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Scientific landscape of traditional and complementary medicine in chronic diseases in older adults: A bibliometric and qualitative analysis of the most influential literature

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Abstract: This study aims to analyze the scientific landscape of Traditional and Complementary Medicine (TCM) applied to chronic disease management in older adults, highlighting global research trends, thematic clusters, and collaboration networks. A mixed-methods study combining bibliometric and qualitative analyses was conducted using Scopus and Web of Science databases. Thirty-two peer-reviewed articles published between 2002 and 2025 were selected following inclusion and exclusion criteria. Data were processed using R (v4.4.2) and VOSviewer (v1.6.20) to evaluate productivity, citation impact, thematic evolution, and institutional cooperation. Results show a non-linear but sustained growth in scientific production, with peaks in 2015 and 2019 and a post-pandemic slowdown. The United States and Australia lead in productivity and impact, while Asian countries contribute emerging evidence. Three thematic clusters were identified: clinical effectiveness, emotional well-being, and complementary therapies (acupuncture, phytotherapy, meditation). TCM research on chronic diseases in older adults has achieved global relevance but remains fragmented, with limited international collaboration and a lack of standardized clinical protocols. The findings provide actionable evidence to guide public health policies, promote multicenter research, and foster integration of TCM into healthy aging programs.

Keywords: *Collaboration networks, Emotional well-being, Healthy aging, Integrative therapies, Public health, Thematic trends.*

1. Introduction

The aging of the global population is increasing the incidence of chronic diseases, which represents a major public health challenge [1, 2]. For example, China is facing rapid changes in its population structure and a growing burden of chronic diseases among older adults [3]. Aging is associated with several complex diseases, including type 2 diabetes, neurodegenerative diseases, and cancer [4]. The treatment of age-related diseases is an important topic in both modern and traditional medicine [4]. Traditional Chinese Medicine (TCM) offers a holistic approach to well-being and incorporates herbal remedies, acupuncture, and other therapies [5]. The clinical application of TCM in diabetes in older adults, for example, considers the unique pathological characteristics of this age group, such as complications, vascular aging, cognitive decline, osteoporosis, and sarcopenia [6]. TCM is also used to treat cancer-related fatigue, a common and prolonged condition that affects the physical and mental health of oncology patients [7].

In this scenario, traditional and complementary medicine (TCM) has emerged as an alternative and complement to conventional approaches for the prevention, treatment, and management of chronic diseases in older adults [8, 9]. Given the growing global burden of chronic diseases and the limitations

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of modern medicine in fully addressing them, traditional Chinese medicine offers a holistic approach that can improve patients' quality of life [10].

The relevance of TCM in the management of chronic diseases has been widely documented in many regions. In Asia, particularly in China, Japan, Korea, and Thailand, these practices are a fundamental part of national public health strategies, supported by government policies and controlled clinical studies that demonstrate their effectiveness in managing pain, mobility, emotional stability, and the prevention of complications. However, the integration of TCM in Latin America has been slower and faces barriers related to the lack of regulation, limited scientific evidence, and constraints in healthcare system coverage. This contrast highlights a disparity in the production and visibility of scientific literature on the topic, which largely depends on investment in research, inter-institutional cooperation, and adoption of multidisciplinary approaches.

The analysis of the existing literature shows that, although TCM is recognized as a valuable resource in the comprehensive care of older adults, significant knowledge gaps persist. These include the absence of standardized clinical protocols, methodological heterogeneity of studies, and difficulties in assessing the long-term effectiveness of interventions. Moreover, limited international cooperation and the concentration of publications in a few countries and journals restrict the generation of solid evidence that would allow for global comparisons and support the formal incorporation of these therapies into public health policies. This fragmentation poses a challenge for both researchers and healthcare professionals, who require reliable, updated, and contextualized information to guide their clinical decision-making.

In recent years, scientific production on TCM has experienced sustained growth, reflecting a paradigm shift toward more integrated care. However, this increase has been uneven in terms of its impact and visibility. While countries such as the United States, Australia, and some Asian nations lead the research agenda, other regions remain underrepresented in the literature indexed in high-impact databases. This situation creates significant bias, as findings from local contexts or regional publications often remain outside the global reach, limiting the understanding of the diversity of TCM applications and outcomes in different sociocultural settings. Therefore, it is necessary to analyze not only scientific productivity but also geographic distribution, the influence of collaboration networks, and the evolution of thematic trends in this field.

Given the existing fragmentation and the need to strengthen the scientific evidence on the role of TCM in managing chronic diseases in older adults, an integrated approach combining quantitative and qualitative analyses is required. This approach makes it possible to identify the most influential journals, leading countries, key institutions, and the most widely studied therapies, as well as to evaluate citation patterns and thematic interconnections that structure current scientific production in this field. In this regard, bibliometrics constitutes an ideal tool for mapping the evolution of this field of study and revealing opportunities for future research.

Bibliometric analysis has become a common quantitative method for understanding trends in complementary, alternative, and integrative medicine (CAIM) [11]. In addition, bibliometric and scientometric analyses help evaluate TCM by providing insights into research activity, performance, scholarship, and trends in this field [12].

Bibliometric analysis involves the use of quantitative statistical methods to understand trends in a specific scientific field [11]. These analyses can reveal the most influential articles, journals, and authors, as well as emerging trends and underexplored research areas [13, 14].

In this context, bibliometric and qualitative analyses of the most influential literature can provide valuable insights into the scientific landscape of traditional and complementary medicine in the management of chronic diseases in older adults. This approach helps identify key trends, research gaps, and possible pathways for integrating TCM into healthcare systems to improve patient care and outcomes in this vulnerable population.

