

Original Article

Bibliographic analysis of Taiwanese publications in the Web of Science subject category of Integrative & Complementary Medicine from 1977 to 2023

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Traditional Chinese Medicine has a 2,000-year history, and research on Integrative & Complementary Medicine (ICM) has rapidly developed in Taiwan. This study aimed to analyze the publication trends of Taiwanese ICM-related research from 1977 to 2023 using the Web of Science (WoS) ICM category database. A total of 3299 papers published in the WoS ICM category from Taiwan were retrieved and analyzed. Taiwan ranked seventh among the top ten most productive countries in this field. These publications were also distributed in the subject categories of Pharmacology & Pharmacy, Chemistry, Medicinal, Plant Sciences, and Medicine, General & Internal. China Medical University and its affiliated hospital were identified as the leading institutions in terms of publication output. The annual number of ICM papers from Taiwan gradually increased from 1977 to 2013, reaching its peak between 2011 and 2013, with over 200 papers published each year. Meanwhile, citation counts continued

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to rise until 2021. However, the mean impact factor, average citations per paper, and H-index did not increase over time. In conclusion, Taiwanese publications in the WoS ICM category showed a steady growth trend from 1977 to 2013. However, the lack of improvement in the scientific impact of publications highlights the need to enhance both the quality and quantity of ICM research to strengthen Taiwan's academic influence in the global ICM field.

Key words: Bibliography; Citation, Impact factor, Integrative & Complementary Medicine; Subject category; Web of Science

Introduction

As defined by the National Center for Complementary and Integrative Health (NCCIH) in the United States of America (USA), complementary medicine refers to therapies that are used in addition to, but not as a substitute for, conventional Western medicine. Integrative health, on the other hand, combines conventional Western medicine with complementary methods in a coordinated way. Integrative health also emphasizes multimodal interventions, that involve two or more interventions, such as conventional health care methods (e.g., medication, physical rehabilitation, psychotherapy) and various combinations of complementary health approaches (e.g., acupuncture, yoga, probiotics), with a focus on treating the person as a whole rather than on an organ system basis [1,2].

Taiwan, located in the western Pacific Ocean off the coast of mainland China, is a multicultural island with a total area of 36,193 km² and a population of 23 million. Its ancestors migrated mainly from mainland China in the early 17th century [3]. Traditional Chinese Medicine (TCM), which has a 2,000-year history, is considered part of complementary medicine. The National Health Insurance (NHI) program in Taiwan

began in 1995, and TCM treatments, including herbal medicine and acupuncture, have been covered under this widespread program since 1996. While Western medicine remains the primary form of healthcare in Taiwan, the country's health insurance system allows easy access to integrated treatments that combine both Western medicine and TCM [4-6]. According to a report in 2012, 75.5% to 86.9% of adults in Taiwan used at least one form of traditional medicine [7,8]. During the recent COVID-19 pandemic, Taiwan's successful use of the herbal treatment "Qing Guan Yi Hao" has raised expectations for TCM worldwide. These conditions have led to a significant amount of research on Integrative & Complementary Medicine (ICM) in Taiwan.

Academic publication is a key factor in the successful development of medical professions or disciplines. ICM often has cultural specificity and local characteristics. Taiwan, which is primarily a Chinese society, makes extensive use of TCM, which has become a rapidly developing area of academic publication [9]. However, the impact of ICM-related research and the analysis of the performance and trends of such research in Taiwan over the past few decades have not been reported. Therefore, this study aims to analyze ICM research and publications in Taiwan from

