the contemporary landscape of integrative medicine research (Figure 2A, Table 3). The red cluster emphasizes mind-body and psychological interventions, such as yoga, mindfulness, and acupuncture, with a growing focus on mental health outcomes and chronic pain management. The green cluster captures the integration of traditional medical systems (notably Ayurveda, traditional/Chinese medicine, and nutrition-based practices) into modern healthcare, reflecting both cultural diversity and global health relevance. The blue cluster delineates evidence-based evaluation, centering on systematic reviews, meta-analyses, and methodological rigor across CAM and integrative medicine. The yellow cluster represents the field of integrative oncology, highlighting the use of complementary therapies to enhance quality of life and supportive care in cancer treatment. Finally, the violet cluster underscores education and clinical practice development, focusing on professional training, qualitative research, and the implementation of integrative therapies across diverse populations. Together, these themes illustrate the multidimensional evolution of integrative medicine — from traditional roots and

Table 3. Research themes and categories identified in the most recent and highly cited papers, along with their primary research focuses: Representative author keywords, categories, and themes in research concerning integrative medicine

Color	Representative author keywords (number of occurrences)	Categories	Theme
Red	Acupuncture (302), anxiety (73), chronic pain (116), complementary and integrative health (86), depression (63), integrative health (84), integrative therapy (81), meditation (67), mindfulness (83), pain (132), veterans (62), yoga (128)	Mind–Body and Integrative Therapies; Integration of psychological and physiological approaches in complementary and integrative health programs, especially for veterans and chronic disease populations.; Implementation of integrative therapy protocols within conventional healthcare for mental and somatic comorbidities.	Psychological Wellbeing and Mind-Body Interventions
Green	Alternative medicine (214), ayurveda (59), chinese medicine (65), complementary medicine (393), covid-19 (78), integrative medicine (1525), nutrition (60), traditional medicine (98)	Traditional Systems and Global Health; Comparative and integrative studies on Ayurveda, Traditional & Chinese Medicine and nutrition-based approaches.; Exploration of COVID-19–related integrative interventions	Traditional, Complementary, and Integrative Medical Systems
Blue	CAM (100), complementary and alternative medicine (63), complementary and integrative medicine (86), herbal medicine (105), homeopathy (64), meta-analysis (51), systematic review (113), traditional chinese medicine (142)	Synthesis and critical appraisal through systematic reviews and meta-analyses in complementary and alternative medicine (CAM).; Evaluation of herbal medicine, homeopathy, and TCM within rigorous evidence-based frameworks.; Methodological discussions on research quality, reproducibility, and reporting standards for integrative medicine studies.	Evidence-Based Assessment and Systematic Research in Integrative Medicine
Yellow	Breast cancer (119), cancer (251), chemotherapy (55), integrative oncology (289), oncology (76), palliative care (70), quality of life (148), supportive care (64)	Application of integrative medicine approaches in oncology and palliative care; Assessment of quality of life and symptom management during chemotherapy and cancer survivorship; Development of integrative oncology models emphasizing supportive and holistic care	Integrative Oncology and Supportive Cancer Care
Violet	Chiropractic (54), complementary (66), complementary therapies (240), education (59), medicine (55), pediatrics (51), qualitative research (56)	Curricular and professional training in complementary and integrative therapies for medical and allied health professionals; Clinical application of chiropractic, pediatric integrative medicine, and qualitative research on patient experience;	Integrative Medicine Education and Clinical Practice Development

clinical applications to methodological refinement and healthcare system integration.

Table 4 presents the top 20 countries in integrative medicine research, ranked by total publications and including key bibliometric indicators such as total citations, average citations (AC), and corresponding author contributions single-country publications (SCP) vs multiple-country publications (MCP). The ranking of countries according to the research output and international collaboration across the top 20 countries based on corresponding authors with full counting was carried out in RStudio/Bibliometrix, which identified scientific articles in two groups: SCP and MCP. The

Table 4. Top 20 countries distributed by publications and citations according to corresponding authors' countries

