

Operational Definition of Complementary, Alternative, and Integrative Medicine Derived from a Systematic Search

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Method Article

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Abstract

Background

Identifying what therapies constitute complementary, alternative, and/or integrative medicine (CAIM) is complex for a multitude of reasons. An operational definition is dynamic, and changes based on both historical time period and geographical location whereby many jurisdictions may integrate or consider their traditional system(s) of medicine as conventional care. To date, only one operational definition of “complementary and alternative medicine” has been proposed, by Cochrane researchers in 2011. This definition is not only several years old but also did not use systematic methods to compile the therapies. Furthermore, it did not capture the concept “integrative medicine”, which is an increasingly popular aspect of the use of complementary therapies in practice. An updated operational definition reflective of CAIM is warranted given the rapidly increasing body of CAIM research literature published each year.

Methods

Four peer-reviewed or otherwise quality-assessed information resource types were used to inform the development of the operational definition: peer-reviewed articles resulting from searches across seven academic databases; the “aims and scope” webpages of peer-reviewed CAIM journals; CAIM entries found in online encyclopedias, and highly-ranked websites identified through searches of CAIM-related terms on HONcode. Screening of eligible resources, and data extraction of CAIM therapies across them, were each conducted independently and in duplicate. CAIM therapies across eligible sources were deduplicated.

Results

A total of 101 eligible resources were identified: peer-reviewed articles (n = 19), journal “aims and scope” webpages (n = 22), encyclopedia entries (n = 11), HONcode-searched websites (n = 49). Six hundred four unique CAIM terms were included in this operational definition of CAIM.

Conclusions

This updated operational definition is the first to be informed by systematic methods, and could support the harmonization of CAIM-related research through the provision of a standard of classification, as well as support improved collaboration between different research groups.

Background

Defining complementary, alternative and integrative medicine (CAIM) has been both complex and dynamic. The US National Centre for Complementary and Integrative Health (NCCIH) defines “complementary” medicine as a non-mainstream practice that is used *together with* conventional medicine and “alternative” medicine as a non-mainstream practice used *in place of* it. They defined “integrative health” as the bringing together of conventional and complementary approaches in a coordinated way [1]. In all three instances, these terms imply a relationship to conventional medicine, which may limit the categorization of therapies that have an undefined or non-existent relationship to conventional care [2]. Another challenge is that many of these terms are used interchangeably in the medical literature despite having marked differences in their meanings, and there is no universal consensus regarding which term ought to be used or is most “correct”. Other, less frequently used terms to describe these therapies also include “unconventional”, “unorthodox”, and “non-mainstream”, which are all reflective of therapies that are not typically taught at and/or provided by Western health care systems. Historically, subsets of such therapies have also been referred to as “quackery” and “charlatanism”, among other pejorative terms that are generally not used to describe them in the medical literature today [2].

Despite the difficulties in defining CAIM, it is well-documented that therapies described as complementary, alternative, traditional, or integrative are used with a high prevalence across the world. Many patients use CAIM in combination with, and a minority in lieu of, conventional care. Eighty-eight percent of World Health Organization member states (170 countries) have acknowledged the use of CAIM, having formally developed policies, laws, regulations, programs and offices for CAIM, as examples [3, 4]. The prevalence of CAIM use among many Western countries is highly variable, though in some countries it can be high; for example, among Canadians it is approximately 80% [5]. Across European countries, CAIM use has been found to vary from 0.3–86% [6, 7]. The use of CAIM is also known to be highly prevalent among patients living with a wide range of diseases/conditions; in cancer patients, as many as 90% report using some form of CAIM [8–10]. While one reason for these large differences in the prevalence of CAIM use across different jurisdictions may indeed be attributed to cultural norms or true preferences for or against CAIM, another reason includes the fact that there is simply no consensus, and therefore standard, for what is or is not included in an operational definition of CAIM. Even national surveys, themselves, do not contain an identical list of therapies when compared across time within countries.

The popularity and acceptance of different CAIM therapies have also not remained equal, but instead have varied over time, culture, and geographical region. For example, in the 1900s, animal magnetism (also known as mesmerism) was a type of CAIM that had gained some popularity in Europe and the United States, though conventional medical practitioners at the time viewed it with skepticism [11, 12]. Today, however, it is largely unpracticed and could arguably be excluded from an operational definition of CAIM. Other CAIMs have gained increased popularity, as well as greater acceptance from conventional healthcare practitioners in some regions of the world, such as chiropractic [13], naturopathy [14, 15], acupuncture [16, 17], and traditional Chinese medicine [18, 19]

Regardless of how CAIM therapies gain popularity among patients, the reasons that motivate patients to use CAIM are well-studied and some of the most common ones include: symptom relief, improved quality of life, augmentation of conventional therapy, support of one’s philosophical orientations towards health, and achievement in control over one’s care [20–22]. Due to the popularity of these therapies in some populations [23] and even some significant results

of efficacy [24], they could arguably be offered in conventional healthcare settings including family physician practices, hospitals and hospices. The very fact that patients actively choose to use CAIM therapies, with many lacking safety and efficacy profiles, justifies the conducting of research in this field. New knowledge gained in turn, can be incorporated into the medical curriculum, and can help inform shared decision-making between healthcare practitioners and patients. Unsurprisingly, it is also known that the quantity of CAIM research being conducted has increased greatly over the past few decades [2, 25].

A theoretical definition of CAIM, however, is arguably not enough to inform certain types of CAIM research. Aside from studies testing specific CAIM therapies, such as those conducted through randomized controlled trials, currently published systematic reviews and bibliometric analyses on CAIM in general address multiple CAIM therapies and lack complete search strategies [26]. This can be attributed to the fact that no standard list of CAIM therapies is agreed upon within the research community, largely due to the lack of an existing comprehensive operational definition. This, in turn, results in a great omission of potentially eligible studies across these research methods, which yield biased or incomplete results. This justifies the development of an operational definition of CAIM, which if comprehensive, can serve as a solution. An operational definition serves a different purpose than a theoretical definition, as it identifies all (if not, as many as possible) therapies that can be categorized as CAIM, yet it is also a far more challenging definition to create. Like CAIM itself, an operational definition of it is dynamic, changing based on both historical time period in light of new evidence generated from medical research, and geographical location whereby many jurisdictions may integrate or consider their traditional system(s) of medicine as conventional care.

Developing an Operational Definition of CAIM

To date, only one operational definition of complementary and alternative medicine (CAM, not CAIM) has been published by Wieland et al. in 2011. They began by considering ways in which the 2005 Institute of Medicine theoretical definition of CAM, as therapies “other than those intrinsic to the politically dominant health system of a particular society or culture in a given historical period”, was relevant to the landscape of the early 21st century. To obtain a list of specific therapies, they examined sources in the US National Library of Medicine (NLM) PubMed database including the Medical Subject Heading (MeSH) definition of “Complementary Therapies” and the CAM on PubMed subset search strategy. They created an initial list of 70 alphabetical CAM terms or combinations of terms under subtopics according to the 5 categories of CAM therapies set by the National Center for Complementary and Alternative Medicine (NCCAM, the former name of the NCCIH at the time), and then subjected these terms to further qualifications and refinements based on setting, route of administration, and therapy/indication pairings [27]. Although the term “integrative” medicine had been in use as early as 1995 [28, 29], it remained a relatively infrequently used term at the time that Wieland et al.’s study was published [2]; thus, it is understandable why their definition did not include this term. Over the last decade, however, the use of the term “integrative” to refer to such therapies has become increasingly popular by both healthcare practitioners and researchers alike [2, 30, 31]. Considering that the NCCAM was renamed the National Centre for Complementary and Integrative Health (NCCIH) in December 2014, the update to their name is significant and indicates the emergence of patient, clinician, researcher and policy maker interest in an integrative approach in medical treatment plans [32]. It thus follows that a new operational definition that includes “integrative” is created.