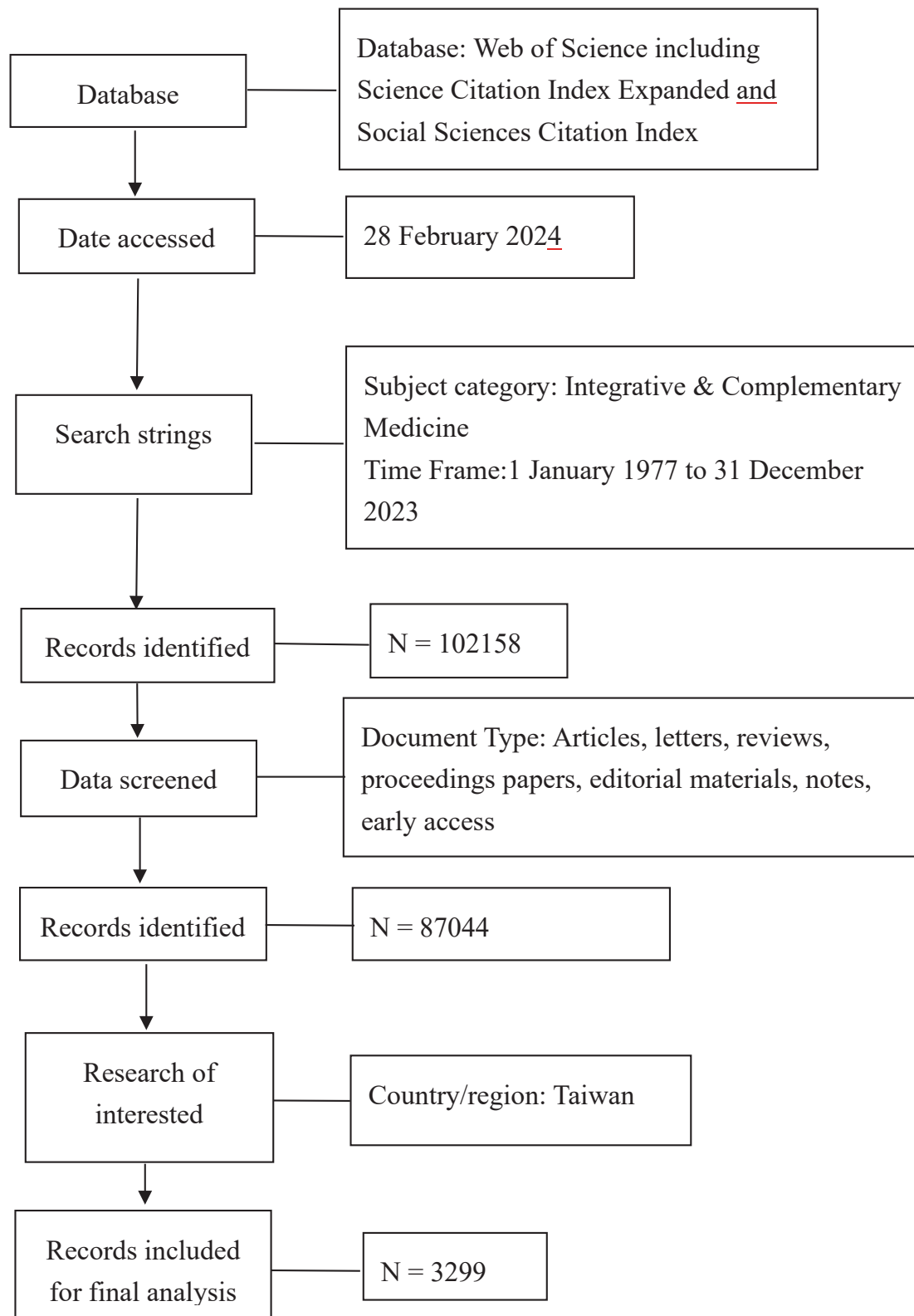


Figure 1. Research strategy flow diagram of bibliographic analysis of Taiwanese publications in Web of Science subject category of Integrative & Complementary Medicine.

1977 to 2023, using bibliographic analysis of papers indexed in the Web of Science (WoS) subject category of ICM, to explore the current status and application of ICM research in Taiwan.

Materials and methods

1. Bibliographic database in the Web of Science ICM category

The WoS database was accessed via the website of the Taipei Veterans General Hospital Library on 28 February 2024 [10]. The first step was to evaluate publications in the WoS subject category of ICM (Figure 1). Publications in SCI-E and SSCI from 1 January 1977 to 31 December 2023 were searched (Taiwan published the first ICM SCI paper in 1977). The WoS subject categories are assigned at the journal level. Each journal can be assigned to one or more categories, with a maximum of six categories. The assignment process involves a meticulous evaluation of several criteria, including the subject matter and scope of the journal, author and editorial board affiliations, funding sources, cited references, and the links between cited references. In addition, factors such as the journal sponsorship and classification in other bibliographic databases are taken into account to ensure a comprehensive classification within the Web of Science Core Collection [11]. This detailed classification provides researchers with a sophisticated framework for navigating, analyzing and comparing scholarly publications. Publications in the WoS subject category of the ICM worldwide were then identified. We included publication types such as articles, letters, reviews, proceedings papers, editorial material, notes and early access, excluding conference abstracts and corrections for further analysis.

2. Taiwanese publications in the Web of Science ICM category

The second step focused specifically on Taiwanese publications in the WoS ICM category. A detailed search was conducted to identify papers published from Taiwan between 1977 and 2023. The analysis included the annual publication output, taking into account these publications in the WoS subject category other than ICM, all contributing researchers, the organization or institute that submitted the papers, and the publication title of the journals in which these papers were published. For the comparison of annual research output, divided the time period into 1977-1990, the 10-year interval from 1990-2020 and 2021-2023.

The definition of country/region, researchers, institutes and publication title of the publications follows the criteria of the Web of Science Core Collection and Clarivate's InCites platform [12]. WoS includes several types of aggregation of country definitions, such as the World Health Organization, the Organizations for Economic Co-operation and Development, the European Union (15, 25, 27 and 28), Africa, the Asia-Pacific region, Latin America, the Middle East and the United Kingdom, to ensure country and regional coverage. In addition, we used 'Researcher field' of publications rather than 'Author field' which recognized as they appear in publications. Researchers are a disambiguated author entity created by Clarivate and linked to researcher IDs, ORCIDs, and an algorithmic clustering of co-authors and institutions.

3. Citations and impact factors of Taiwanese publications in the Web of Science ICM category

To analyze the citation counts and impact factor of published papers, we also obtained the citation counts

of each paper from the WoS database and the impact factors of published journals from the 2022 Journal Citation Report (JCR). The WoS citation counts file and the JCR impact factors file were linked using the Statistical Analysis System (SAS), version 9.4 (SAS Institute Inc., Cary, NC, USA), with the journal's ISSN and eISSN serving as the linking parameters.