Ranked by publications	Country	Total articles	Citations	Average citations (AC)	Corresponding author (CA)		/5290%	Rank by AC
					SCP	MCP		
1	USA	2008	38283	19	1844	164	38.0	5
2	China	457	6993	15	384	71	8.6	10
3	Germany	344	5973	17	263	81	6.5	=9
4	Australia	325	7679	24	282	43	6.1	=3
5	Canada	261	6621	25	227	34	4.9	2
6	Israel	179	3262	18	136	43	3.4	=6
7	UK	175	4824	28	150	25	3.3	1
8	South Korea	171	1838	11	158	13	3.2	=15
9	India	166	1513	9	143	23	3.1	19
10	Italy	114	1922	17	92	22	2.2	=9
11	Iran	105	1207	12	82	23	2.0	14
12	Brazil	96	1067	11	81	15	1.8	=15
13	Switzerland	63	1117	18	42	21	1.2	=6
14	France	52	685	13	34	18	1.0	=11
15	Sweden	42	745	18	36	6	0.8	=6
16	Türkiye	38	401	11	37	1	0.7	=15
17	Netherlands	34	818	24	20	14	0.6	=3
18	Japan	31	392	13	29	2	0.6	=11
19	Denmark	29	381	13	22	7	0.5	=11
20	Spain	29	324	11	23	6	0.5	=15

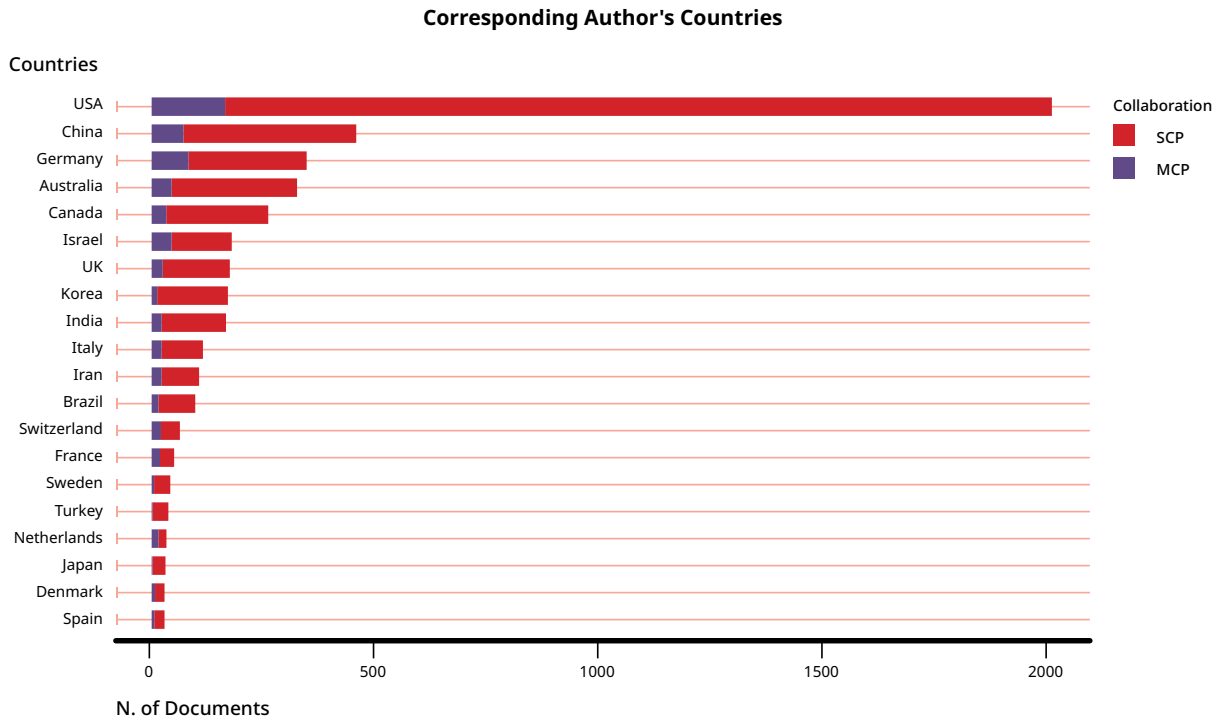


Figure 4. Corresponding authors' countries

distinction between SCP and MCP was made with the primary goal to understand the extent of global engagement in research, particularly in terms of countries' collaborative patterns. Following this principle, authors from Türkiye (MCP ratio of 2.6%) and Japan (MCP ratio of 6.5%) demonstrated minimal collaboration with other countries (Figure 4).

The United States dominated the field, contributing 2008 articles with 38 283 citations, yielding an average of 19 citations per article and accounting for 1844 SCP and 164 MCP representing 38% of the total publications with corresponding authorship.