Despite the growing interest in Traditional and Complementary Medicine (TCM) and its potential to improve the quality of life of older adults with chronic diseases, current scientific evidence remains

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fragmented and dispersed. Existing studies present high methodological heterogeneity, limited comparability of findings, and a lack of standardized clinical protocols, which restricts the ability to rigorously evaluate the effectiveness and safety of these treatments. Furthermore, the low internationalization of research output and limited inter-institutional collaboration hinder the development of a global consensus and the translation of findings into public health policies. In this context, our study addresses this gap by providing an integrated approach that combines bibliometric analysis and qualitative review to map thematic trends, identify knowledge gaps, and generate actionable evidence to guide clinical guidelines and inform health policies for integrating TCM into healthy aging programs.

2. Methodology

A descriptive and exploratory bibliometric and scientometric study was conducted using a mixed-methods approach that combined quantitative bibliometrics to analyze productivity, impact, collaboration, and thematic trends, along with a qualitative review of the selected articles focused on traditional and complementary medicine in chronic diseases among older adults.

2.1. Information Sources and Search Strategy

Scientific information was collected from two high-quality academic databases: Scopus and Web of Science (WoS). These platforms were selected because of their international coverage, thematic diversity, and integrated analytical tools, which ensure the representativeness and rigor of the results [15, 16]. In WoS, the Science Citation Index Expanded (SCI-EXPANDED) and Social Science Citation Index (SSCI) collections were used to ensure study quality. Therefore, regional databases such as Scielo and Google Scholar were not selected, as they lack global reach and scientific rigor.

Scopus and Web of Science (WoS) were prioritized because of their broad international coverage, rigorous indexing standards, and availability of robust bibliometric indicators. However, regional databases such as SciELO and Google Scholar were not included because of the limited standardization of their metadata and lower international visibility. Although this decision is methodologically consistent, it may have introduced a potential exclusion bias regarding the relevant literature in the Latin American context.

To define the search strategy, equations were built using Boolean operators and controlled terms, such as: "ICT," "Information and Communication Technologies," "Tecnologías de la Información y la Comunicación," "education," "educación," "Latin America," "América Latina." The equations were applied to the title, abstract, and keywords.

For Scopus, the following equation was used: TITLE-ABS-KEY("traditional medicine" OR "complementary medicine" OR "alternative medicine" OR "integrative medicine" OR "folk medicine" OR "ethnomedicine") AND TITLE-ABS-KEY("chronic disease" OR "chronic condition" OR "non-communicable disease" OR "NCDs") AND TITLE-ABS-KEY("older adults" OR elderly OR "aged population" OR "older people" OR "senior citizens"). For WoS, the following equation was used: TS=("traditional medicine" OR "complementary medicine" OR "alternative medicine" OR "integrative medicine" OR "folk medicine" OR "ethnomedicine") AND TS=("chronic disease" OR "chronic condition" OR "non-communicable disease" OR "NCDs") AND TS=("older adults" OR elderly OR "aged population" OR "older people" OR "senior citizens").

2.2. Inclusion and Exclusion Criteria

Two types of criteria were applied.

1. Original peer-reviewed journal articles were included in this review.
2. Thematic areas related to health, such as medicine, public health, and nursing, were selected.
3. Records published in Spanish and English were included in the study.

Additionally, duplicates and studies that did not provide complete information on the geographic or thematic context necessary to meet the study objectives were excluded.

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2.3. Data Extraction and Cleaning Procedure

The results obtained from the search equations were exported as .csv format from Scopus and .xlsx from WoS. Subsequently, duplicate and irrelevant records were excluded. This process included reading the title and abstract and, in doubtful cases, the full text.

2.4. Bibliometric Analysis

Bibliometric analysis was conducted using R software (version 4.4.2) [17]. For data processing and cleaning, a combination of specialized packages was used.

- readxl: to import WoS records saved in. xlsx format. xls format.
- data.table: to efficiently read and manage large Scopus files. R. csv format.
- dplyr: for data manipulation, including merging datasets, filtering records based on Boolean search terms, and selecting relevant variables;
- openxlsx: to export cleaned and merged datasets in .xlsx format.
- ggplot2 and gridExtra: used to generate graphical representations of publication and citation trends throughout the analyzed period.

The bibliometric records obtained from WoS and Scopus were integrated after standardizing the titles to lowercase. Duplicates were identified and removed by comparing the titles. A Boolean filter was then applied to ensure thematic relevance using grepl(), selecting only those articles that explicitly included key terms such as *"traditional medicine," "complementary medicine," "alternative medicine," "integrative medicine," "folk medicine," "ethnomedicine"* and *"chronic disease," "chronic condition," "non-communicable disease," "NCDs," "older adults," "aged population," "older people," "senior citizens"* in the title or abstract.

Articles classified as reviews or exclusively bibliometric studies were excluded to maintain the empirical focus of this research. Productivity, measured as the number of publications, and impact, evaluated through received citations, were summarized by year and visually represented through cumulative area and bar charts, allowing the visualization of emerging trends in the field. Additionally, the most influential journals on this topic were analyzed.

VOSviewer software (version 1.6.20) was used to generate keyword co-occurrence maps. These visualizations provide a graphical representation of the structure and interconnections within the research field of traditional and complementary medicine.

The literature search was conducted between January 15 and January 25, 2025, in the Scopus and Web of Science (WoS) databases, using controlled terms and Boolean operators to ensure comprehensive results. This time frame guarantees the inclusion of the most recent scientific literature published up to December 31, 2025, and ensures reproducibility of the process. Initially, 268 records were identified from two databases: Scopus (236 records) and Web of Science (32 records). After applying the inclusion and exclusion criteria, 174 records were reviewed in detail. During the screening process, eight duplicates were removed, and 142 studies were excluded after reviewing the titles and abstracts for not meeting the objectives. Finally, 32 documents were evaluated for eligibility, and none were excluded, constituting the final corpus for the analysis.

2.5. Qualitative Analysis

The 32 selected articles were reviewed to identify the predominant thematic trends, methodological approaches used, most studied geographic areas, most frequently addressed traditional and complementary medicine (TCM) therapies, main reported clinical and sociocultural findings, and knowledge gaps and opportunities for future research.