4. International collaborations of Taiwanese publications in the Web of Science ICM category

This study also examined the international collaboration patterns of Taiwanese publications in the WoS ICM category using the Visualization of Similarities (VOS)viewer (VOSviewer version 1.6.20, Nees Jan van Eck and Ludo Waltman, Centre for Science and Technology Studies, Leiden University, Leiden, The Netherlands). The VOSviewer is a powerful tool that uses network and clustering techniques to create visual representations of bibliometric data [13]. Its primary purpose is to visualize relationships and groupings within the data. This makes it a valuable tool for researchers conducting bibliometric or scientometric network analyses. We extracted author and country information for each publication from the WoS database. A network was constructed using VOSviewer with authorship as the type of analysis and countries as the unit of analysis. The full counting method was used. A minimum of one document per country was required for inclusion in the network analysis. The clustering technique is used to group countries that frequently collaborate with each other, providing insight into key collaborative hubs and international partnerships. The nodes (items) in the network represent countries. The size of the nodes indicates the number of publications from each country, and the closer two nodes are located

to each other, the stronger their relatedness (relative normalized association strength). The edges (lines) between the nodes represent links and the thickness of the edges (lines) indicates the strength of collaboration between countries. Each country pair was represented by a single weighted link in VOSviewer; any apparent duplicate lines in the visualization are due to rendering effects rather than multiple independent connections.

5. Statistics

The results of the first and second steps were expressed as descriptive data (number, percentage, range, mean and standard error of the mean). Analysis of variance (ANOVA) with Bonferroni correction was used to assess statistically significant differences in mean impact factors between study periods (SPSS version 20.0, SPSS Inc., Chicago, Illinois, USA). A p -value <0.05 was considered statistically significant (2-tailed tests).

Results

1. Worldwide publications in the Web of Science ICM category

From 1977 to 2023, 87044 publications were retrieved worldwide from the WoS ICM categories. Table 1 shows the top ten countries with the highest number of publications in this category. Taiwan, with 3299 publications, ranks seventh among the top ten most prolific countries, accounting for 3.79% of total publications. The country with the highest number of publications is the People's Republic of China (27542 papers, accounting for 31.64% of the total publications), followed by the USA (12019 papers, 13.81%), South Korea (6334 papers, 7.28%), India (4570 papers, 5.25%), Germany (4233 papers, 4.86%), and Brazil (3548 papers, 4.08%) (Table 1).

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Table 1. Top ten most productive countries/regions publishing papers in the Web of Science Integrative & Complementary Medicine categories during 1977-2023 worldwide (N=87044)

Country/Region	Papers published	%
People's Republic of China	27542	31.64
USA	12019	13.81
South Korea	6334	7.28
India	4570	5.25
Germany	4233	4.86
Brazil	3548	4.08
Taiwan	3299	3.79
Japan	3121	3.59
England	2854	3.28
Australia	2377	2.73

Table 2. Distribution of 3299 publications in the Web of Science subject category of Integrative & Complementary Medicine from Taiwan (N=3299)

Web of Science category	Papers published	%
Integrative & Complementary Medicine	3299	100.00
Pharmacology & Pharmacy	1071	32.46
Chemistry, Medicinal	1046	31.71
Plant Sciences	1046	31.71
Medicine, General & Internal	634	19.22
Oncology	83	2.52
Neurosciences	21	0.64
Health Care Sciences & Services	16	0.49
Rehabilitation	16	0.49
Nursing	10	0.30
Clinical Neurology	1	0.03
Medicine, Research & Experimental	1	0.03

2. Taiwanese publications in the ICM category of Web of Science

According to WoS database, of the 3299 papers published from Taiwan in the ICM category, they were also distributed in the subject categories of Pharmacology & Pharmacy (32.46%), Chemistry, Medicinal (31.71%), Plant Sciences (31.71%), and Medicine, General & Internal (19.22%). In addition, 83 papers (2.52%) were published in the subject category of Oncology. (Table 2). The top five productive researchers in Taiwan with the most publications in the ICM category are Hsieh CL, Lin JG, Huang KCY, Wu YC, and Peng WH. Among them, Professor Hsieh CL and Lin JG have the highest number of publications, both having published more than one hundred papers during the study period (Table 3).

Looking at the publishing institutions, China Medical University has the highest number of papers published in the ICM category (1282 papers, 38.86%),

followed by China Medical University Hospital (598 papers, 18.13%), Taipei Medical University (491 papers, 14.88%), National Yang Ming Chiao Tung University (445 papers, 13.49%), and Kaohsiung Medical University (432 papers, 13.09%) (Table 4).

Table 5 lists the top ten journals that published papers from Taiwan in the ICM category. The results show that *Evidence-Based Complementary and Alternative Medicine* published the most papers in the ICM category (781 papers, 23.67%). This is followed by the *American Journal of Chinese Medicine* (634 papers, 19.22%), *Journal of Ethnopharmacology* (448 papers, 13.58%), and *Planta Medica* (369 papers, 11.19%).

3. Annual number of publications, citations, and impact factors of Taiwanese publications in the Web of Science ICM category

The number of publications from Taiwan in

Table 3. Top 10 most prolific researchers from Taiwan who published papers in the Web of Science Integrative & Complementary Medicine category during 1977-2023 (total papers, N=3299)

Author name	Papers published	%
Hsieh, CL	114	3.46
Lin, JG	108	3.27
Huang, KCY	55	1.67
Wu, YC	52	1.58
Peng, WH	48	1.46
Yen, HR	47	1.43
Li, TC	46	1.39
Lin, CC	46	1.39
Chang, FR	42	1.27
Liu, IM	41	1.24

Table 4. Top 10 most productive institutes publishing papers in the Web of Science Integrative & Complementary Medicine category from Taiwan during 1977-2023 (total papers, N=3299)

Institutes	Papers published	%
China Medical University Taiwan	1282	38.86
China Medical University Hospital Taiwan	598	18.13
Taipei Medical University	491	14.88
National Yang Ming Chiao Tung University	445	13.49
Kaohsiung Medical University	432	13.09
National Taiwan University	421	12.76
Asia University Taiwan	338	10.25
Chang Gung Memorial Hospital	291	8.82
Chang Gung University	286	8.67
National Chung Hsing University	205	6.21