China ranked second in productivity with 457 publications but a lower AC of 15. Germany (344 articles, AC 17) and Australia (325 articles, AC 24) reflected both high-quality output and strong visibility. Australia showed the highest AC among the top five.

Single-country publications generally exceeded MCP, indicating that most research is led by domestic corresponding authors, while countries like the USA (164 articles in MCP, ratio of 8.2%), Germany (81 article in MCP, 23.5%), and China (71 article in MCP, 15.5%) also demonstrated strong international collaboration. In percentage, the Netherlands, Norway, and France led in the MCP ratio, with 41.2%, 39.3% and 34.6% of articles made in MCP, respectively.

The distribution of publications and citations across the top 20 journals in integrative medicine revealed a diverse yet clearly stratified publication landscape, reflecting both the field's interdisciplinarity and the varying degrees of journal impact (Table 5). The Journal of Alternative and Complementary Medicine emerged as the most prolific outlet, with 220 publications and the highest citation count (4092) a moderate Journal Impact Factor (JIF = 2.4), Scimago Journal Rank (SJR = 0.498, Q2) and its last indexation going back to 2021 (Scopus), or 2023 (WoS).

Table 5. The most prolific journals: Top 20 journals distributed by publications and citations

Journal	Number of publications	H-index	Total citations	Impact factor (SJR - 2024)	Quartile	Journal impact factor (JIF - 2024)
Journal of Alternative and Complementary Medicine	220	32	4092	0.498*	Q2 (SJR)* Q2 (JIF)**	2.4**
Complementary Therapies in Medicine	143	27	2505	1.018	Q1 (SJR) Q1 (JIF)	3.5
Integrative Cancer Therapies	143	24	2389	0.799	Q1 (SJR) Q2 (JIF)	2.8
European Journal of Integrative Medicine	125	18	1567	0.399	Q2 (SJR) Q3 (JIF)	1.7
Evidence-Based Complementary and Alternative Medicine	121	31	2987	0.469***	Q2 (SJR)*** Q3 (JIF) ****	2.65 ****
BMC Complementary and Alternative Medicine	99	31	3206	0.741*****	Q1 (SJR) ***** Q1 (JIF) ******	4.782 ******
Explore-The Journal of Science and Healing	95	17	1633	0.510	Q1 (SJR) Q2 (JIF)	2.2
Chinese Journal of Integrative Medicine	81	16	994	0.561	Q2 (SJR) Q2 (JIF)	2.5
Complementary Therapies in Clinical Practice	79	17	1035	0.920	Q1 (SJR) Q2 (JIF)	3.0
Supportive Care in Cancer	79	20	1411	1.109	Q1 (SJR) Q2 (JIF)	3.0
BMC Complementary Medicine and Therapies	78	13	883	0.741	Q1 (SJR) Q1 (JIF)	3.4
Journal of Integrative and Complementary Medicine	54	7	214	0.648	Q1 (SJR) Q3 (JIF)	1.7
Medical Acupuncture	54	10	413	0.267	Q3 (SJR) Q4 (JIF)	0.9
Advances in Integrative Medicine	48	9	227	0.312	Q2 (SJR) Q3 (JIF)	1.3
Journal of Integrative Medicine	46	14	670	0.867	Q1 (SJR) Q1 (JIF)	4.0
PLoS One	43	17	810	0.803	Q1 (SJR) Q2 (JIF)	2.6
Integrative Medicine Research	42	12	468	0.564	Q2 (SJR) Q2 (JIF)	3.0
Medicine	36	7	158	0.463	Q3 (SJR) Q2 (JIF)	1.4
Journal of Ayurveda and Integrative Medicine	32	8	147	0.373	Q2 (SJR) Q2 (JIF)	1.9
Pain Medicine	32	16	590	0.982	Q1 (SJR) Q1 (JIF)	3.0

*2022 SJR because the journal was last indexed in 2021; ** 2023 JIF because the journal was last indexed in 2023;
*** 2022 SJR because the journal was last indexed in 2022; **** 2021 JIF because the journal was last indexed in 2021;
***** 2019 SJR because the journal was last indexed in 2019; ****** 2021 JCR because the journal was last indexed in 2019

Other leading contributors included Complementary Therapies in Medicine and Integrative Cancer Therapies (143 articles each), both with Q1 in terms of SJR and strong citation profiles (2505 and 2389 citations, respectively).