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3. Results

3.1. Productivity and Citation Analysis

Figure 1 describes the temporal evolution of scientific production and the number of accumulated citations in the field of traditional and complementary medicine (TCM) applied to the management of chronic diseases in older adults between 2002 and 2025. The data revealed three distinct phases that reflected changes in academic interest and research visibility.

3.2. Exploratory Phase with Concentrated Impact (2002–2011)

In this initial stage, scientific production was limited (eight articles in ten years), with a moderate impact (219 accumulated citations). The most relevant years were as follows:

- In 2005, three articles were published that received 123 citations (41 citations per document), demonstrating foundational studies on the therapeutic efficacy of traditional Chinese medicine (TCM).
- 2007 → A single article received 46 citations, consolidating the debate on the integration of complementary therapies in clinical settings.
- 2011 → With 2 articles and 33 citations; interest in evaluating clinical effectiveness was maintained, although still with limited reach.

During this period, studies were characterized as descriptive and contextual, with minimal international collaboration, which restricted their visibility.

3.3. Growth and Academic Consolidation Phase (2013–2019)

Starting in 2013, research experienced sustained growth in both the number of publications and their impact (Table 1).

Table 1.
Evolution of Articles, Citations, and Average Citations per Article.

Year	Documents	Citations	Average citations per article
2013	3	57	19
2015	3	107	35.7
2018	4	78	19.5
2019	6	218	36.3

The years 2015 and 2019 were turning points.

- 2015: Greater visibility of multicenter studies integrating clinical and sociocultural evidence.
- 2019: Historical peak in productivity (six publications) and 218 accumulated citations, reflecting a phase of academic maturity. This peak is associated with increased international interest, participation in collaborative networks, and the impact of highly cited articles published in high-impact factor journals.

This period marks a paradigm shift, where TCM transitioned from isolated studies to multidimensional research, integrating analyses of clinical effectiveness, cultural factors, and regulatory barriers.

3.4. Phase of Deceleration and Low Citation (2020–2025)

In the last five years, scientific production has remained relatively stable, with seven published articles, but its impact has decreased significantly, with a total of 18 citations.

- 2020:1 article → 9 citations.
- 2021–2023: four articles → only nine combined citations.
- 2024 and 2025: two articles → zero citations to date.

This sharp drop in citation numbers can be explained by three main factors.

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1. Maturation of previous literature → The most recent studies have not yet had enough time to accumulate sufficient citations.
2. Greater thematic dispersion → Diversification of methodological approaches reduces the concentration of impact.
3. Shifting research priorities: The COVID-19 pandemic temporarily redirected scientific attention toward other public health topics.

The analysis in Figure 1 reveals four key findings.

- Non-linear growth: Scientific production showed significant fluctuations, with peaks in 2005, 2015, and 2019, followed by periods of lower impact.
- Maturity point: 2019 represented the peak of international visibility, indicating that TCM had become a consolidated topic of interest in journals and scientific communities.
- Recent citation gap: The decline in impact since 2020 highlights the need to strengthen collaboration networks and increase publications in high-impact journals.

Future opportunities: The low citation of recent works suggests an open field for systematizing evidence, integrating clinical protocols, and exploring the relationship between TCM, aging, and chronic diseases.

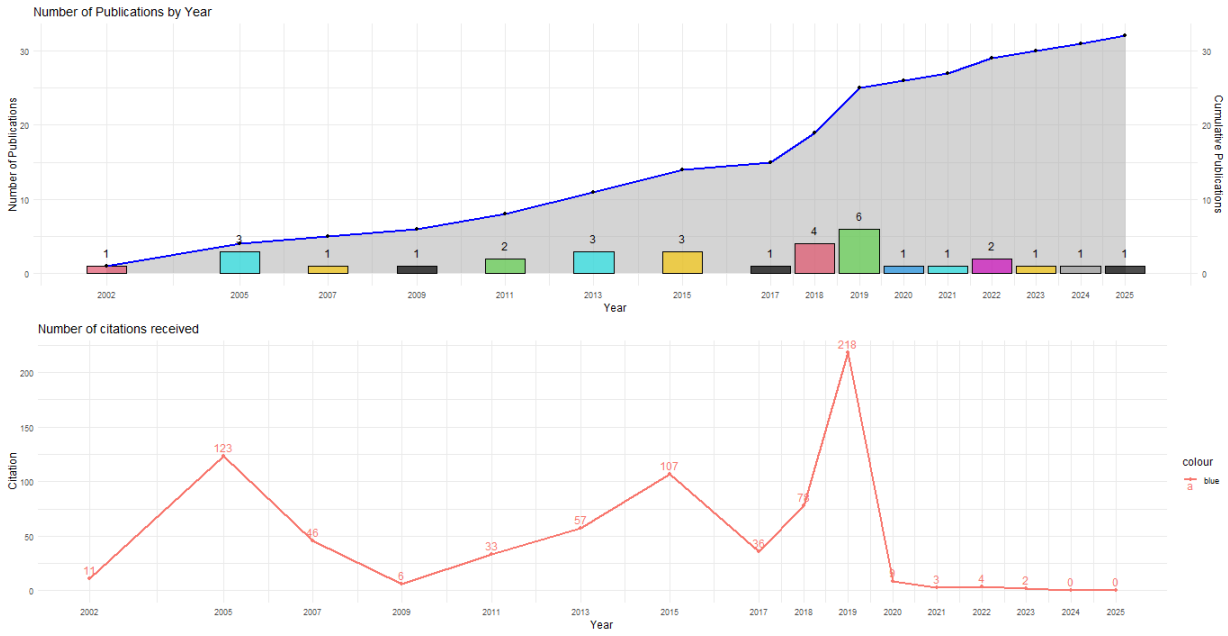

Figure 1.
Evolution of Scientific Productivity and Impact.