Table 5. Top 10 journals that published most papers in the Web of Science Integrative & Complementary Medicine category from Taiwan during 1977-2023 (total papers, N=3299)

Journal name	Papers published	%
<i>Evidence-Based Complementary and Alternative Medicine</i>	781	23.67
<i>American Journal of Chinese Medicine</i>	634	19.22
<i>Journal of Ethnopharmacology</i>	448	13.58
<i>Planta Medica</i>	369	11.19
<i>Phytomedicine</i>	219	6.64
<i>BMC Complementary and Alternative Medicine</i>	172	5.21
<i>Journal of Alternative and Complementary Medicine</i>	133	4.03
<i>Complementary Therapies in Medicine</i>	96	2.91
<i>Integrative Cancer Therapies</i>	83	2.52
<i>Journal of Traditional and Complementary Medicine</i>	43	1.30

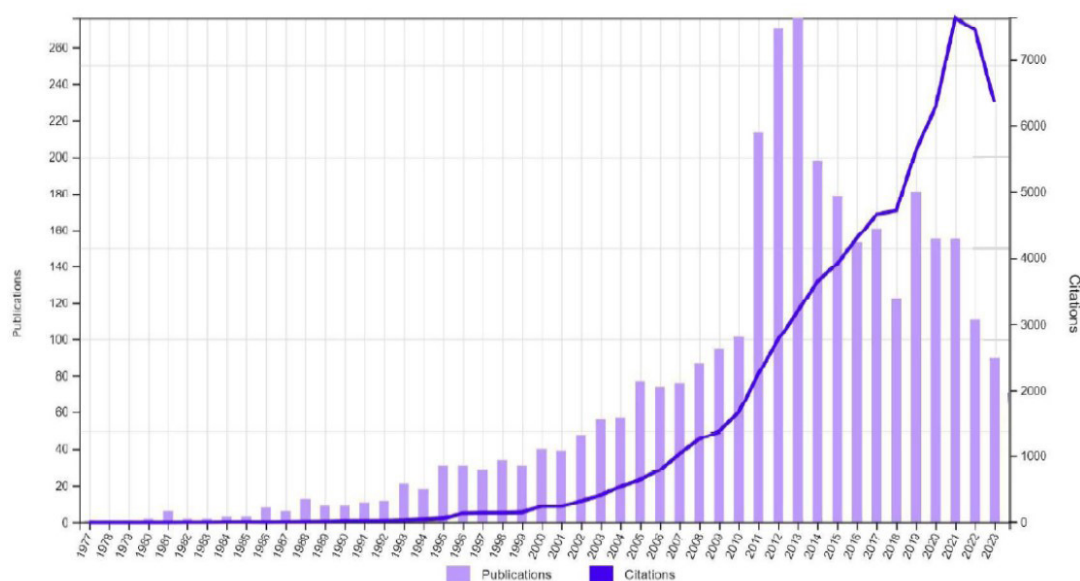


Figure 2. Number of papers published by Taiwanese researchers in the Web of Science Integrative & Complementary Medicine category each year, and their citation trends. The citation number represents the total number of times Taiwanese papers were cited in a given year.

the ICM category gradually increased from 1977 to 2013, reaching a peak in 2011, 2012, and 2013, with more than 200 papers published each year. Since 2014, however, there has been a declining trend in publications. Nevertheless, the citations of these papers published from Taiwan have increased from 1977 to 2021 (Figure 2). In addition, the mean journal impact factor of Taiwanese ICM publications differed significantly across the five time periods (ANOVA, $F=110.50$, $P < 0.05$). Post-hoc pairwise comparisons with Bonferroni correction demonstrated that the mean impact factor during 2011–2020 was significantly lower than that in all other periods (all $P < 0.05$). In addition, the mean impact factor in 2021–2023 was significantly lower than that in 1977–1990, 1991–2000 and 2001–2010 ($P < 0.05$). (Table 6). Also, the average number of citations per paper and the H-index did not increase over time from 2011 to 2023 (Table 7).

4. International collaborations of Taiwanese

ICM publications

Out of 3299 Taiwanese publications, 575 publications (17.43%) had international collaborations with co-authors from 49 countries other than Taiwan. The USA has the highest number of research collaborations with Taiwan (209 co-authors, 6.34%), followed by the People's Republic of China (169, 5.12%), Japan (66, 2.00%), Canada (32, 0.97%) and India (31, 0.94%). Figure 3 shows the international collaboration of Taiwanese publications using the VOSviewer network and the clustering method. Table 8 shows the top ten collaborative countries with Taiwan, their document number, citations and total link strength. The USA had the largest node and the thickest line, closely linked to Taiwan, indicating the close link of ICM research and publications between two countries. The People's Republic of China and Japan also had large nodes with thick lines connected to Taiwan, indicating the close collaboration in ICM publications.