Despite the omission of the term “integrative”, Wieland et al.’s study is a valuable starting point for the development of the present study’s operational definition, as they detailed how they constructed their definition, such as considering the historical context of a therapy, whether it is a standard treatment within the dominant medical system, whether it is a standard treatment for a given condition, and the setting in which the therapy is provided [27]. A number of sentiments shared by Wieland et al., with respect to the value of an operational definition, therefore, equally apply to the present study. An operational definition of CAIM would support the harmonization of research, as CAIM-specific research databases can be developed in a more standardized fashion with respect to classifying what constitutes included therapies. This may also allow for more effective collaboration among research groups, as a general consensus can be reached rapidly [27]. Operationalization also enables the precise comparison of different CAIM areas over time and across investigators [27]. Undoubtedly, value has emerged from Wieland et al.’s (2011) work, as a variety of studies have utilized their operational definition to inform their research. Some examples include a literature review of traditional and complementary medicine in the context of mental health services in low- or middle-income countries [33] and a systematic review of the cost-effectiveness of common complementary and integrative therapies [34]. Studies have also used Wieland et al.’s operational definition with some modification [6], or in combination with other approaches to propose an operational definition for clinical pathways [35].

The methods used by Wieland et al. (2011) to construct their operational definition, was not without its weaknesses, however, and the present study aims to update and build on their work in a few ways. Wieland et al. (2011) only reviewed two sources within the US National Library of Medicine’s PubMed database, the MeSH definition of ‘Complementary Therapies’ and the Complementary Medicine subset search strategy, to generate a listing of specific therapies [27]. In light of these shortcomings, the objective of the present study is to create an operational definition of CAIM derived from a systematic search, and to construct search strategies for common academic databases based on our findings to improve and standardize search strategies pertinent to future CAIM research.

Methods

Approach

Preliminary searches were conducted to identify studies that have provided an operational definition of CAIM (and CAIM-related terms), of which only Wieland et al.’s (2011) study was found. Following this, searches were conducted during the weeks of August 24 and 31, 2020 across four different types of quality-assessed media, including 1) peer-reviewed articles from seven major databases (MEDLINE, EMBASE, AMED, PsycINFO, CINAHL, Scopus and Web of Science, searched systematically), 2) “Aims and Scope” webpages of peer-reviewed CAIM journals, 3) entries containing CAIM therapies in highly-accessed online encyclopaedias, and 4) highly ranked websites resulting from Health On the Net Code of Conduct (HONcode) searches. These four types of media were specifically selected, as they have been deemed to contain quality-assessed information. Peer-reviewed articles and peer-reviewed CAIM journals are both academic authorities on CAIM research. Highly accessed encyclopedias contain entries written by experts in the corresponding fields; they are fact-checked and frequently are also peer-reviewed. Websites present on HONcode are assessed for reliability and credibility of information, and must meet specific criteria in order to be certifiable and appear in HONcode searches (unlike Google or Yahoo!, for example). Eligible items identified across all four resource types were

reviewed for therapies relating to CAIM (and CAIM-related terms, such as “complementary”, “alternative” or “integrative” medicine), which were then data extracted for inclusion in the operational definition of CAIM. A protocol was registered with the (Prospective Register of Systematic Reviews) PROSPERO, registration number CRD42020206301. It should be noted that in our PROSPERO registration, we also describe the development of academic database search strategies informed by this operational definition, which we plan to publish separately.

Eligibility Criteria

Based on the differing nature of these four media sources, we applied specific inclusion criteria to each in order to inform the development of an operational definition of CAIM. Peer-reviewed articles were deemed eligible if they provided a list or group of CAIMs, or CAIM-related terms (i.e. a list of alternative medicines, etc.). We specifically excluded articles that did not provide a list or group of CAIM therapies, as this would have been extremely time-consuming with little return in benefit, as the vast majority of these articles pertained to the study of a single CAIM. Peer-reviewed journals’ “Aims and Scope” webpages were deemed eligible if the title of the journal contained the words “complementary”, “alternative”, and/or “integrative”. Highly-accessed online encyclopaedias were eligible if they were not publicly editable (i.e. Wikipedia entries were excluded) and contained entries relating to complementary, alternative and/or integrative/integrated medicine. As we sought to develop an operational definition, we did not include encyclopaedia entries about specific CAIMs (i.e. chiropractic, acupuncture, etc.). Highly ranking websites which appeared within the first 20 results (or first two search results pages) of each HONcode search were reviewed; websites were deemed eligible if they contained any CAIM therapies (i.e. therapies explicitly described/listed as a CAIM [or synonym thereof, i.e. complementary medicine, alternative medicine, integrative medicine] on the website itself). HONcode search results also yielded peer-reviewed articles, which were treated based on the eligibility criteria of peer-reviewed articles. Any items not published in the English language were excluded across all four media types.

Searching and Screening

MEDLINE, EMBASE, AMED, PsycINFO, CINAHL, Scopus and Web of Science (WoS) were searched from inception of each respective database on August 25th, 2020. The search strategies were developed by JYN and included terms that commonly refer to CAIM [1]. Eligible full-text articles were identified by screening abstracts and titles independently and in duplicate. Citations of these articles were also checked to retrieve new literature to contribute to the operational definition. Eligible “Aims and Scope” webpages were identified using Scimago (<https://www.scimagojr.com/> [“Complementary and Alternative Medicine” Category]) and Journal Citation Reports (<https://jcr.clarivate.com/> [“Integrative and Complementary Medicine” Category]). Highly-accessed online encyclopaedias were identified via Alexa ranking [36]. The search strategies run on the seven databases can be found in **Table 1**.

Highly-ranking websites were identified by means of search strategies developed by JYN, relating to CAIM definitions via HONcode searches [37]. Twenty terms were searched on <https://www.hon.ch/en/search.html> and sorted by “Relevance” and “All” including: “alternative medicine search strategy”; “complementary medicine search strategy”; “integrated medicine search strategy”; “integrative medicine search strategy”; “list of alternative medicine”; “list of complementary medicine”; “list of integrated medicine”; “list of integrative medicine”; “operational definition of alternative medicine”; “operational definition of complementary medicine”; “operational definition of integrated medicine”; “operational definition of integrative medicine”; “types of alternative medicine”; “types of complementary medicine”; “types of integrated medicine”; and “types of integrative medicine”. The first two pages (first 20 results) were reviewed for each search, totalling 320 webpages (16 search terms).

TD and ED screened the titles and abstracts of peer-reviewed articles recovered from MEDLINE, EMBASE, AMED, PsycINFO, CINAHL, Scopus, Web of Science and HONcode independently and in duplicate. TD and ED screened a subset of the CAIM journal “Aims and Scope” webpages independently and in duplicate. ZT and AV screened CAIM entries in highly-accessed online encyclopaedias, HONcode searches, and a subset of the journal “Aims and Scope” webpages, both independently and in duplicate. Duplicates resulting from searches between and across all four media sources were removed. After all the items were screened, TD, ED, ZT, and AV met with JYN to discuss and resolve discrepancies. These results were checked over an additional time by LSW and DM.