3.5. Most Influential Scientific Journals

The 32 articles in this study were published in 20 journals. Table 2 presents the 10 main journals in which the articles were published. The results reflect a high concentration of impact in a few sources, combining high-impact journals (Q1) with specialized publications of regional or thematic scope (Q2 and Q3). The findings were divided into three key categories.

3.6. High-Impact Journals and International Leadership (Q1)

Five of the journals included in the table belong to the first quartile (Q1), indicating high international visibility and a rigorous peer-review process. Although they account for only five articles (50%), they generated 338 citations, which is equivalent to 57.5% of the total citations in this selection.

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The articles published in the Medical Journal of Australia and Gerontologist are seminal references, as they account for 231 combined citations, which equals 39.5% of all citations in this table. This suggests that the most influential research has been published in highly indexed journals, amplifying its global reach.

3.7. Academic Consolidation Journals and Thematic Specialization (Q2)

Two second-quartile (Q2) journals, with five articles and 68 combined citations, played a relevant role in disseminating specialized knowledge on TCM, aging, and comprehensive health.

The Journal of Alternative and Complementary Medicine was the most productive source in the table (3 articles), demonstrating its role as a consistent dissemination platform in the field of TCM. Educational Gerontology contributes research with a more formative and social focus, but with a lower citation impact.

3.8. Emerging Journals and Regional Scope (Q3)

Three third-quartile (Q3) journals accounted for three articles and 129 combined citations, representing an academic paradox: despite their lower impact factor, some of these articles were highly cited.

The journal Studies on Ethno-Medicine stands out as a specialized niche, with a highly influential article (52 citations), indicating that traditional therapies and ancestral knowledge attract significant interest from specific academic communities. The other articles, although published in journals with lower indexation, demonstrate that academic impact does not depend exclusively on quartile ranking but also on thematic relevance and geographic context.

A total of 31% of the journals (3 out of 10) accounted for 59.6% of the citations (Medical Journal of Australia, Gerontologist, and Studies on Ethno-Medicine). However, the journal with the highest number of articles (Journal of Alternative and Complementary Medicine, 3 publications) is not the most influential, demonstrating that publication volume does not guarantee academic visibility.

The journals combine clinical, sociocultural, and educational approaches, indicating that the study of TCM requires a multidisciplinary perspective. Furthermore, although Q1 journals concentrate on global impact, some studies published in Q3 achieve high citation levels, suggesting the existence of highly active and relevant scientific niches in local contexts.

Table 2.
Most Influential Scientific Journals.

Source title	Documents	Citations	Quartile
Journal of Alternative and Complementary Medicine	3	56	Q2
Educational Gerontology	2	12	Q2
Medical Journal of Australia	1	130	Q1
Gerontologist	1	101	Q1
Studies on Ethno-Medicine	1	52	Q3
Journal of Health and Social Behavior	1	46	Q1
Evidence-Based Complementary and Alternative Medicine	1	41	Q3
Caspian Journal of Internal Medicine	1	36	Q3
Journal of Evidence-Based Integrative Medicine	1	32	Q1
BMC Complementary and Alternative Medicine	1	29	Q1

3.9. Collaboration Between Institutions

Figure 2 represents the inter-institutional collaboration map generated using VOSviewer based on the articles included in the analysis corpus. In the visualization, each node corresponds to an academic institution, and the links reflect the intensity of co-authorship relationships. The colors identify clusters that share common research lines.

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The analysis reveals that scientific collaboration in the field of traditional and complementary medicine (TCM) applied to chronic diseases in older adults presents a centralized structure, with a main node articulating most connections and two secondary clusters with limited interaction between them.

The "Department of Psychology, Coll" positions itself as the main hub of the network, acting as a strategic intermediary between institutions that would otherwise remain unconnected. This node concentrated the highest centrality values, highlighting its relevance in the network's structure and function.

- Coordinating inter-institutional projects integrating psychology, health education, and complementary therapies.
- Disseminating interdisciplinary knowledge and generating empirical evidence on the effectiveness of TCM.
- Facilitating scientific exchange and promoting the transfer of results among academic institutions from different fields.

Its role as a collaboration hub demonstrates that the most influential studies in this field largely depend on the active participation of institutions.

Additionally, the network shows two secondary clusters structured around the central node.

- Left cluster (green): Includes institutions such as the Department of Healthcare Administration, Department of Health Education, and Department of Psychology, University. This group focuses on TCM from a preventive and healthcare management perspective, prioritizing studies on public policies, health promotion, and educational models applied to healthy aging.
- Right cluster (light red): Composed of institutions focused on health education and clinical psychology, with a stronger orientation toward the adoption of traditional therapies, perceived efficacy, and sociocultural barriers influencing their use.

The existence of these clusters highlights that TCM research requires multidisciplinary approaches, where psychology, public health, and education converge to explain the adoption patterns and therapeutic effectiveness.

Despite having a solid central node, the network presents significant limitations.

- The link density is low, indicating that inter-institutional collaborations are still incipient and poorly consolidated.
- A broad international network was not observed, suggesting that current research is regionally concentrated and lacks a wider global reach.
- The excessive dependence on a single central node implies that, in the absence of this institution, the network would become fragmented and less capable of generating interdisciplinary evidence of the highest quality.

These limitations reveal the need to strengthen scientific cooperation, promote multicenter projects, and establish strategic international alliances that facilitate the integration of findings and the production of knowledge with a greater global impact.

The analysis in Figure 2 indicates that TCM research applied to older adults faces structural and integration challenges. To enhance knowledge generation and improve result transfer, the following suggestions are proposed:

- Consolidate international collaboration networks among high-impact institutions.
- Interdisciplinary projects integrating psychology, gerontology, medicine, and health education should be promoted.
- Encourages the diversification of institutional actors in the network, reducing dependence on a dominant central node.