It is important to note that some metrics were based on the most recently available indexing year rather than the current year. These annotations ensure transparency and contextual accuracy, clarifying that certain impact metrics reflect the latest available data rather than the current reporting year.

Discussion

This bibliometric analysis offers a multifaceted view of the scientific literature and research activity on integrative medicine at the intersection with conventional medicine, highlighting key trends, influential publications, geographic distribution, collaboration networks, and the thematic development of research from 1951 to 2024. By analyzing a large dataset of publications during the study period, the analysis revealed thematic expansion, geographic distribution, institutional contributions, and journal impact within the field, along with the relevance of highly cited papers and influential authors.

Scientific interest in integrative medicine research began in 1951[25], with a significant and continuous increase in the number of publications starting from the early 2000s. The scope of research in the field of integrative medicine has significantly expanded, with an exponential increase particularly noticeable since the early 2000s, reaching a peak in 2024 with 524 publications. Our study revealed that the number of studies on integrative medicine has significantly increased from the year 2000 to the present, with a sharp acceleration in scientific production after 2010. This surge likely corresponds to global policy shifts promoting complementary and integrative practices, the establishment of dedicated journals, and the growing interdisciplinary interest linking traditional, complementary, and evidence-based medicine. However, this association cannot be confirmed without formal time-series or regression analyses.

The discovered growth trajectory substantially exceeds the one documented in earlier bibliometric studies focusing solely on integrative medicine or CAM, suggesting that examining the explicit intersection with conventional medicine captures a particularly dynamic and expanding research domain[26,27].

The exponential growth in integrative medicine publications observed in our study is consistent with trends documented in earlier bibliometric analyses, yet extended and amplified their findings in important ways. Ding and Li[12], analyzing the broader field of integrative and complementary medicine in WoS from 2009 to 2018, documented annual publication output growing from approximately 2076 to 3797 articles, with a notable inflection point around 2013. Our data not only confirmed this upward trajectory but also revealed a markedly steeper acceleration after 2015, culminating in 524 publications in 2024 alone, suggesting that the intersection of integrative and conventional medicine has become an increasingly distinct and dynamic research domain within the broader CAM landscape.

This increase corresponds to several converging factors, including the establishment of dedicated research centers and funding mechanisms, particularly through the National Center for Complementary and Integrative Health (NCCIH)[28], and the growing recognition that chronic diseases require multifaceted therapeutic approaches. The most cited article, authored by Astin (2487 citations), explores patients' reasons for turning to alternative medicine and is regarded as a seminal contribution to understanding patient-centered determinants of integrative medicine utilization[29]. Other highly

cited publications include clinical practice guidelines[30,31], randomized controlled trials[32,33], as well as methodological papers and review articles[34,35], underscoring the interdisciplinary scope and strong evidence-based orientation of research in this domain. Several of these influential studies addressed emerging holistic approaches, including mindfulness-based interventions[36] and nature-based therapies[37], reflecting a growing scholarly emphasis on psychophysiological processes and lifestyle-focused therapeutic strategies.

The prominence of clinical practice guidelines among highly cited works, including guidelines for allergic rhinitis and evidence-based integrative therapies in breast cancer care, demonstrates the field's progression from descriptive studies to evidence synthesis capable of informing clinical decision-making.

From a broader historical perspective, Danell and colleagues[10], who mapped 50 years of CAM research, observed a gradual but steady bibliometric expansion across the field as a whole. Our study added conceptual specificity to this picture by focusing exclusively on literature that explicitly addresses the intersection between integrative and conventional medicine; a framing that captures a more institutionally embedded and evidence-oriented segment of the field.