Table 6. The scientific impact of Taiwanese papers published in the Web of Science Subject Category of Integrative & Complementary Medicine from 1977 to 2023 by comparing the mean impact factor using Analysis of Variance with Bonferroni post-hoc test in different time periods

Time periods	Papers number	Mean Impact factor ($\pm$ standard error of mean)	F value	P value
1977-1990	66	4.50 $\pm$ 0.19	110.50	0.000*
1991-2000	258	4.65 $\pm$ 0.09		
2001-2010	714	4.38 $\pm$ 0.07		
2011-2020	1920	2.49 $\pm$ 0.06		
2021-2023	345	3.39 $\pm$ 0.05		
Time period (I)	Comparison groups (J)	Mean difference (I-J)	Standard error of mean	P value
1977-1990	1991-2000	-0.14274	0.33554	1.000
	2001-2010	0.12537	0.31311	1.000
	2011-2020	2.01539	0.30460	0.000*
	2021-2023	1.03190	.032636	0.016*
1991-2000	1977-1990	0.14274	0.33554	1.000
	2001-2010	0.26811	0.17696	1.000
	2011-2020	2.15813	0.16144	0.000*
	2021-2023	1.17464	0.19948	0.000*
2001-2010	1977-1990	-0.12537	0.31311	1.000
	1991-2000	-0.26811	0.17696	1.000
	2011-2020	1.89002	0.10729	0.000*
	2021-2023	0.90653	0.15887	0.000*
2011-2020	1977-1990	-2.01539	0.30460	0.000*
	1991-2000	2.15813	0.16144	0.000*
	2001-2010	-1.89002	0.10729	0.000*
	2021-2023	-0.98349	0.14138	0.000*
2021-2023	1977-1990	-1.03190	.032636	0.016*
	1991-2000	-1.17464	0.19948	0.000*
	2001-2010	-0.90653	0.15887	0.000*
	2011-2020	0.98349	0.14138	0.000*

* < 0.05

Table 7. The scientific impact of Taiwanese papers published in the Web of Science Subject Category of Integrative & Complementary Medicine from 1977 to 2023 by comparing the average citation per paper and H-index in different time periods

Time periods	Papers number	Total citations	Average citation/paper	H-index
1977-1990	66	1376	20.85	21
1991-2000	258	7888	30.57	47
2001-2010	714	26332	36.88	74
2011-2020	1920	46658	24.30	71
2021-2023	345	4096	11.87	28

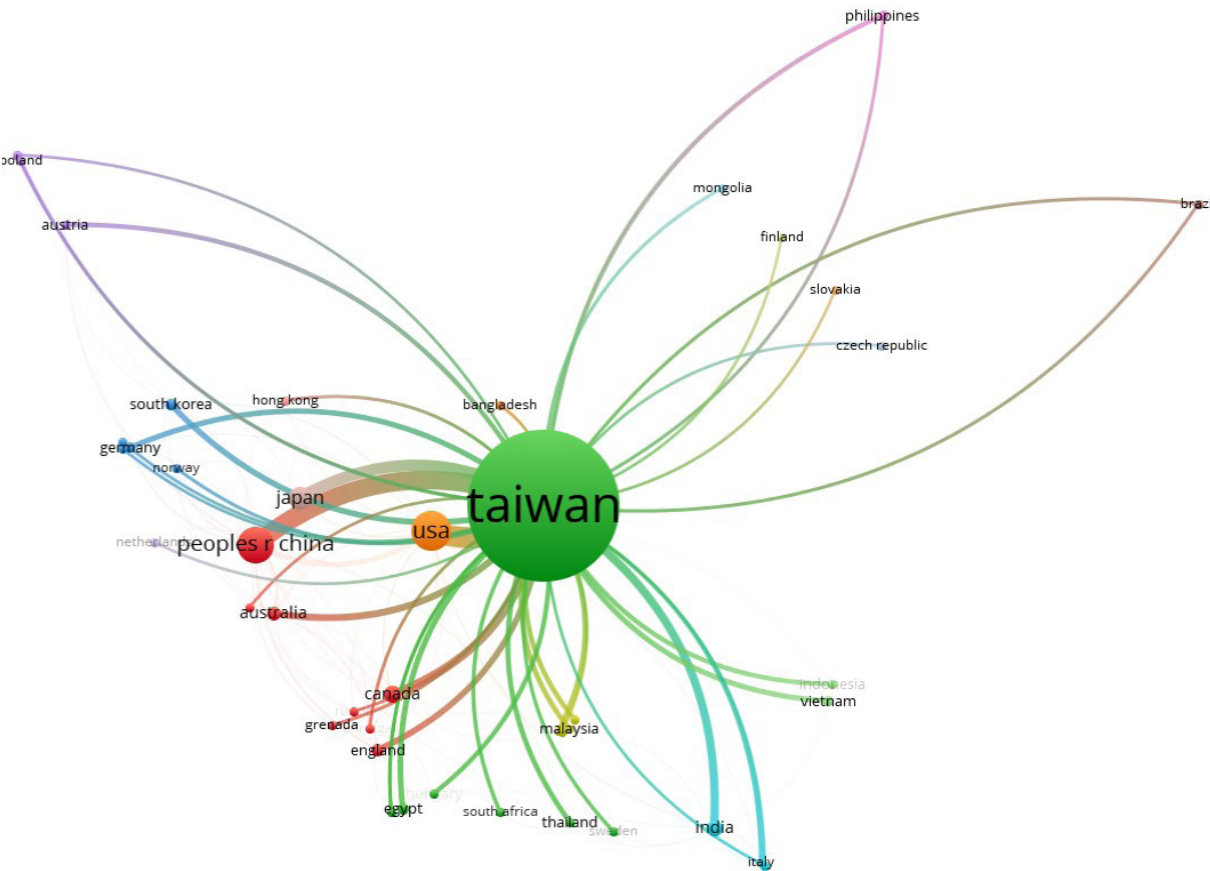


Figure 3. VOSviewer analysis of international collaborations of Taiwanese publications in the Web of Science Integrative & Complementary Medicine category (see text for details). USA: United States of America.