Data Extraction and Analysis

ZT and AV data extracted the names of CAIM therapies from eligible HONcode searches, CAIM-related entries in the most-visited online encyclopaedias, and journals’ “Aims and Scopes” webpages independently and in duplicate. TD and ED extracted the names of CAIM therapies from eligible peer-reviewed articles, including those resulting from HONcode searches, independently and in duplicate. After all the names of CAIM therapies were data extracted, TD, ED, ZT, and AV met with JYN to discuss and resolve discrepancies. These results were checked over an additional time by LSW and DM.

Creation of a CAIM Operational Definition

A list of all names of CAIM therapies yielded from all data extractions across were compiled into a Microsoft Excel spreadsheet, and duplicates were removed. Given the large number of CAIM therapies identified, TD, ED, ZT, and AV reviewed each item an additional time for accuracy. Upon finalizing the list of CAIM therapies included in the operational definition, we grouped similar/identical CAIM therapies (i.e. “St. John’s wort” and “Hypericum perforatum”) together to appear on a single line, then alphabetized all lines. A certain degree of evaluator judgement was exercised in determining 1) whether a therapy was considered CAIM and 2) whether one or more CAIMs were similar/identical to one another. To guide our decisions, we also consulted monographs published by the Natural Medicines Research Collaboration [38] to identify all common and scientific names pertaining to each CAIM therapy; in cases where no professional monograph was available, we consulted the peer-reviewed literature. We note that we did not discriminate between very broad (i.e. “complementary and alternative medicine”) and highly specific (i.e. “St. John’s wort”) CAIMs; therefore, we included any term that we identified that referred to a single or a group of CAIM(s) or this category of therapies altogether. We also note that we included therapies that may serve as CAIM in one context and conventional medicine in another; these were included based on the fact that they were denoted as CAIM in the original source found through our systematic search. Additionally, JYN and LSW have considerable experience studying CAIM, and DM is a highly experienced research methodologist; both assisted in guiding the other authors in making a finalized judgement resulting in the finalized operational definition of CAIM.

Results

The search conducted on OVID databases (AMED, EMBASE, MEDLINE, PsycINFO), Web of Science, CINAHL, Scopus and HONCode peer-reviewed sources retrieved a total of 1255 results, of which a total of 483 were unique. From the 483 results, 424 titles/abstracts were excluded, leaving 59 results that were deemed eligible based on their title/abstracts. This was followed by 34 further exclusions, leaving 25 results deemed eligible based on their full text. Of the remaining 25 full-text articles, 9 were excluded, resulting in 16 full-text publications to remain. Three additional publications were retrieved from the citations of the 16 full-texts, totaling 19 full-text publications. Thus, 19 journal articles contributed to providing CAIM terms for the operational definition. In terms of non-peer-reviewed article sources, 22 journals from SCIMAGO and JCR, 11 encyclopedias from Alexa rankings, and 49 eligible non-peer reviewed article HONCode search entries were also reviewed for contribution to the CAIM terms for the operational definition. Overall, a total of 101 items were obtained from both peer-reviewed and non-peer reviewed sources. Our final operational definition in this study includes a total of 604 unique CAIM terms, based on the 1561 terms CAIM terms extracted from the final 101 items in addition to the 259 terms retrieved from Cochrane. A modified Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) diagram depicting all searched, screened, and included items is shown in **Figure 1**.

Operational Definition of CAIM

Of the 1561 final terms that underwent further analysis, 149 terms were removed as they were not considered CAIM, resulting in 1412 terms. The 259 terms retrieved from the Cochrane Complementary Medicine operational definition of complementary medicine were screened for CAIM terms that were not already included in the list of final terms, after which 82 were deemed to be unique, and subsequently added to the operational definition on March 18, 2021. After these changes, a total of 1494 terms were standardized as informed by the process of proximity searching; terms were standardized under keywords or phrases that typically appear in approximate sets of words in literature. After standardization, the final list of CAIM therapies included in our study was 604 as they described the fundamental nature of CAIM rather than actual CAIM therapies. The complete operational definition of CAIM is provided in **Table 2**.

Discussion

In the present study, we created an operational definition of CAIM informed by a systematic search of four quality-assessed media sources. Prior to the creation of this operational definition, only one study conducted by Wieland et al.’s (2011) had developed an operational definition of CAM (excluding the term “integrative”) containing 70 therapies. This number was later expanded through addition of further examples to 259 therapies which are listed on the Cochrane Complementary Medicine website [39]. The present study’s operational definition contains 1561 unique terms which comprise 604 CAIM therapies, in which all 259 aforementioned therapies are included. This updated definition more than doubles the list of CAIM therapies and provides researchers with a considerably more comprehensive list of therapies to improve the conduct of future CAIM research involving systematic searches, such as reviews and bibliometric analyses.

Perceived Utility of an Updated Operational Definition for Future CAIM Research

Systematic and Scoping Reviews

Systematic and scoping reviews are research methodologies which use repeatable analytical methods to search for, gather, and summarize literature on a given topic in order to fill a knowledge gap [40–45]. Standardized academic search strategies are of great benefit to researchers seeking to conduct these types of studies, as this yields more consistent search results; this in turn, can maximize the opportunity of capturing as much of the relevant available peer-reviewed literature as possible, identify gaps in research, and inform potential future directions [46–50]. This is no exception with respect to CAIM-specific research, however, conducting systematic searches within this particular field comes with its own particular challenges [51] due to the fact that prior to this study, there was no standardized list of terms used to inform a search. To date, the search strategies used to identify general CAIM-related literature appear to differ from researcher to researcher, undoubtedly resulting in selection biases with respect to therapies included [51]. Furthermore, indexed headings relating to CAIM are not standardized across different databases, nor is any single indexed term (or group of indexed terms) comprehensive enough to capture the

entirety of the CAIM literature [51–54]. The standardized search strategies provided in this study can, therefore, mitigate this challenge by establishing a replicable collection of literature pertinent to the topic of CAIM. It can be anticipated that should future systematic and scoping reviews employ the search strategies informed by this operational definition, they will yield more comprehensive results, which will consequently serve to more comprehensively capture eligible articles regardless of the defined inclusion criteria.

Bibliometric Analyses

A bibliometric analysis is a research methodology that involves the statistical assessment of scientific articles or books, to identify the characteristics and determine the impact of the literature published in a specific academic discipline [55–59]. Unlike the systematic or scoping review, however, no reporting guideline nor standard checklist for the conduct of a bibliometric analysis exists to date [60]; despite this, all bibliometric analyses typically share common similarities such as the assessing of one or more of the following characteristics: number of publications (in total and per year); open access status; articles per journals; journal names and impact factors; language of article; document type; publication country; author affiliations; funding sponsors; most highly published authors; and highest-cited articles [46, 61, 62]. Unlike the literature on other academic topics which may be captured by relatively short and simple search strategies, the conduct of a comprehensive bibliometric analysis specific to CAIM in general needed to include a defined list of CAIM therapies for the purpose of constructing the search strategy employed on academic databases. Hence, published bibliometric analyses on CAIM have been largely relegated to those assessing research published in CAIM journals [63–65], based on certain research methodologies (i.e. trials [66, 67]), or those specific to certain categories of CAIM (i.e. acupuncture [68, 69], apitherapy [70], yoga [71, 72] and homeopathy [73], among others). As with this operational definition's utility to reviews, these standardized search strategies provided in this study can also mitigate these challenges by establishing a replicable collection of literature pertinent to the topic of CAIM [27]. It can be anticipated that should future bibliometric analyses employ search strategies informed by this operational definition, they will yield more comprehensive results, which will serve to better monitor the development, growth, and characteristics of the field of CAIM in general.

