

Teaching integrative and complementary medicine in health undergraduate courses: systematic review

Abstract

Background: Health undergraduate courses have their curricula focused on conventional medicine. Integrative and Complementary Practice also known as Complementary and Alternative Medicine (CAM) have been included in this worldwide scenario motivated by the growing need for new care possibilities that value Traditional Medicines and the individual-centered view. This work aims to analyze published evidence about CAM in health teaching around the world. **Methods:** This is a systematic review about the teaching of CAM on fifteen different undergraduate health courses, published between 2010 and 2020, in Portuguese and English, indexed in the Pubmed and VHL databases. The descriptors were “complementary and alternative medicine teaching” or its variations and the name of fifteen undergraduate health courses. The methodological quality was assessed using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) recommendations and Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) criteria. **Results:** The initial search identified 351 articles. After exclusion criteria, 22 articles were read to identify the courses that offers CAM, the modalities and the effects of including CAM in health courses. Different modalities were found and varies according to the country and health course, as well as they are offered as elective format. The contact with integrative medicine at undergraduate increases the interest, confidence and level of knowledge. In students’ opinions, the professional who adds CAM in their training tends to take full care of patients. **Conclusions:** There is a clear need to include integrative medicine in all undergraduate health courses curriculum to provide safe and complete information about integrative medicine.

Keywords: CAM, teaching, integrative medicine, undergraduate health

Volume 17 Issue 4 - 2024

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Received: July 30, 2024 | **Published:** August 15, 2024

Abbreviations: CAM, complementary and alternative medicine; PRISMA, preferred reporting items for systematic reviews and meta-analyses; PAHO, pan American health organization; WHO, world health organization; TCM, traditional and complementary medicine

Introduction

Integrative and Complementary Practices in Health (PICS), also known as Complementary and Alternative Medicine (CAM) or more recently as Complementary and Integrative Traditional Medicine (MTCI) by the Pan American Health Organization (PAHO) and the World Health Organization (WHO) are a set of health practices aimed at humanized treatment and centered on the comprehensiveness of the patient, standing out in the process of welcoming listening, development in the therapeutic bond and in bringing the individual closer to nature and society that surrounds the patient.¹ Since the 1980s, in Brazil, at the 8th National Health Conference (CNS), the need to introduce an alternative health care model in addition to the institutionalized hegemonic model has been discussed, given the stagnation of this system to meet the demands of the current health system,² the growing number of iatrogenic and the appreciation of traditional and popular practices.

The insertion of traditional and complementary/alternative medicines (MTCI/CAM) in the various health systems around the world came as a recommendation by the WHO and added to the guidelines of the CNS. Driven by these ideals, in June 2003, a working group in union with the Ministry of Health (MS), met to start the process of building the National Policy on Integrative and

Complementary Practices (PNPIC), which after a period of long work and changes to the proposal, the PNPIC was approved in February 2006 and published in the form of Brazilian Ministerial decree n° 971.³ After the creation of the PNPIC, the practices included in the Unified Health System (SUS) to be offered to the population were: Traditional Chinese Medicine/acupuncture, homeopathy, medicinal plants and phytotherapy, social thermals/crenotherapy and anthroposophical medicine.²

The PNPIC has as its main objectives incorporate and implement Integrative and Complementary Practices in the SUS, from the perspective of disease prevention and health promotion and recovery, with an emphasis on primary care, focused on continuous, humanized and comprehensive health care; Contribute to increasing the System’s resolvability and expanding access to Integrative and Complementary Practices, ensuring quality, effectiveness, efficiency and safety in use; Promote the rationalization of health actions, encouraging innovative and socially contributing alternatives to the sustainable development of communities; encourage actions related to social control/participation, promoting the responsible and continued involvement of users, managers and workers in different instances of health policy implementation.⁴

In 2017, about 10 years after the creation of the PNPIC, ordinance No. 849 was created, including 14 more practices in the country’s health service.⁵ In 2018, ordinance No. 702 changes the previous ordinance to include new practices in the PNPIC, totaling 29 practices offered by the Unified Health System (SUS).⁶ Among the WHO strategies on Traditional Medicine for the 2014-2023 decade, the training of professionals in PICS permeates the three strategic

objectives that range from strengthening management and integrating these to health services to strengthening quality assurance, safety and proper use and regulation of products and professional practices.⁷

In Brazil, with a view to meeting these guidelines, the Ministry of Health has offered several courses aimed at the continuing education of health professionals and the qualification of management in PICS. In this scenario, the PICS are inserted in a public and universal health system, being primarily allocated to Primary Care, a differential to the health system of other countries that have also adopted complementary medicine.⁸ One of the great difficulties for the expansion of PICS in the SUS is the lack of trained professionals to develop, guide and refer patients to use the practices in a safe and appropriate way. This problem reflects the low offer of the modality in the training of these health professionals, especially within public universities where the offer of PICS in the curriculum is lower than in private colleges.⁹ The teaching format within universities is mostly presented, following the curative method, so that the student tends to become a professional who treats the patient following such teachings, where he tends to keep the focus on the health-disease process focused only for healing.⁹ On the other hand, professionals who maintain contact during the period of their training with placed PICS within disciplines in their curriculum, tend to become professionals who have a look expanded the health-disease process, seeing the patient, integrally and applying methods beyond the conventional in the diagnosis and treatment process.^{10,11}

In recent years there has been a growing demand for PICS. This upward movement can be explained by the increase in chronic diseases, the dissemination of information, the high costs of certain treatments and conventional interventions, leading the population to seek complementary methods to treatments already widely offered. With the growing demand for PICS and with the importance cited on the influence of PNPIC for the implementation of PICS in health services, professional training is a fundamental instrument for the expansion

of these practices in the SUS. Therefore, the insertion of PICS in the scope of academic training of health education institutions is of great importance in this expansionist movement,¹² corroborating the doctrinal principle of the SUS of integrality,¹³ enabling professionals to offer patients and professionals the right to make choices regarding therapeutic models based on different rationales.