Table 8. Top ten countries collaborated with Taiwan in Integrative & Complementary Medicine publications, their document number, citations and total link strength

Country	Document number	Citations	Total link strength
USA	209	4599	268
People's Republic of China	169	3293	236
Japan	66	1696	80
India	31	579	45
Canada	32	703	43
Australia	20	417	38
England	15	257	30
South Korea	13	111	23
Egypt	12	229	20
Germany	11	373	19

USA: United States of America

Discussion

1. Worldwide publications in the Web of Science ICM category

This study used a bibliometric approach to analyze the performance of Taiwanese publications in the WoS ICM category from 1977 to 2023. These data were collected through an extensive search of publications in the WoS ICM category, including papers published in SCI-E and SSCI journals. This approach ensured a comprehensive analysis of indicators such as annual publications, citations, researchers, affiliated institutes and publication titles.

The analysis of global ICM research shows that the People's Republic of China, South Korea, India and Taiwan are among the most productive Eastern countries in terms of ICM research and publications. This is due to the long-standing development of TCM,

Korean medicine and Ayurvedic medicine in these countries. The widespread use of traditional medicine in these cultures is driving the growth of ICM research [14-16].

The USA and Germany are the most productive Western countries in terms of ICM research and publications. Both countries have high levels of public acceptance of ICM, which is supported by strong government backing. In the USA, for example, the NCCIH has been supporting scientific research in ICM for decades. Meanwhile, the German government enforces strict regulations on ICM therapies to ensure their safety and efficacy [17,18]. This phenomenon may create a situation where a country's increasing resource input into ICM could influence the results of ICM research and publications [19].

2. Taiwanese publications in the Web of Science ICM category

Table 2 shows that Taiwanese publications in the ICM category are also distributed across the subject categories of Pharmacology & Pharmacy, Chemistry, Medicinal, Plant Sciences and Medicine, General & Internal. These results suggest that ICM in Taiwan primarily uses herbal medicine, while also focusing on research in pharmacology [20,21]. In addition, there are more papers published in the Oncology category, suggesting that integrated ICM approaches to cancer treatment may be widely accepted by the Taiwanese population [22,23]. In addition, the Taiwanese NHI program reimburses TCM cancer treatment for patients diagnosed by Western medicine, as part of the Enhanced Integrated Care of TCM in Cancer Patients Project since 2018. This might further facilitate the ICM research and publications by clinicians or researchers.

Among the top ten institutions with the highest number of publications, most publications in the ICM category were generated in university departments or university affiliated/teaching hospitals, which are responsible for teaching and research other than clinical services. This may be due to the need for talent development in TCM with academic clinical demand [24].

Our results show that the institutions with the highest publication volume in the ICM category were China Medical University and its affiliated hospital. The top five researchers with the highest publication volume also had worked at China Medical University or its affiliated hospitals. Founded in 1958, China Medical University was the first academic institution in Taiwan to offer courses in TCM and pharmacy to medical students. Since its establishment, China Medical University has been the leading institution in Taiwan for TCM-related research. In addition to its

undergraduate programs, China Medical University established the Institute of TCM in 1975 and the Institute of Acupuncture Science in 2005, which are dedicated to academic research in ICM. As the main clinical teaching hospital of China Medical University, China Medical University Hospital is committed to promoting the characteristics of Chinese medicine in both clinical and academic aspects, and also facilitating the modernization of ICM [25].

Based on our research findings, the number of publications in the ICM category from Taiwan has increased steadily over the past few decades, peaking in 2011-2013. This increase can be attributed to the establishment of post-baccalaureate programs in TCM at I-Shou University in 2010 and Tzu Chi University in 2012, as well as the inclusion of TCM in hospital accreditation by the Taiwanese government in 2011. These factors led to a rapid increase in the number of publications in the field of ICM [26,27]. Of course, other possible factors also deserve further evaluation. Despite the increase in publication volume, the mean impact factor, average citations per paper and H-index of ICM journals did not increase over time from 2011 to 2023, indicating the difficulty of maintaining paper quality alongside increased publication volume [28]. In addition, the COVID-19 pandemic in 2020-2023 resulted in difficulties in enrolling participants in clinical trials and face-to-face contact with study subjects, leading to a subsequent decline in publication production [29].

There are several ways to evaluate the scientific impact of publications. However, the impact factor announced by Clarivate in the JCR each year only reflects citations from the previous two years, which limits the value of long-term comparisons. Please note that *Evidence-Based Complementary and Alternative*

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Table 9. Number of top five journals in which Taiwanese Integrative & Complementary Medicine papers were published, their impact factors, and percentages over the five time periods

Time period/number of papers	Publication title	Impact factor	Papers Count	%
1977-1990 (N=66)				
	<i>American Journal of Chinese Medicine</i>	5.7	36	54.55
	<i>Planta Medica</i>	2.7	24	36.36
	<i>Journal of Ethnopharmacology</i>	5.4	5	7.58
	<i>Acupuncture & Electro-Therapeutics Research</i>	0.3	1	1.52
1991-2000 (N=258)				
	<i>American Journal of Chinese Medicine</i>	5.7	91	35.27
	<i>Planta Medica</i>	2.7	63	24.42
	<i>Journal of Ethnopharmacology</i>	5.4	32	12.40
	<i>Phytomedicine</i>	7.9	5	1.94
2001-2010 (N=714)				
	<i>American Journal of Chinese Medicine</i>	5.7	233	32.63
	<i>Planta Medica</i>	2.7	194	27.17
	<i>Journal of Ethnopharmacology</i>	5.4	134	18.77
	<i>Journal of Alternative and Complementary Medicine</i>	2.6	55	7.70
	<i>Phytomedicine</i>	7.9	38	5.32
2011-2020 (N=1920)				
	<i>Evidence-Based Complementary and Alternative Medicine</i>	-	698	36.35
	<i>Journal of Ethnopharmacology</i>	5.4	221	11.51
	<i>American Journal of Chinese Medicine</i>	5.7	211	10.99
	<i>BMC Complementary and Alternative Medicine</i>	3.9	168	8.75
	<i>Phytomedicine</i>	7.9	128	6.67
2021-2023 (N=345)				
	<i>Evidence-Based Complementary and Alternative Medicine</i>	-	68	19.71
	<i>Journal of Ethnopharmacology</i>	5.4	53	15.36
	<i>Phytomedicine</i>	7.9	47	13.62
	<i>Journal of Traditional and Complementary Medicine</i>	5.1	27	7.83
	<i>American Journal of Chinese Medicine</i>	5.7	24	6.96