The geographic distribution of top authors revealed a concentration of integrative medicine research within specific institutional hubs. Israel emerged as the most productive single-country contributor, with the top 3 authors affiliated with Technion. Europe was represented through Swiss and German institutions, while North America's leading contributors were predominantly affiliated with cancer research centers, reflecting the strong overlap between integrative medicine and oncology. The presence of authors from Australia further underscored the field's growing internationalization beyond traditional Western hubs. Research on integrative medicine was most concentrated in the United States (US), which accounted for 38% of the publications with corresponding authorship and maintained the highest absolute citation count, followed by China, the United Kingdom, Australia, and Germany. This is in contrast with broader bibliometric analyses of the TCAIM (traditional, complementary, alternative and integrative medicine) field, where China has consistently been identified as the leading contributor[12,38,39], suggesting that the explicit focus on the intersection with conventional medicine preferentially captures literature embedded within Western evidence-based research frameworks. The US lead not only in the number of publications but also in international collaboration: its 164 MPC placed it at the center of international collaboration networks. Despite having a large number of published papers (457 articles), China received moderate to average citations[15], suggesting potential language barriers limiting international accessibility or focus on research questions with primarily domestic relevance. This observation mirrors findings by Ding and Li, who similarly noted a gap between high publication volume and moderate citation impact in Chinese integrative and complementary medicine research[12]. The United Kingdom and Australia, despite having fewer publications than the US and China, were revealed to have high average citation counts (24 and 28 average citations, respectively), indicating the quality of their research. Germany's prominent position is consistent with Danell's findings in integrative oncology, and was further reflected in our author-level data, where two of the top ten most productive authors were affiliated with the University of Tübingen[11]. The international collaboration network showed that integrative medicine research remains largely domestically focused, with the predominance of single-country publications over multiple-country publications across most countries. This pattern suggests potential limitations in cross-cultural learning and global knowledge synthesis. The range of H-index values and career start years suggests a dynamic research community combining longstanding contributors with emerging leaders.

Thematic clustering identified five primary research areas: integrative oncology, mind-body interventions, traditional medical systems, evidence-based assessment, and education and practice development. This thematic distribution supports a multidisciplinary approach, emphasizing the integration of diverse therapeutic strategies. It became evident that subcategories are interconnected, with the mind-body interventions cluster, encompassing acupuncture, yoga, mindfulness, and meditation, representing approaches with particularly robust evidence bases and growing acceptance within conventional healthcare settings. The evidence-based assessment cluster, encompassing systematic reviews and meta-analyses, represents the field's ongoing efforts to establish scientific credibility through synthesis and critical appraisal. These findings are broadly consistent with prior bibliometric analyses: Song, Ang, and Lee identified TCM, acupuncture, yoga, systematic reviews, and CAM as dominant themes in Q1 integrative medicine journals, directly echoing our traditional medical systems, mind-body, and evidence-based clusters[26]. The prominence of integrative oncology is similarly supported by Danell and Moral-Munoz et al., whose co-word analysis identified palliative care, cancer survivorship, anxiety, and meditation as recurring themes[13,39]. All of these themes closely mirror our integrative oncology and mind-body clusters, confirming that these represent stable, cross-cutting research priorities in the field. The education and practice development cluster, by contrast, was less prominent in prior studies, potentially signaling an emerging focus on the institutionalization and professional training dimensions of integrative medicine.

The journal landscape of integrative medicine is both diverse and stratified, with research concentrated in a core group of outlets balancing high productivity with citation visibility. The continued dominance of the Journal of Alternative and Complementary Medicine reflects its longstanding role in the field, despite its recent de-indexation from Scopus and WoS. The strong performance of Q1-ranked journals such as Complementary Therapies in Medicine indicates growing methodological rigor and clinical relevance. The increasing presence of regionally anchored journals highlights the field's geographic diversification, while the rise of newer journals, such as the Journal of Integrative Medicine and Integrative Medicine Research, signals a maturing and expanding publication ecosystem. Notably, the appearance of Supportive Care in Cancer and Pain Medicine journals (ranked 10th and 20th, respectively) among the top 20 journals is consistent with Ding and Li's observation that high-impact integrative medicine papers are increasingly published in mainstream biomedical journals, suggesting the field's growing clinical relevance beyond its traditional disciplinary boundaries[12].

As previously mentioned, prior bibliometric reviews have not focused in detail on the explicit intersection between integrative and conventional medicine, even though this is a key concept when addressing this issue. To our knowledge, this was the first analysis to explore the hotspots and trends in research examining integrative medicine explicitly at its intersection with conventional medicine, utilizing both the Scopus and WoS databases and covering the entire research period from 1951 to December 2024.