Existing Challenges and Limitations of Developing an Operational Definition of CAIM

While we anticipate that this operational definition of CAIM will provide much value to the future of CAIM research, it must be acknowledged that it is not without limitations, many of which are a result of a number of existing challenges that remain with respect to conducting research in this field.

Underinclusiveness and Overinclusiveness: Different Countries, Cultures, Systems of Traditional Medicine and Schools of Thought

Firstly, it must be re-stated that CAIM therapies are and will likely forever be dynamic in nature, which makes it complex to define operationally. Even though our operational definition was informed by systematic searches, because there is no general standard nor agreement as to what constitutes a CAIM therapy, even among experts [27, 51], this list was therefore, constructed based on media sources largely authored by this group of individuals. It must also be acknowledged that certain types of CAIMs are inherently challenging to define. For example, certain CAIM therapies or systems of CAIM are difficult to categorize for multiple reasons; they originate from different regions of the world, cultures, systems of traditional medicine, and schools of thought [4, 74]. For example, CAIM therapies rooted in Buddhist practices originate from Eastern cultures such as Cambodia, Thailand, Myanmar, Bhutan, and Sri Lanka where they may be considered part of conventional care, however, their usage is considered to be CAIM across many European and North American countries [75, 76]. This challenge is further compounded across certain categories of CAIM. Herbal therapies, for example are referred to in multiple different ways, which may include scientific names and multiple common names, the latter of which may be derived from multiple languages, and not necessarily just English [77]. For other therapies, whether they are defined as CAIM or not are situational, even if considered within the context of conventional medical care. One example of this includes chelation therapy, which is the primary treatment method of heavy metal poisoning, and in this context it is considered as conventional care. However, when this same therapy is used for the treatment of atherosclerosis, it is considered CAIM [39]. Another example of this includes vitamins; in the context of treating diseases resulting from vitamin deficiency, these therapies are considered part of conventional care, however, the use of large doses of vitamins, often many times greater than the recommended dietary allowance (known as megavitamin therapy or orthomolecular medicine) is typically categorized as CAIM [39, 78]. Thus, even the most well-constructed operational definition of CAIM will suffer from both underinclusiveness and overinclusiveness. Despite this, the value added by this operational definition as a result of being informed by a systematic search strategy, includes the fact that it has largely captured the most common terms used to refer to the most commonly-researched CAIMs.

English-Language Bias

Apart from the aforementioned challenges in defining CAIM, the very fact that this operational definition was searched for and constructed based on only the English language and literature serves as a limitation. Language biases are an additional and significant obstacle to CAIM research, and no single language or group of languages can sufficiently capture the entirety of the CAIM literature. It can reasonably be inferred that research conducted on CAIM therapies originating from a certain region or culture are commonly published in the local or national language(s). The majority of CAIM studies, however, are published by English-language non-CAIM journals and by Chinese-language CAIM journals [67]. It has also been found that while the English journals publish a higher frequency of studies reporting negative results associated with CAIM therapies, Chinese, Japanese, and Russian journals have published more positive results [79, 80]. Although little is known about CAIM research published in other languages, such stark differences in findings only based on the English versus Chinese, Japanese and Russian languages, likely mean that large degrees of variance in findings likely exist between other languages too [81, 82].

Our operational definition is, therefore, limited by an English-language and Western bias, as the umbrella term of CAIM itself is a largely Western concept [83]. As mentioned earlier, many traditional medicines comprise a part of conventional care in non-Western countries, and are sometimes regarded as safe and effective (if not safer and more effective) in comparison to conventional Western medicine [80, 84]. One example includes Kampo, a Japanese traditional medicine system which incorporates herbal medicine and acupuncture therapies, which is commonly practiced in tandem with Western medicine, and is partly covered by public health insurance in Japan [85–88]; such therapies arguably would not fall under a Japanese definition of CAIM. Another example includes

traditional Chinese medicine (TCM), which like Kampo, is used in conjunction with Western medicine in China. Although it has existed for many thousands of years, in recent years the study of TCM has been studied, produced, and dosed based on modern research technologies [89, 90]. Furthermore, TCM has been standardized by the federal government of China in a gradual process, with complete diagnostic and treatment guidelines and basic principles that act as the basis of scientific research and education on TCM [89–91]. From a Chinese cultural perspective, therefore, TCM would by definition not be considered CAIM either. Similar challenges in Western countries to the CAIM status of some therapies originating from early professional or quasi-professional practitioners of Western medicine can also be observed. Among CAIM professions, disputes among practitioners can lead to divisions in how a given therapy is practiced and perceived. The chiropractic profession is one example with a turbulent history; while some practitioners sought to align themselves more closely with conventional medical practitioners, others acted to reject this notion [92, 93]. Today, the profession in North America still remains divided, however, a significant number of members have succeeded in advancing the profession to a point whereby certain jurisdictions regard chiropractic care as conventional medicine [94–96].

Lack of CAIM Therapy Categorization

Following the development of the operational definition, we opted not to categorize the list of CAIM therapies, and instead present it alphabetically. While this may be perceived as a limitation, this decision was made based on the fact that no international standard for categorizing CAIM therapies exist [27]. While it could be argued that the CAIM therapies could have been categorized based on an arbitrarily-selected categorization system (i.e. natural products, mind and body practices [1]), a subsequent challenge included the fact that no consensus exists regarding which CAIM therapies fall into which categories. While management of an additional layer of classifications may be an onerous task to conduct in this already ambitious present study, its operationalization may support further work in identifying categories of CAIM therapies. Further research seeking to develop consensus around both CAIM therapy categories, and the categories under which each CAIM therapy falls into, may be of value in the future, however, the achievement of this represents both a time-consuming and resource-intensive venture that is beyond the scope of our present study.

Conclusion

The present study involved a systematic search of four quality-assessed information resource types which was used to create an operational definition of CAIM. While this operational definition is not without its limitations, it represents a highly-comprehensive list of therapies. This operational definition can be used to improve the conduct of future CAIM research involving systematic searches, thereby supporting the harmonization of CAIM-related research through the provision of a standard of classification, as well as support improved collaboration between different research groups with a vested interest in this topic area.

Abbreviations

CAIM	complementary alternative and integrative medicine
CAM	complementary and alternative medicine
HONcode	Health On the Net Code of Conduct
MeSH	Medical Subject Heading
NCCIH	National Centre for Complimentary and Integrative Health
NCCAM	National Center for Complementary and Alternative Medicine
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PROSPERO	Prospective Register of Systematic Reviews
TCM	traditional Chinese medicine

Declarations

Ethics Approval and Consent to Participate

This study involved a systematic review of peer-reviewed literature only; it did not require ethics approval or consent to participate.

Consent for Publication

All authors consent to this manuscript's publication.

Availability of Data and Materials

All relevant data are included in this manuscript.

Competing Interests

The authors declare that they have no competing interests.

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This study was unfunded.

Authors' Contributions

JYN: designed and conceptualized the study, collected and analysed data, drafted the manuscript, and gave final approval of the version to be published.

TD: assisted with the collection and analysis of data, critically revised the manuscript, and gave final approval of the version to be published.

ED: assisted with the collection and analysis of data, critically revised the manuscript, and gave final approval of the version to be published.

ZT: assisted with the collection and analysis of data, critically revised the manuscript, and gave final approval of the version to be published.