These actions would strengthen scientific visibility, diversify research approaches, and generate robust evidence for incorporating TCM into more integrated and culturally relevant healthcare systems.

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Figure 2 reveals a centralized institutional collaboration network, where the "Department of Psychology, Coll" plays a crucial role as an articulating node. Although relevant clusters reflect multidisciplinary approaches, the low density of connections and limited internationalization demonstrate the need to strengthen scientific cooperation in this field. Consolidating global strategic alliances and promoting multicenter projects would expand the research impact and generate stronger evidence for the effective integration of TCM in the management of chronic diseases in older adults.

Figure 2.
Institutional Collaboration Network Map.

When comparing this network with internationally successful collaboration models in the field of integrative and complementary medicine, such as the Global Research Collaboration Network on Integrative Medicine (GRCN-IM) and the World Health Organization's Global Network on Traditional Medicine, a clear difference emerges: these global networks operate under a distributed leadership model, where multiple institutions function as hubs rather than relying on a single, central node.

To strengthen the visibility, diversity, and resilience of scientific production in TCM, strategies for expanding multicenter networks should be adopted, including:

1. Promoting distributed leadership to reduce dependency on a single dominant institution.
2. Developing multicenter clinical and observational projects that integrate institutions from Asia, Latin America, North America, and Europe will ensure greater representativeness of the findings.
3. Establishing strategic alliances with global actors, such as the WHO, NIH, and regional public health consortia, to enhance funding, visibility, and knowledge transfer.
4. Standardizing research protocols across institutions will improve comparability and strengthen the clinical evidence supporting the use of TCM in managing chronic diseases.

Incorporating these strategies would foster stronger collaboration, reduce structural dependency, and align the field with international best practices, improving both the scientific impact and the applicability of results to public health policies focused on healthy aging.

3.10. Leading Countries in Scientific Production

Table 3 summarizes the contributions of the main countries to scientific production on TCM and chronic diseases in older adults, considering the number of published documents and accumulated citations. The results show significant asymmetries between the publication volume, academic visibility, and scientific influence.

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Table 3.
Leading Countries in Scientific Production.

Country	Documents	Citations
Australia	4	209
Canada	3	38
Iran	3	48
South Africa	3	55
Taiwan	3	28
Thailand	3	55
United States	13	273

3.11. United States: Absolute Leadership in Production and Impact

The United States stands out as the undisputed leader in the field, with 13 documents accumulating 273 citations, which is equivalent to an average of 21.0 citations per publication.
This performance can be attributed to three key factors.

- Strong investment capacity for biomedical research and controlled clinical trials.
- International collaborations with Asian and European institutions have increased the visibility of the results.
- Publication in high-impact journals (Q1 and Q2), which amplifies citations and positions studies as seminal references in the integration of TCM within healthcare systems.

The predominance of the United States reveals that, although TCM has deep cultural roots in other regions, studies with greater international reach are concentrated in highly competitive and better-funded research environments.

3.12. Australia: High Scientific Efficiency and Regional Leadership

Australia ranked second in terms of global impact, with four documents totaling 209 citations, achieving an exceptional average of 52.2 citations per article, the highest among all analyzed countries.
This result highlights the international relevance of Australian studies, likely related to the following:

- Pioneering research on acupuncture, phytotherapy, and chronic disease management in older adults.
- Strategic collaborations with Asian and North American universities.
- Publications in high-impact journals, such as the Medical Journal of Australia, which alone accounts for 130 citations in one article, consolidate Australia as a global reference point.

3.13. Asia as an Emerging Research Hub

Asian countries such as Iran, Thailand, and Taiwan made a balanced contribution in terms of production (three articles each), but with differences in impact (Table 4).

Table 4.
Impact of Asian Countries on Research.

Country	Documents	Citations	Average Citation per Article
Iran	3	48	16
Thailand	3	55	18.3
Taiwan	3	28	9.3

Iran and Thailand have considerable visibility, with impact averages comparable to those of Canada and South Africa. Conversely, Taiwan, although maintaining a similar level of productivity, shows a lower impact, suggesting that its publications are concentrated in lower-quartile journals or have a regional reach.

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The prominence of these nations reinforces Asia's importance as a historical and cultural hub of TCM, where ancestral knowledge is integrated with modern scientific methodologies.

3.14. Canada and South Africa: Intermediate Actors with Moderate Impact

Canada and South Africa each have three publications, but they show different patterns.

- South Africa recorded 55 citations (18.3 per article), achieving an impact similar to Thailand, reflecting the integration of traditional Chinese medicine in the community-based and ethnomedical management of chronic diseases.
- Canada, with 38 citations (12.7 per article), showed an intermediate impact, standing out in studies that combined health education, promotion of healthy aging, and applied psychology.

These results position both countries as strategic contributors, although they are less visible than global leaders.

3.15. From The Analysis in Table 3, Three Key Patterns Were Identified.

- Concentration of leadership → The United States and Australia generate 52% of publications and 64% of total citations, reflecting their dominant influence on the scientific agenda.
- Emerging relevance of Asia → Iran, Thailand, and Taiwan strengthen the field with culturally rooted research, contributing to methodological diversity and new therapeutic perspectives.
- Visibility gap → Countries with consistent production but fewer citations, such as Canada and Taiwan, face the challenge of publishing in higher-impact journals and strengthening international collaborations.

3.16. Thematic Area

Figure 3 shows the keyword co-occurrence map generated using VOSviewer, based on the selected articles on traditional and complementary medicine (TCM) in the management of chronic diseases in older adults. Each node represents a keyword, its size is determined by the frequency of occurrence, and the thickness of the links reflects the strength of the association between terms.