Medicine was removed from the Clarivate Web of Science Core Collection in 2023. Consequently, the journal was not assigned a journal impact factor in the 2022 Journal Citation Reports or subsequent editions. Table 9 shows the top five journals published in each time period. Of the papers published during the 2011–2020 and 2021–2023 periods, respectively, 36.35% and 19.71% were published in *Evidence-Based Complementary and Alternative Medicine*, which had no impact factor in 2022. Our results showed no consistent improvement in the scientific impact of publications over time, as measured by the mean impact factor, the average number of citations per publication, and the H-index. In order to strengthen Taiwan's academic influence in the global ICM field, it is necessary to enhance the quality and quantity of ICM research and publications.

Transnational collaboration is crucial in ICM as it facilitates the exchange and sharing of ideas and knowledge between different countries. By pooling resources and technical strengths, research teams can improve efficiency and output, thereby enhancing the credibility and reliability of research and producing more impactful results [30,31]. In the WoS ICM category, almost a fifth of Taiwanese papers involve international collaborations, with the USA and the People's Republic of China being the most common partners in ICM research and publication. This highlights Taiwan's emphasis on international collaboration, using ICM knowledge to promote the overall improvement of global health.

3. Study limitations

This study has several limitations. Although the WoS provides a comprehensive database of ICM biomedical literature, the number of medical journals and citations may still be underestimated, particularly

for papers published in languages other than English. Additionally, publications not listed in the WoS ICM category may have been overlooked. Furthermore, limitations of bibliometric analyses based on large citation databases may include author name ambiguity and institutional name variations. In addition, there is a small chance of double counting if the proceeding papers and notes are developed into full articles at a later date. Nevertheless, it is reasonable to conclude that WoS is one of the most powerful databases for bibliometric analysis, and that our research is the most up to date. [32]. However, our bibliographic analyses mostly produced descriptive reports and trend analyses. These phenomena deserve further evaluation with more detailed explanations.

Conclusions

Our study shows that Taiwan has been actively publishing research related to ICM from 1977 to 2023, with an increasing trend in both the quantity and citation frequency of ICM-related papers. However, the mean impact factor, average citations per paper and H-index of the publications did not increase over time. These results provide a basis for analyzing the strengths of current ICM research and offer insights for future research strategies. Overall, maintaining a certain quantity and quality of ICM publications remains crucial and plays a key role in the development of ICM in Taiwan.

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(#113-00-8000-5714).

References

1. Ng JY, Dhawan T, Dogadova E, et al. Operational definition of complementary, alternative, and integrative medicine derived from a systematic search. *BMC Complement Med Ther.* 2022; 22(1): 104.
2. National Center for Complementary and Integrative Health (NCCIH) , Complementary, Alternative, or Integrative Health: What's In a Name? 2024. Available at <https://www.nccih.nih.gov/health/complementary-alternative-or-integrative-health-whats-in-a-name>. Accessed May 4, 2024.
3. Feng YA, Chen CY, Chen TT, et al. Taiwan Biobank: A rich biomedical research database of the Taiwanese population. *Cell Genom.* 2022; 2(11): 100197.
4. Cheng SH, Chiang TL. The effect of universal health insurance on health care utilization in Taiwan. Results from a natural experiment. *JAMA.* 1997; 278(2):89-93.
5. Wen SH, Chang WC, Shen HS, Wu HC. Prescription patterns and factors influencing the use of Chinese herbal medicine among pregnant women in Taiwan: a population-based retrospective study. *BMC Complement Med Ther.* 2020; 20(1): 240.
6. Lin LY, Warren-Gash C, Smeeth L, Chen PC. Data resource profile: the National Health Insurance Research Database (NHIRD). *Epidemiol Health.* 2018; 40: e2018062.
7. Chang MY, Liu CY, Chen HY. Changes in the use of complementary and alternative medicine in Taiwan: a comparison study of 2007 and 2011. *Complement Ther Med.* 2014; 22(3): 489-499.
8. Yeh ML, Lin KC, Chen HH, Wang YJ, Huang YC. Use of traditional medicine and complementary and alternative medicine in Taiwan: a multilevel analysis. *Holist Nurs Pract.* 2015; 29(2): 87-95.
9. Ding Z, Li F. Publications in Integrative and Complementary Medicine: A Ten-Year Bibliometric Survey in the Field of ICM. *Evid Based Complement Alternat Med.* 2020; 2020: 4821950.
10. Clarivate Analytics, Web of Science Core Collection 2024. Available at <https://www.webofscience.com/wos/woscc/basic-search>. Accessed February 28, 2024.
11. Clarivate Analytics, Web of Science Core Collection Help 2024. Available at images.webofknowledge.com/images/help/wos/hp.subject_category_terms_tasca.html. Accessed February 28, 2024.
12. Clarivate Analytics, InCites Help 2024. Available at <https://incites.help.clarivate.com/Content>. Accessed February 28, 2024.
13. van Eck NJ, Waltman L. Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics.* 2010; 84(2): 523-538.
14. Ansari S. Overview of traditional systems of medicine in different continents. In: Preparation of Phytopharmaceuticals for the Management of Disorders. Academic Press. pp.431-473, 2021.
15. Kim D, Shih CC, Cheng HC, Kwon SH, Kim H, Lim B. A comparative study of the traditional medicine systems of South Korea and Taiwan: Focus on administration, education and license. *Integr Med Res.* 2021; 10(3): 100685.
16. Sen S, Chakraborty R. Revival, modernization and integration of Indian traditional herbal medicine in clinical practice: Importance, challenges and future.