AV: assisted with the collection and analysis of data, critically revised the manuscript, and gave final approval of the version to be published.

LSW: assisted with the analysis of data, critically revised the manuscript, and gave final approval of the version to be published.

DM: assisted with the analysis of data, critically revised the manuscript, and gave final approval of the version to be published.

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References

1. National Center for Complementary and Integrative Health (NCCIH). Complementary, Alternative, or Integrative Health: What's In a Name? <https://www.nccih.nih.gov/health/complementary-alternative-or-integrative-health-whats-in-a-name>. Accessed March 15, 2021.
2. Ng JY, Boon HS, Thompson AK, Whitehead CR. Making sense of "alternative", "complementary", "unconventional" and "integrative" medicine: exploring the terms and meanings through a textual analysis. *BMC Complement Altern Med*. 2016; 16:134. <http://dx.doi.org/10.1186/s12906-016-1111-3>.
3. World Health Organization. Traditional, Complementary and Integrative Medicine. 2021. https://www.who.int/health-topics/traditional-complementary-and-integrative-medicine#tab=tab_1. Accessed March 18, 2021.
4. World Health Organization. WHO global report on traditional and complementary medicine 2019. 2019. <https://apps.who.int/iris/handle/10665/312342> Accessed March 28, 2021.
5. Esmail N. Complementary and Alternative Medicine: Use and Public Attitudes 1997, 2006, and 2016. Fraser Institute; 2017. <http://www.fraserinstitute.org>. Accessed March 28, 2021.
6. Kemppainen LM, Kemppainen TT, Reippainen JA, Salmenniemi ST, Vuolanto PH. Use of complementary and alternative medicine in Europe: Health-related and sociodemographic determinants. *Scand J Public Health*. 2018; 46(4):448–455. <http://dx.doi.org/10.1177/1403494817733869>.
7. Eardley S, Bishop FL, Prescott P, Cardini F, Brinkhaus B, Santos-Rey K, Vas J, von Ammon K, Hegyi G, Dragan S *et al*. A systematic literature review of complementary and alternative medicine prevalence in EU. *Forsch Komplementmed*. 2012; 19 Suppl 2:18–28. <http://dx.doi.org/10.1159/000342708>.
8. Savas P, Robertson A, Beatty L, Hookings E, McGee M, Marker J, McCaleb B, Bowen J, Richards A, Koczwara B. Patient preferences on the integration of complementary therapy with conventional cancer care. *Asia Pac J Clin Oncol*. 2016; 12(2):e311-318. <http://dx.doi.org/10.1111/ajco.12226>.
9. Begbie SD, Kerestes ZL, Bell DR. Patterns of alternative medicine use by cancer patients. *Med J Aust*. 1996; 165(10):545–548. <http://dx.doi.org/10.5694/j.1326-5377.1996.tb138639.x>.
10. Adams M, Jewell AP. The use of Complementary and Alternative Medicine by cancer patients. *Int Semin Surg Oncol*. 2007; 4:10. <http://dx.doi.org/10.1186/1477-7800-4-10>.
11. Rouse T. The brief and strange history of mesmerism and surgery. Hektoen Institute of Medicine; 2019. <https://hekint.org/2018/12/24/the-brief-and-strange-history-of-mesmerism-and-surgery/>. Accessed May 4, 2021.

12. Crabtree A. Animal magnetism, early hypnotism, and psychical research, 1766–1925: An annotated bibliography. Kraus International Publications; 1988. <https://www.esalen.org/ctr/animal-magnetism>. Accessed May 5, 2021.
13. Homola S. Chiropractic: history and overview of theories and methods. *Clin Orthop Relat Res*. 2006; 444:236–242. <http://dx.doi.org/10.1097/01.blo.0000200258.95865.87>.
14. Gort EH, Coburn D. Naturopathy in Canada: changing relationships to medicine, chiropractic and the state. *Soc Sci Med*. 1988; 26(10):1061–1072. [http://dx.doi.org/10.1016/0277-9536\(88\)90224-9](http://dx.doi.org/10.1016/0277-9536(88)90224-9).
15. Baer HA. The potential rejuvenation of American naturopathy as a consequence of the holistic health movement. *Med Anthropol*. 1992; 13(4):369–383. <http://dx.doi.org/10.1080/01459740.1992.9966058>.
16. White A, Ernst E. A brief history of acupuncture. *Rheumatology (Oxford)*. 2004; 43(5):662–663. <http://dx.doi.org/10.1093/rheumatology/keg005>.
17. Zhuang Y, Xing JJ, Li J, Zeng BY, Liang FR. History of acupuncture research. *Int Rev Neurobiol*. 2013; 111:1–23. <http://dx.doi.org/10.1016/B978-0-12-411545-3.00001-8>.
18. Li J, Zhu J, Hu H, Harnett JE, Lei CI, Chau KY, Chan G, Ung COL. Internationalization of Traditional/Complementary Medicine products: market entry as medicine. *Chinese Medicine*. 2018; 13(1):50. <http://dx.doi.org/10.1186/s13020-018-0209-6>.
19. Chao J, Dai Y, Verpoorte R, Lam W, Cheng YC, Pao LH, Zhang W, Chen S. Major achievements of evidence-based traditional Chinese medicine in treating major diseases. *Biochem Pharmacol*. 2017; 139:94–104. <http://dx.doi.org/10.1016/j.bcp.2017.06.123>.
20. Astin JA. Why patients use alternative medicine: results of a national study. *JAMA*. 1998; 279(19):1548–1553. <http://dx.doi.org/10.1001/jama.279.19.1548>.
21. Kristoffersen AE, Stub T, Musial F, Fonnebo V, Lillenes O, Norheim AJ. Prevalence and reasons for intentional use of complementary and alternative medicine as an adjunct to future visits to a medical doctor for chronic disease. *BMC Complement Altern Med*. 2018; 18(1):109. <http://dx.doi.org/10.1186/s12906-018-2179-8>.
22. McCaffrey AM, Pugh GF, O'Connor BB. Understanding patient preference for integrative medical care: results from patient focus groups. *J Gen Intern Med*. 2007; 22(11):1500–1505. <http://dx.doi.org/10.1007/s11606-007-0302-5>.
23. Redvers N, Marianayagam J, Blondin B. Improving access to Indigenous medicine for patients in hospital-based settings: a challenge for health systems in northern Canada. *Int J Circumpolar Health*. 2019; 78(2):1589208. <http://dx.doi.org/10.1080/22423982.2019.1589208>.
24. Chopra A, Saluja M, Tillu G, Sarmukkaddam S, Venugopalan A, Narsimulu G, Handa R, Sumantran V, Raut A, Bichile L *et al*. Ayurvedic medicine offers a good alternative to glucosamine and celecoxib in the treatment of symptomatic knee osteoarthritis: a randomized, double-blind, controlled equivalence drug trial. *Rheumatology (Oxford)*. 2013; 52(8):1408–1417. <http://dx.doi.org/10.1093/rheumatology/kes414>.
25. Ng J. Insight into the Characteristics of Research Published in Complementary, Alternative, and Integrative Medicine Journals: A Bibliometric Analysis. 2021. <http://dx.doi.org/10.21203/rs.3.rs-440363/v1>.
26. Corrao S, Argano C, Colomba D, Ippolito C, Gargano V, Arcoraci V, Licata G. Information management and complementary alternative medicine: the anatomy of information about CAMs through PubMed. *Intern Emerg Med*. 2013; 8(7):627–634. <http://dx.doi.org/10.1007/s11739-013-0997-8>.
27. Wieland LS, Manheimer E, Berman BM. Development and classification of an operational definition of complementary and alternative medicine for the Cochrane collaboration. *Altern Ther Health Med*. 2011; 17(2):50–59.
28. Snyderman R, Weil AT. Integrative Medicine: Bringing Medicine Back to Its Roots. *Archives of Internal Medicine*. 2002; 162(4):395–397. <http://dx.doi.org/10.1001/archinte.162.4.395>.
29. Maizes V, Rakel D, Niemiec C. Integrative medicine and patient-centered care. *Explore (NY)*. 2009; 5(5):277–289. <http://dx.doi.org/10.1016/j.explore.2009.06.008>.
30. Yun H, Sun L, Mao JJ. Growth of Integrative Medicine at Leading Cancer Centers Between 2009 and 2016: A Systematic Analysis of NCI-Designated Comprehensive Cancer Center Websites. *J Natl Cancer Inst Monogr*. 2017; 2017(52). <http://dx.doi.org/10.1093/jncimonographs/lgx004>.
31. Youn BY, Song HJ, Yang K, Cheon C, Ko Y, Jang BH, Shin YC, Ko SG. Bibliometric Analysis of Integrative Medicine Studies from 2000 to 2019. *Am J Chin Med*. 2021:1–13. <http://dx.doi.org/10.1142/S0192415X21500397>.
32. National Center for Complementary and Integrative Health. Frequently Asked Questions: Name Change. <https://www.nccih.nih.gov/news/frequently-asked-questions-name-change>. Accessed March 28, 2021.
33. Gureje O, Nortje G, Makanjuola V, Oladeji BD, Seedat S, Jenkins R. The role of global traditional and complementary systems of medicine in the treatment of mental health disorders. *Lancet Psychiatry*. 2015; 2(2):168–177. [http://dx.doi.org/10.1016/S2215-0366\(15\)00013-9](http://dx.doi.org/10.1016/S2215-0366(15)00013-9).
34. Herman PM, Poindexter BL, Witt CM, Eisenberg DM. Are complementary therapies and integrative care cost-effective? A systematic review of economic evaluations. *BMJ Open*. 2012; 2(5). <http://dx.doi.org/10.1136/bmjopen-2012-001046>.
35. Lawal AK, Rotter T, Kinsman L, Machotta A, Ronellenfitsch U, Scott SD, Goodridge D, Plishka C, Groot G. What is a clinical pathway? Refinement of an operational definition to identify clinical pathway studies for a Cochrane systematic review. *BMC Med*. 2016; 14:35. <http://dx.doi.org/10.1186/s12916-016-0580-z>.
36. Alexa Internet. The top 500 sites on the web. <https://www.alexa.com/topsites/category>. Accessed September 5, 2020.
37. HONcode. Health On the Net (HON); 2020. <https://www.hon.ch/HONcode/>. Accessed April 1, 2021.
38. Therapeutic Research Center. Natural Medicines. <https://naturalmedicines.therapeuticresearch.com>. Accessed April 1, 2021.
39. Cochrane Complimentary Medicine. Operational Definition of Complimentary Medicine. <https://cam.cochrane.org/operational-definition-complimentary-medicine>. Accessed March 21, 2021.