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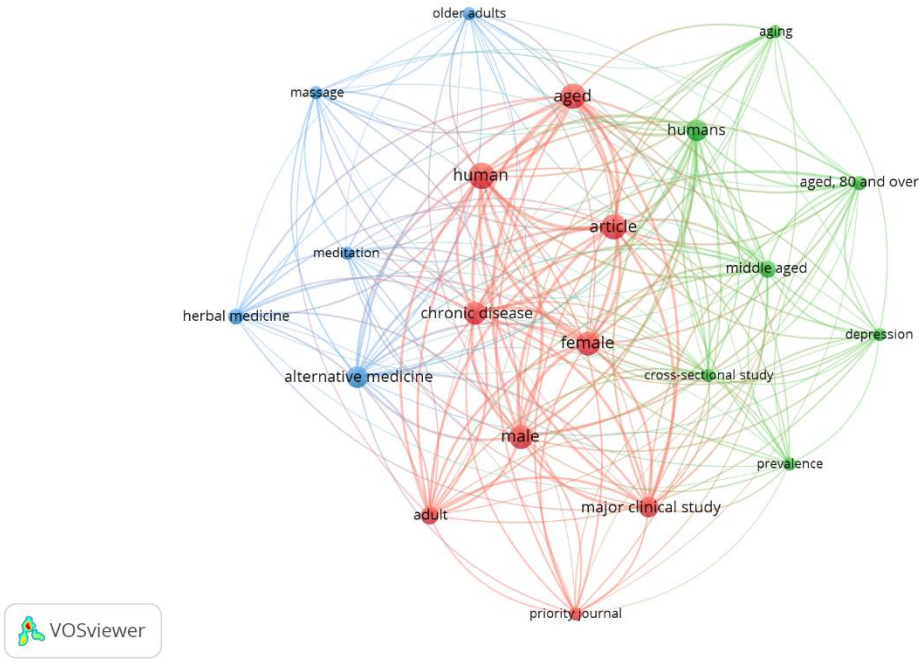

Figure 3.
Keyword Co-occurrence Map.

The analysis reveals three main thematic clusters, represented in red, green, and blue, which structure the scientific production in this field.

3.17. Red Cluster: Clinical and Demographic Axes

This cluster groups central terms such as human (20 occurrences, Total Link Strength (TLS)=185), aged (19, TLS=178), article (18, TLS=174), female (17, TLS=173), and male (17, TLS=173), showing that most studies:

- Focus on adult and elderly populations, including groups over 80 years old (six occurrences, TLS=67).
- Analyze TCM as a therapeutic intervention for managing chronic diseases (15 occurrences, TLS=146).
- Integrate sociodemographic variables (sex, age, health status) to evaluate differences in therapy adoption and effectiveness.
- Priority clinical studies (major clinical studies, 12 occurrences, TLS=130) demonstrated an approach based on controlled trials and solid empirical data.

This cluster represents the core of biomedical research, where studies prioritize the evaluation of clinical outcomes and population profiles of patients.

3.18. Green Cluster: Health Conditions and Population-Based Studies

The green cluster focuses on terms related to aging, mental health, and research methodologies.

- Humans (13 occurrences, TLS=126) and middle-aged individuals (eight occurrences, TLS=93) highlight the importance of the mid-life stage in aging research.
- Aging (5 occurrences, TLS=42) and aged ≥ 80 years (6 occurrences, TLS=67) reflect attention toward clinical gerontology.

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- Cross-sectional studies (5 occurrences, TLS=59) and prevalence (5 occurrences, TLS=39) indicate that a significant portion of scientific production relies on descriptive studies to estimate TCM usage patterns.
- Depression (5 occurrences, TLS=52) highlights the growing exploration of mental health in older adults using TCM.

This cluster represents population-based studies that analyze the relationships between aging, chronic health conditions, and emotional well-being, contributing evidence on epidemiological trends and psychosocial factors associated with TCM usage.

3.19. Blue Cluster: Therapies, Interventions, and Complementary Practices

The blue cluster groups the main therapies studied and reflects the applied component of TCM.

- Alternative medicine (13 occurrences, TLS=108) emerged as a central term connected to specific therapies.
- Herbal medicine (7 occurrences, TLS=51)
- Massage (5 occurrences, TLS=49)
- Meditation (5 occurrences, TLS=48)

The frequency of these keywords indicates that the evidence primarily emphasizes low-risk, accessible interventions that are widely used for managing pain, mobility, emotional well-being, and quality of life.

This cluster reflects the therapeutic dimension of TCM, highlighting the scientific community's interest in evaluating specific practices and their clinical benefits, as well as the progressive integration of ancestral and complementary techniques into primary care and geriatric medicine.

3.20. Global Patterns and Relevance of the Map

From the analysis of Figure 3 and Table 5 on frequencies, three key findings were identified.

- High connectivity between clusters: The network shows intense interrelations between clinical, methodological, and therapeutic approaches, suggesting that TCM research combines biomedical evidence, population contexts, and ancestral knowledge.
- Predominance of the clinical approach: Terms associated with humans, aged, chronic disease, and major clinical studies dominated the network, revealing that studies prioritize controlled trials and effectiveness assessments.
- Emergence of new research lines: The presence of concepts such as meditation, massage, and herbal medicine indicates the growth of integrative approaches that combine traditional therapies with conventional medicine is evident.

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Table 5.
Frequency and Link Strength of Keywords.

Keyword	Occurrences	Total Link Strength
Adult	10	109
Aged	19	178
aged, 80 and over	6	67
Aging	5	42
Alternative medicine	13	108
Article	18	174
Chronic disease	15	146
Cross-sectional study	5	59
Depression	5	52
Female	17	173
herbal medicine	7	51
Human	20	185
Humans	13	126
Major clinical study	12	130
Male	17	173
Massage	5	49
Meditation	5	48
Middle aged	8	93
Older adults	5	39
Prevalence	5	39
Priority journal	5	51

3.21. Qualitative Analysis

Qualitative analysis allowed for an in-depth examination of the 32 selected articles, identifying thematic trends, methodological approaches, the most researched traditional and complementary medicine (TCM) therapies, and the main clinical and sociocultural findings. The review revealed that the literature addresses TCM from three main dimensions: therapeutic efficacy, the influence of cultural and social factors, and the challenges of integrating these practices into formal healthcare systems [18-20].