- J Tradit Complement Med.* 2016; 7(2): 234-244.
17. Fjær EL, Landet ER, McNamara CL, Eikemo TA. The use of complementary and alternative medicine (CAM) in Europe. *BMC Complement Med Ther.* 2020; 20(1): 108.
18. Tangkiatkumjai M, Boardman H, Walker DM. Potential factors that influence usage of complementary and alternative medicine worldwide: a systematic review. *BMC Complement Med Ther.* 2020; 20(1): 363.
19. Ng JY. Insight into the characteristics of research published in traditional, complementary, alternative, and integrative medicine journals: a bibliometric analysis. *BMC Complement Med Ther.* 2021; 21(1): 185.
20. Lin KC, Chen ML, Yeh ML, Hsu CH, Chen YL, Chou P. Prevalence, pattern, and predictors of use of complementary and alternative medicine in Taiwan. *Taiwan J Public Health.* 2009; 28(1): 53–68.
21. Huang CW, Tran DNH, Li TF, et al. The utilization of complementary and alternative medicine in Taiwan: An internet survey using an adapted version of the international questionnaire (I-CAM-Q). *J Chin Med Assoc.* 2019; 82(8): 665-671.
22. Su PH, Tai CJ. Current development in integrative therapy of traditional Chinese medicine for cancer treatment: A mini-review. *J Tradit Complement Med.* 2019; 10(5): 429-433.
23. Kuo YT, Chang TT, Muo CH, et al. Use of complementary traditional Chinese medicine by adult cancer patients in Taiwan: A Nationwide population-based study. *Integr Cancer Ther* 2018; 17(2): 531-541.
24. Alkuwati A, Alkhamis A, Alshahrani MS, Alkhayal IA. A critical appraisal study on how medical schools differ from teaching hospitals. *Acad Strateg Manage J.* 2021; 20(s2): 1-10.
25. Chen WL, Hsieh CL. Acupuncture research in Taiwan. *Taiwan J Obstet Gynecol.* 2012; 51(2): 179-185.
26. Yeh JT, Shulruf B, Lee HC, et al. Faculty appointment and promotion in Taiwan's medical schools, a systematic analysis. *BMC Med Educ.* 2022; 22(1): 356.
27. Hussein M, Pavlova M, Ghalwash M, Groot W. The impact of hospital accreditation on the quality of healthcare: a systematic literature review. *BMC Health Serv Res.* 2021; 21(1): 1057.
28. Chu JSG, Evans JA. Slowed canonical progress in large fields of science. *Proc Natl Acad Sci U S A.* 2021; 118(41): e2021636118.
29. Sathian B, Asim M, Banerjee I, et al. Impact of COVID-19 on clinical trials and clinical research: A systematic review. *Nepal J Epidemiol.* 2020; 10(3): 878-887.
30. Xu Q, Bauer R, Hendry BM, et al. The quest for modernisation of traditional Chinese medicine. *BMC Complement Altern Med.* 2013; 13: 132.
31. De Lima C, Perez-Cruz PE, Paliva BSR, et al. The impact of international research collaborations on the citation metrics and scientific potential of South American palliative care research: Bibliometric analysis. *Ann Glob Health.* 2021; 87(1): 1-11.
32. Fu Jy, Zhang X, Zhao YH, Huang MH. Bibliometric analysis of complementary and alternative medicine research over three decades. *Scientometrics.* 2011; 88: 617-626.

臺灣學者於 Web of Science 整合與補充醫學領域出版趨勢之書目分析 (1977 - 2023)

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中醫藥具有兩千年歷史，整合與補充醫學 (Integrative & Complementary Medicine, ICM) 研究在臺灣迅速發展。本研究利用 Web of Science (WoS) 資料庫中 ICM 領域之收錄論文，分析 1977 年至 2023 年間臺灣相關研究的發展趨勢。結果顯示，該期間臺灣於 WoS ICM 領域共發表 3299 篇論文，位居全球第七，主要分佈於藥理與藥學、藥物化學、植物科學及一般內科等學科。發表量最高之機構為中國醫藥大學及其附設醫院。論文數量自 1977 年起逐年增加，並於 2011 至 2013 年間達到高峰，每年超過 200 篇。然而，論文的平均影響因子、平均論文被引用次數及 H-指數並未隨時間上升。整體而言，臺灣在 ICM 領域的研究產出呈穩定成長，惟未見質的同步提升。未來應兼顧研究數量與品質，以促進臺灣整合與補充醫學之持續發展。

關鍵字：書目分析、引用次數、影響因子、整合與補充醫學、學科領域、Web of Science

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