40. Moher D, Liberati A, Tetzlaff J, Altman DG, Group P. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Med.* 2009; 6(7):e1000097. <http://dx.doi.org/10.1371/journal.pmed.1000097>.
41. Cohen JF, Deeks JJ, Hooft L, Salameh JP, Korevaar DA, Gatsonis C, Hopewell S, Hunt HA, Hyde CJ, Leeflang MM *et al.* Preferred reporting items for journal and conference abstracts of systematic reviews and meta-analyses of diagnostic test accuracy studies (PRISMA-DTA for Abstracts): checklist, explanation, and elaboration. *BMJ.* 2021; 372:n265. <http://dx.doi.org/10.1136/bmj.n265>.
42. Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, Moher D, Peters MDJ, Horsley T, Weeks L *et al.* PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med.* 2018; 169(7):467–473. <http://dx.doi.org/10.7326/M18-0850>.
43. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology.* 2005; 8(1):19–32. <http://dx.doi.org/10.1080/1364557032000119616>.
44. Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implementation Science.* 2010; 5(1):69. <http://dx.doi.org/10.1186/1748-5908-5-69>.
45. Colquhoun HL, Levac D, O'Brien KK, Straus S, Tricco AC, Perrier L, Kastner M, Moher D. Scoping reviews: time for clarity in definition, methods, and reporting. *J Clin Epidemiol.* 2014; 67(12):1291–1294. <http://dx.doi.org/10.1016/j.jclinepi.2014.03.013>.
46. Linnenluecke MK, Marrone M, Singh AK. Conducting systematic literature reviews and bibliometric analyses. *Australian Journal of Management.* 2019; 45(2):175–194. <http://dx.doi.org/10.1177/0312896219877678>.
47. Bramer WM, de Jonge GB, Rethlefsen ML, Mast F, Kleijnen J. A systematic approach to searching: an efficient and complete method to develop literature searches. *J Med Libr Assoc.* 2018; 106(4):531–541. <http://dx.doi.org/10.5195/jmla.2018.283>.
48. Kugley S, Wade A, Thomas J, Mahood Q, Jørgensen A-MK, Hammerstrøm K, Sathe N. Searching for studies: a guide to information retrieval for Campbell systematic reviews. *Campbell Systematic Reviews.* 2017; 13(1):1–73. <http://dx.doi.org/https://doi.org/10.4073/cm.2016.1>.
49. Lefebvre C GJ, Briscoe S, Littlewood A, Marshall C, Metzendorf M-I, Noel-Storr A, Rader T, Shokraneh F, Thomas J, Wieland LS. Chapter 4: Searching for and selecting studies *Cochrane*; 2021. <http://www.training.cochrane.org/handbook>. Accessed April 1, 2021.
50. Salvador-Olivan JA, Marco-Cuenca G, Arquer-Aviles R. Errors in search strategies used in systematic reviews and their effects on information retrieval. *J Med Libr Assoc.* 2019; 107(2):210–221. <http://dx.doi.org/10.5195/jmla.2019.567>.
51. Veziari Y, Leach MJ, Kumar S. Barriers to the conduct and application of research in complementary and alternative medicine: a systematic review. *BMC Complement Altern Med.* 2017; 17(1):166. <http://dx.doi.org/10.1186/s12906-017-1660-0>.
52. Bardia A, Wahner-Roedler DL, Erwin PL, Sood A. Search strategies for retrieving complementary and alternative medicine clinical trials in oncology. *Integr Cancer Ther.* 2006; 5(3):202–205. <http://dx.doi.org/10.1177/1534735406292146>.
53. Pilkington K. Searching for CAM evidence: an evaluation of therapy-specific search strategies. *J Altern Complement Med.* 2007; 13(4):451–459. <http://dx.doi.org/10.1089/acm.2007.6308>.
54. Murphy LS, Reinsch S, Najm WI, Dickerson VM, Seffinger MA, Adams A, Mishra SI. Searching biomedical databases on complementary medicine: the use of controlled vocabulary among authors, indexers and investigators. *BMC Complementary and Alternative Medicine.* 2003; 3(1):3. <http://dx.doi.org/10.1186/1472-6882-3-3>.
55. Otlet P: **Traité de documentation: le livre sur le livre, théorie et pratique.** Bruxelles: Editiones Mundaneum; 1934.
56. Rousseau R. Library science: Forgotten founder of bibliometrics. *Nature.* 2014; 510(7504):218. <http://dx.doi.org/10.1038/510218e>.
57. Price DDS. A general theory of bibliometric and other cumulative advantage processes. *Journal of the American Society for Information Science.* 1976; 27(5):292–306. <http://dx.doi.org/https://doi.org/10.1002/asi.4630270505>.
58. Hicks D, Wouters P, Waltman L, de Rijcke S, Rafols I. Bibliometrics: The Leiden Manifesto for research metrics. *Nature.* 2015; 520(7548):429–431. <http://dx.doi.org/10.1038/520429a>.
59. Pritchard A. Statistical Bibliography or Bibliometrics? *Journal of Documentation.* 1969; 25(4): 348–349. http://dx.doi.org/https://www.researchgate.net/profile/Alan_Pritchard/publication/236031787_Statistical_Bibliography_or_Bibliometrics/links/0c960515eBibliography-or-Bibliometrics.
60. Jappe A. Professional standards in bibliometric research evaluation? A meta-evaluation of European assessment practice 2005–2019. *PLoS One.* 2020; 15(4):e0231735. <http://dx.doi.org/10.1371/journal.pone.0231735>.
61. AlRyalat SAS, Malkawi LW, Momani SM. Comparing Bibliometric Analysis Using PubMed, Scopus, and Web of Science Databases. *J Vis Exp.* 2019(152). <http://dx.doi.org/10.3791/58494>.
62. van Eck NJ, Waltman L. Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics.* 2010; 84(2):523–538. <http://dx.doi.org/10.1007/s11192-009-0146-3>.
63. Fu J-Y, Zhang X, Zhao Y-H, Huang M-H, Chen D-Z. Bibliometric analysis of complementary and alternative medicine research over three decades. *Scientometrics.* 2011; 88(2):617–626. <http://dx.doi.org/10.1007/s11192-011-0391-0>.
64. Moral-Munoz JA, Carballo-Costa L, Herrera-Viedma E, Cobo MJ. Production Trends, Collaboration, and Main Topics of the Integrative and Complementary Oncology Research Area: A Bibliometric Analysis. *Integrative cancer therapies.* 2019; 18:1534735419846401–1534735419846401. <http://dx.doi.org/10.1177/1534735419846401>.
65. Zyoud SeH, Al-Jabi SW, Sweileh WM. Scientific publications from Arab world in leading journals of Integrative and Complementary Medicine: a bibliometric analysis. *BMC Complementary and Alternative Medicine.* 2015; 15(1):308. <http://dx.doi.org/10.1186/s12906-015-0840-z>.
66. Vickers AJ. Bibliometric analysis of randomized trials in complementary medicine. *Complementary Therapies in Medicine.* 1998; 6(4):185–189. [http://dx.doi.org/https://doi.org/10.1016/S0965-2299\(98\)80026-5](http://dx.doi.org/https://doi.org/10.1016/S0965-2299(98)80026-5).