3.22. Predominant Thematic Trends

The studies show a clear concentration in three thematic areas:

- Therapeutic use and perceived benefits → Most studies reported improvements in quality of life, symptom control, and emotional well-being among older adults using TCM [18, 20, 21].
- Sociocultural and spiritual dimensions → Several studies have highlighted that the choice of traditional therapies is closely linked to cultural identity, ancestral knowledge, and community healing narratives [22-24].
- Integration and regulation of TCM: There is a consensus on the need to integrate these therapies with conventional medicine, but the authors emphasize regulatory gaps, self-medication risks, and the lack of clinical protocols [24-26].

3.23. Methodological Approaches and Geographical Diversity

The reviewed studies present a wide methodological diversity, combining cross-sectional designs, exploratory qualitative studies, and cohort studies [26-28].

In terms of geography, Asia and Latin America account for the largest number of publications, particularly in countries such as China, India, Brazil, and Mexico, where ancestral therapies are deeply embedded in the community [19, 28, 29].

In contrast, studies from Europe and North America have primarily focused on perceptions, access, and barriers to TCM usage, reflecting a more individualized approach [30, 31].

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3.24. Key Findings

- 60% of the studies report perceived benefits in chronic pain, mobility, and emotional well-being [18, 20, 21].
- The most studied therapies include phytotherapy, acupuncture, tai chi, meditation, herbal medicine, and traditional healing practices [27, 28, 32].
- Spirituality and community support have emerged as key factors influencing the adoption of these therapies [22, 32].
- The most frequent risks identified are drug interactions, lack of regulation, and medical misinformation [24, 33].
- Only 25% of the articles proposed concrete strategies for integrating traditional Chinese medicine with conventional medicine [25, 34].

4. Discussion

The results of this study show that research on traditional and complementary medicine (TCM) in managing chronic diseases in older adults has followed a non-linear evolution, with phases of initial exploration, academic consolidation, and a recent slowdown in both productivity and citations. This aligns with previous studies highlighting the global expansion of complementary therapies and the fragmentation of existing evidence [20]. These findings are consistent with prior research, indicating that while TCM has gained prominence in recent years, challenges persist regarding its integration into formal healthcare systems and the generation of robust evidence to support its clinical efficacy [18, 19, 28].

The temporal evolution of scientific production revealed three distinct stages. The first, from 2002 to 2011, was characterized by a limited number of publications and low international visibility, with predominantly descriptive studies of limited scope and minimal inter-institutional collaborations. Since 2013, a phase of growth and academic consolidation began, peaking in 2019 with six articles and 218 citations. This increase was driven by the incorporation of collaborative networks and multicenter studies combining clinical and sociocultural perspectives, enhancing TCM's visibility in international literature. However, between 2020 and 2025, a significant slowdown is evident, with seven articles published but only 18 citations. This trend may be attributed to factors such as the prioritization of research related to the COVID-19 pandemic, methodological fragmentation in studies, and a lack of coordination among global research agendas, as noted by Wang et al. [21].

Geographic analysis revealed significant asymmetries in the distribution of scientific production and its impact. The United States and Australia accounted for over half of the publications and two-thirds of the total citations, reflecting their leadership in biomedical TCM research. While the United States stands out for its productivity, Australia excels in efficiency, achieving an average of 52.2 citations per article, primarily driven by publications in high-impact journals, such as the *Medical Journal of Australia*. In contrast, Asian countries, such as Iran, Thailand, and Taiwan, contributed a comparable number of publications but showed varied citation patterns. While Iran and Thailand demonstrate impact levels similar to Canada and South Africa, Taiwan has a more limited reach, possibly because its publications are concentrated in lower-impact journals. This finding underscores Asia's emerging role as a hub for therapeutic innovation, given its strong cultural roots and integration of ancestral knowledge with contemporary scientific methodologies, although it still faces challenges in increasing the international visibility of its contributions.

Analysis of the most influential journals shows that TCM's scientific impact is concentrated in a small number of sources. Three journals, the *Medical Journal of Australia*, *Gerontologist*, and *Studies on Ethno-Medicine*, accounted for nearly 60% of citations, demonstrating the existence of high-influence niches in knowledge dissemination. However, the journal with the most articles, *Journal of Alternative and Complementary Medicine*, is not the most cited, indicating that productivity alone does not guarantee greater academic visibility. These results suggest that researchers aiming to increase the dissemination

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of their findings should prioritize publishing in high-impact journals and designing international collaborations to strengthen knowledge transfer, as noted by Macinko and Upchurch [20].

Regarding collaboration networks, the results reflect a highly centralized structure around the Department of Psychology, Coll, which serves as the main hub and concentrates most connections. While this institution plays a strategic role in coordinating projects, the low density of links and limited internationalization highlight the need to strengthen interactions among institutional actors, promote multidisciplinary participation, and foster multicenter projects integrating psychology, gerontology, medicine, epidemiology, and health education fields. The fragmentation of research networks limits the generation of robust evidence, a problem also identified by Grzywacz et al. [26] and Halpin et al. [33] who noted that the lack of international cooperation reduces the ability to build consensus and develop standardized clinical protocols.

Thematic analysis revealed that research is organized around three main axes. The first, with a clinical-demographic focus, is dominated by studies analyzing population profiles, gender differences, and therapeutic efficacy, highlighting the influence of sociodemographic variables on TCM adoption [34, 35]. Second, with an epidemiological-methodological focus, cross-sectional and descriptive studies examined the prevalence of TCM usage and its relationship with psychosocial and mental health factors. Third, the therapeutic-applied axis explores specific interventions, such as phytotherapy, massage, meditation, and other ancestral and complementary medical practices [25, 36]. While these thematic lines reflect significant progress, critical gaps remain, including the lack of standardized clinical protocols, limited longitudinal evidence to assess the sustained effects of therapies, and insufficient integration of sociocultural and contextual dimensions into methodological designs.