Despite our thorough analysis of keywords, journals, institutions, references, authors, and countries, certain limitations existed in the preparation of this study. First, despite utilizing both Scopus and WoS, coverage limitations may have underrepresented research published in regional journals or non-English language sources, and it was not possible to definitively determine whether all relevant literature on this topic was identified, especially if authors did not include the mentioned integrative medicine terms and "conventional medicine" explicitly in the title, abstract, or keywords. Using two databases, Scopus and WoS, increased coverage and reduced single-database bias, but may have overlooked papers published outside

these two databases[40], such as PubMed and PsycINFO. At the same time, the advantages of this analysis lie in the inclusion of both Scopus and WoS, which offer broad coverage and a large corpus of works for searching, and represent an important part of scientific communication, especially in biomedicine and health[41]. Moreover, there are relatively few bibliometric studies based on a conjoined analysis of Scopus and WoS, particularly bibliometric analyses of literature in the field of integrative medicine at its explicit intersection with conventional medicine.

More research is needed in countries where integrative medicine and its intersection with conventional medicine are less explored, as cultural and socioeconomic specifics may influence treatment practices, patient preferences, and the availability of integrative approaches. Future bibliometric studies in the field of integrative medicine and its intersection with conventional medicine should include additional professional and biomedical databases, such as the abovementioned PubMed and PsycINFO, to improve thematic coverage. Additionally, expanding search strategies to include even broader terminology related to integrative medicine would further enhance the comprehensiveness of retrieved records. It also has to be noted that citation-based indicators may be influenced by factors such as journal visibility and open-access status, rather than reflecting only the scientific quality and/or impact of individual studies. Moreover, future studies could benefit from comparative bibliometric analyses across different geographic regions, both to address potential language bias and to enable an examination of integrative and conventional medicine interactions within specific socio-cultural, socioeconomic, and healthcare contexts, in order to provide deeper insights into cultural differences in researching these phenomena.

Conclusion

In this study, we conducted a bibliometric analysis with the aim of investigating trends and key focal points of scientific activity in the field of integrative medicine from 1951 to 2024. The analysis identified the most important research areas, current trends, and existing knowledge gaps, thereby enabling scientists and clinicians to better direct future research and clinical practice. Our results showed that research on the intersection of integrative and conventional medicine has experienced clear quantitative and thematic growth over the past several decades, with particular intensification in recent years.

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SAŽETAK

Povezivanje integrativne i konvencionalne medicine: globalni istraživački obrasci i mreže suradnji iz bibliometrijske perspektive

Maja Crnov, Vladimir Ruf, Azra Tojaga, Ivan Beljan i Josip Šimić

Integrativna medicina, kao sinteza konvencionalne i komplementarne medicine utemeljena na dokazima, sve je zastupljenije istraživačko područje. Ova studija predstavlja bibliometrijsku analizu literature na sjecištu integrativne i konvencionalne medicine mapiranjem globalnih trendova, tematskih cjelina, ključnih suradnika i obrazaca suradnje od 1951. do 2024. godine.

Podaci su prikupljeni iz baza Scopus i Web of Science pretraživanjem s višestrukim terminima. Nakon deduplikacije i primjene smjernica PRISMA 2020, analizirano je 5290 izvornih i preglednih znanstvenih radova korištenjem VOSviewera, Bibliometrixa i Excela.

Znanstvena produkcija bilježila je eksponencijalni rast, osobito nakon 2010. godine, dostigavši 524 publikacije u 2024. godini. Sjedinjene Američke Države dominirale su istraživačkim doprinosom (38 %), a slijedile su ih Kina, Ujedinjeno Kraljevstvo, Australija i Njemačka. Analiza supojavljivanja ključnih riječi izdvojila je pet tematskih cjelina: intervencije usmjerene na um i tijelo, medicinske sustave, procjenu temeljenu na dokazima, integrativnu onkologiju te obrazovanje i profesionalne prakse. Najproduktivniji autor bio je Eran Ben-Arye (Technion), a najproduktivniji časopis Journal of Alternative and Complementary Medicine. Međunarodna suradnja ostala je ograničena.

Prema našim saznanjima, ovo je prva bibliometrijska studija koja je istodobno koristila obje baze podataka s potpunom deduplikacijom za razdoblje od 1951. do 2024., otkrivajući brzi rast, geografsku koncentraciju i mogućnosti za širu međunarodnu suradnju u domeni integrativne medicine.

KLJUČNE RIJEČI

Integrativna medicina; Komplementarna i alternativna medicina; Konvencionalna medicina; Bibliometrijska analiza; Istraživački trendovi