67. Wieland LS, Manheimer E, Sampson M, Barnabas JP, Bouter LM, Cho K, Lee MS, Li X, Liu J, Moher D *et al.* Bibliometric and content analysis of the Cochrane Complementary Medicine Field specialized register of controlled trials. *Systematic Reviews*. 2013; 2(1):51. <http://dx.doi.org/10.1186/2046-4053-2-51>.
68. Ma Y, Dong M, Zhou K, Mita C, Liu J, Wayne PM. Publication Trends in Acupuncture Research: A 20-Year Bibliometric Analysis Based on PubMed. *PLoS one*. 2016; 11(12):e0168123-e0168123. <http://dx.doi.org/10.1371/journal.pone.0168123>.
69. Liang YD, Li Y, Zhao J, Wang XY, Zhu HZ, Chen XH. Study of acupuncture for low back pain in recent 20 years: a bibliometric analysis via CiteSpace. *J Pain Res*. 2017; 10:951–964. <http://dx.doi.org/10.2147/JPR.S132808>.
70. Şenel E, Demir E. Bibliometric analysis of apitherapy in complementary medicine literature between 1980 and 2016. *Complementary Therapies in Clinical Practice*. 2018; 31:47–52. <http://dx.doi.org/https://doi.org/10.1016/j.ctcp.2018.02.003>.
71. Jeter PE, Slutsky J, Singh N, Khalsa SB. Yoga as a Therapeutic Intervention: A Bibliometric Analysis of Published Research Studies from 1967 to 2013. *J Altern Complement Med*. 2015; 21(10):586–592. <http://dx.doi.org/10.1089/acm.2015.0057>.
72. Cramer H, Lauche R, Dobos G. Characteristics of randomized controlled trials of yoga: a bibliometric analysis. *BMC Complementary and Alternative Medicine*. 2014; 14(1):328. <http://dx.doi.org/10.1186/1472-6882-14-328>.
73. Chiu W-T, Ho Y-S. Bibliometric analysis of homeopathy research during the period of 1991 to 2003. *Scientometrics*. 2005; 63(1):3–23. <http://dx.doi.org/10.1007/s11192-005-0201-7>.
74. Petri Jr RP DR, McConnell K. Historical and Cultural Perspectives on Integrative Medicine. *Medical Acupuncture*. 2015; 27(5):309–317. <http://dx.doi.org/10.1089/acu.2015.1120>.
75. Obadia L. The Economies of Health in Western Buddhism: A Case Study of a Tibetan Buddhist Group in France. In: Wood DC. *The Economics of Health and Wellness: Anthropological Perspectives. Volume 26*. Emerald Group Publishing Limited; 2007. p. 227–259.
76. Braun LA, Tiralongo E, Wilkinson JM, Spitzer O, Bailey M, Poole S, Dooley M. Perceptions, use and attitudes of pharmacy customers on complementary medicines and pharmacy practice. *BMC Complementary and Alternative Medicine*. 2010; 10(1):38. <http://dx.doi.org/10.1186/1472-6882-10-38>.
77. Ekor M. The growing use of herbal medicines: issues relating to adverse reactions and challenges in monitoring safety. *Front Pharmacol*. 2014; 4:177. <http://dx.doi.org/10.3389/fphar.2013.00177>.
78. National Institute of Health - Office of Dietary Supplements. Multivitamin/mineral Supplements - Consumer. 2021. <https://ods.od.nih.gov/factsheets/MVMS-Consumer/>. Accessed April 1, 2021.
79. Shekelle PG, Morton SC, Suttrop MJ, Buscemi N, Friesen C. Challenges in Systematic Reviews of Complementary and Alternative Medicine Topics. *Annals of Internal Medicine*. 2005; 142(12_Part_2):1042–1047. http://dx.doi.org/10.7326/0003-4819-142-12_Part_2-200506211-00003.
80. Vickers A, Goyal N, Harland R, Rees R. Do Certain Countries Produce Only Positive Results? A Systematic Review of Controlled Trials. *Controlled Clinical Trials*. 1998; 19(2):159–166. [http://dx.doi.org/https://doi.org/10.1016/S0197-2456\(97\)00150-5](http://dx.doi.org/https://doi.org/10.1016/S0197-2456(97)00150-5).
81. Pham B, Klassen TP, Lawson ML, Moher D. Language of publication restrictions in systematic reviews gave different results depending on whether the intervention was conventional or complementary. *J Clin Epidemiol*. 2005; 58(8):769–776. <http://dx.doi.org/10.1016/j.jclinepi.2004.08.021>.
82. Wu XY, Tang JL, Mao C, Yuan JQ, Qin Y, Chung VC. Systematic reviews and meta-analyses of traditional chinese medicine must search chinese databases to reduce language bias. *Evid Based Complement Alternat Med*. 2013; 2013:812179. <http://dx.doi.org/10.1155/2013/812179>.
83. Louhiala P. Complementary and Alternative Medicine (CAM) and Its Relationship to Western Medicine. In: Schramme T, Edwards S. *Handbook of the Philosophy of Medicine*. Dordrecht: Springer Netherlands; 2017. p. 927–936.
84. Yuan H, Ma Q, Ye L, Piao G. The Traditional Medicine and Modern Medicine from Natural Products. *Molecules*. 2016; 21(5):559. <http://dx.doi.org/10.3390/molecules21050559>.
85. Suzuki N. Complementary and Alternative Medicine: a Japanese Perspective. *Evidence-based complementary and alternative medicine: eCAM*. 2004; 1(2):113–118. <http://dx.doi.org/10.1093/ecam/neh029>.
86. Togo T, Urata S, Sawazaki K, Sakuraba H, Ishida T, Yokoyama K. Demand for CAM Practice at Hospitals in Japan: A Population Survey in Mie Prefecture. *Evidence-Based Complementary and Alternative Medicine*. 2011; 2011:591868. <http://dx.doi.org/10.1093/ecam/neh049>.
87. Motoo Y, Seki T, Tsutani K. Traditional Japanese medicine, Kampo: Its history and current status. *Chinese Journal of Integrative Medicine*. 2011; 17(2):85–87. <http://dx.doi.org/10.1007/s11655-011-0653-y>.
88. Ko Nishimura GAP, Kenji Watanabe. Kampo medicine as an integrative medicine in Japan. *Japan Medical Association Journal*. 2009; 52(3):147–149.
89. Shi X, Zhu D, Nicholas S, Hong B, Man X, He P. Is Traditional Chinese Medicine “Mainstream” in China? Trends in Traditional Chinese Medicine Health Resources and Their Utilization in Traditional Chinese Medicine Hospitals from 2004 to 2016. *Evidence-Based Complementary and Alternative Medicine*. 2020; 2020:9313491. <http://dx.doi.org/10.1155/2020/9313491>.
90. Xu Q, Bauer R, Hendry BM, Fan TP, Zhao Z, Duez P, Simmonds MS, Witt CM, Lu A, Robinson N *et al.* The quest for modernisation of traditional Chinese medicine. *BMC Complement Altern Med*. 2013; 13:132. <http://dx.doi.org/10.1186/1472-6882-13-132>.
91. Li WF, Jiang JG, Chen J. Chinese medicine and its modernization demands. *Arch Med Res*. 2008; 39(2):246–251. <http://dx.doi.org/10.1016/j.arcmed.2007.09.011>.
92. Ng JY. The regulation of complementary and alternative medicine professions in Ontario, Canada. *Integrative Medicine Research*. 2020; 9(1):12–16. <http://dx.doi.org/https://doi.org/10.1016/j.imr.2020.01.001>.
93. Sutherland DC. The development of chiropractic in the Canadian health care system. *J Can Chiropr Assoc*. 1993; 37(3):164–176.
94. Sutherland DC. Chiropractic: from rejection to acceptance 1900–1980. *J Can Chiropr Assoc*. 1998; 42(3):163–170.