Another finding of this review is the impact of TCM interventions on mental health and emotional well-being, which has important implications for public health. Several studies have reported improvements in depression, anxiety, stress management, and overall psychological balance among older adults using therapies such as meditation, Tai Chi, acupuncture, and herbal treatments. However, these mental health benefits are rarely reflected in public health programs, where chronic disease management often prioritizes biomedical indicators over psychosocial outcomes. Integrating TCM into community-based mental health initiatives and developing holistic care models that address both physical and emotional health could improve the quality of life of the aging population and strengthen preventive healthcare strategies.

Finally, the study's findings have direct implications for public policies and clinical practices. Despite TCM's considerable potential in the prevention and management of chronic diseases, its systematic integration into healthcare systems remains limited. It is necessary to establish evidence-based clinical guidelines, promote interdisciplinary training for healthcare professionals, and foster strategic international partnerships to facilitate knowledge transfer and the cultural adaptation of interventions. Greater alignment between scientific research, clinical practice, and public policy will optimize TCM's benefits and advance more integrative, sustainable, and culturally relevant care models.

From a public health policy perspective, the findings of this study reveal significant opportunities for integrating Traditional and Complementary Medicine (TCM) into national strategies for chronic disease prevention and management in older adults. Given the low utilization of TCM in several regions, health ministries should respond by developing evidence-based guidelines that promote its safe and effective use. This includes establishing regulatory frameworks to ensure quality and safety standards, integrating validated TCM interventions into primary healthcare services, and allocating resources to support multicenter clinical trials that generate robust evidence for TCM efficacy. Moreover, aligning these actions with the World Health Organization's Healthy Aging Framework would strengthen existing initiatives, improve health equity, and support the development of culturally relevant and sustainable programs for older populations in the country.

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5. Conclusions

This study analyzed the scientific landscape of Traditional and Complementary Medicine (TCM) in managing chronic diseases among older adults, identifying patterns in productivity, impact, thematic trends, and collaboration networks. While the field has gained global relevance, significant challenges remain in generating robust evidence and integrating it into healthcare systems.

Based on these findings, three key recommendations are proposed.

1. Promoting multicenter longitudinal clinical trials: Future research should prioritize large-scale, multicenter, and longitudinal studies to evaluate the long-term clinical effectiveness and safety of TCM therapies. Such studies are essential for strengthening the evidence base and enabling comparisons across diverse populations and cultural contexts.
2. Adopt standardized clinical protocols: The development and implementation of harmonized clinical guidelines are critical for improving reproducibility, facilitating international collaboration, and ensuring that TCM practices meet evidence-based quality and safety standards.
3. Strengthening collaborative research networks: Researchers should focus on creating multidisciplinary and multicenter partnerships that integrate medicine, gerontology, psychology, and public health. Expanding international collaboration will improve knowledge transfer and foster the translation of research into policies and practices.

By implementing these strategies, the scientific community can advance toward a more rigorous, standardized, and collaborative research agenda, enabling stronger evidence to support the safe and effective integration of TCM into healthy aging policies and global health care systems.

5.1. Practical Implications

The findings of this study have significant implications for integrating traditional and complementary medicine (TCM) into the management of chronic diseases in older adults. First, the results underscore the need to develop standardized clinical protocols to support the safe and effective use of these therapies, ensuring their responsible incorporation into formal healthcare systems. Additionally, the importance of forming interdisciplinary teams including professionals from gerontology, psychology, conventional medicine, and public health is highlighted to design more comprehensive and culturally relevant care strategies for older adults.

From a public policy perspective, establishing clear regulatory frameworks that address the oversight of practices, the quality of products used, and the training of professionals applying these therapies is essential. Furthermore, the synthesized evidence can serve as a foundation for strengthening programs that promote healthy aging, integrating TCM interventions with evidence-based conventional practices to enhance the quality of life of older adults and optimize the prevention of complications associated with chronic diseases.

5.2. Future Research Directions

The results of this analysis reveal several opportunities for guiding future research. A priority area is the development of longitudinal studies to evaluate the sustained impact of TCM therapies on the physical, emotional, and cognitive health of older adults. There is also a need to advance multicenter clinical trials that generate robust evidence on the comparative effectiveness of traditional, complementary, and conventional therapies, particularly for managing chronic diseases with high prevalence.

Another key aspect is the study of the sociocultural determinants influencing TCM adoption, considering geographic differences, ancestral knowledge, and community narratives. Additionally, exploring economic and cost-effectiveness indicators is recommended to assess the feasibility of incorporating these therapies into public healthcare systems. Finally, further investigation into international collaboration strategies is suggested to consolidate scientific networks, enhance the global visibility of the results, and promote more standardized methodological approaches.

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5.3. Study Limitations

While this study provides a comprehensive overview of the scientific landscape of TCM in chronic disease management among older adults, some limitations must be acknowledged. First, the analysis was based solely on documents indexed in Scopus and Web of Science, potentially excluding relevant literature from regional databases or open-access repositories. This may introduce a bias toward research published in contexts with greater international visibility.

Another limitation relates to the methodological heterogeneity of the studies analyzed, which complicates direct comparisons and the synthesis of generalizable evidence. Additionally, since the most recent period (2020–2025) includes articles with few citations, the real impact of recent publications may be underestimated, as they require more time to establish academic visibility.

Finally, this study did not directly evaluate the clinical efficacy of the reviewed therapies but focused on analyzing scientific production, thematic trends, and collaboration networks. Therefore, the results should be interpreted as a characterization of the state of knowledge rather than as definitive evidence of TCM's clinical benefits.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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