95. Leboeuf-Yde C, Innes SI, Young KJ, Kawchuk GN, Hartvigsen J. Chiropractic, one big unhappy family: better together or apart? *Chiropractic & Manual Therapies*. 2019; 27(1):4. <http://dx.doi.org/10.1186/s12998-018-0221-z>.
96. Meeker WC, Haldeman S. Chiropractic: a profession at the crossroads of mainstream and alternative medicine. *Ann Intern Med*. 2002; 136(3):216–227. <http://dx.doi.org/10.7326/0003-4819-136-3-200202050-00010>.

Tables

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Figures

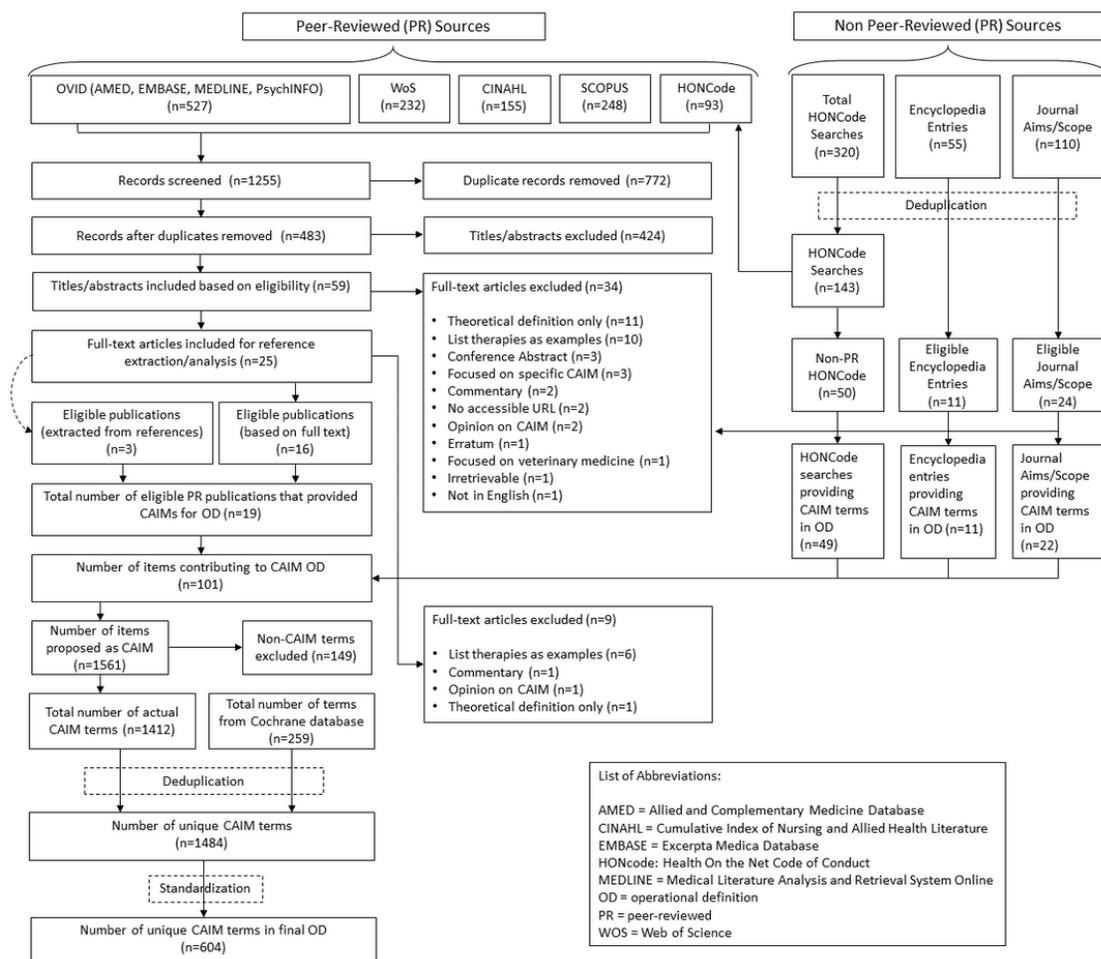


Figure 1

PRISMA Diagram

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