The inclusion of these practices in the curriculum of future health professionals can broaden the perspective and possibilities of care focused on the individual, and not just the disease, in addition to preparing them to act in line with the policies and initiatives of world public health that has valued and inserted such practices in health systems, in addition to promoting a respectful reading of ancestral, community and diverse knowledge of the hegemonic logic. Thus, this work aims to conduct an analysis and bring the experiences of PICS within the health graduations, as well as existing publications on the subject.

Methods

This is a qualitative systematic literature review (RSL) study, developed in accordance with the Cochrane Collaboration and PRISMA recommendations. The investigative question of this study followed the PICO strategy, which represents an acronym for Population, Intervention, Comparison and Outcome. The main terms used in this review were defined as follows: P - undergraduate health students; I - courses that offer PICS at their graduation; C- students who do not receive PICS at their undergraduate level versus students who receive PICS at their undergraduate level; O- PICS contribute to improving student education.

The literature review was performed by two different researchers through the PubMed database and Virtual Health Library (VHL) using established methodology previously organized in the PRISMA flowchart in Figure 1.

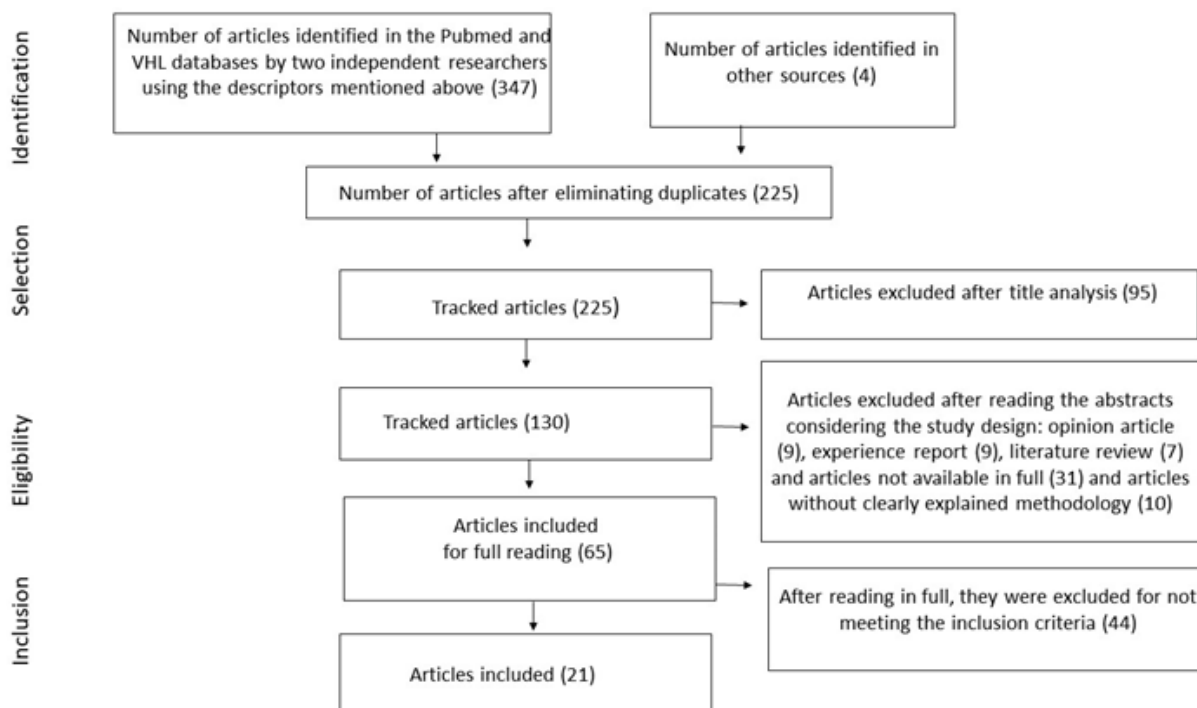


Figure 1 PRISMA flowchart.

The descriptors used for the research were in English and Portuguese and were previously verified in the platform Descriptors in Health Sciences (DeCS). In addition to these descriptors, uncontrolled descriptors were also used, due to the variation in the spelling of the theme. Such descriptors were applied only to the search for titles and abstracts and were grouped into three axes and later combined (AND) in the systematic search:

Axis 1: thematic areas of health. The 15 courses in the health area were considered, defined by the International Labor Organization (ILO), and the names of these courses were defined as descriptors: biomedicine, physical education, nursing, physiotherapy, medicine, dentistry, psychology, occupational therapy, pharmacy, nutrition, speech therapy, biological sciences (OR biology), veterinary medicine, social work, and public health.

Axis 2: teaching theme. For this purpose, the defined descriptors were teaching OR education.

Axis 3: thematic Integrative and Complementary Practices in Health Considering the different nomenclatures that the PICS have in Brazil and worldwide, the following descriptors were defined: integrative medicine, complementary and alternative medicine (CAM), integrative and complementary practices in health (ICPH), complementary and integrative traditional medicines (CITM), traditional and complementary medicine (TCM) and traditional medicine.

The inclusion criteria were articles that related the teaching of CAM/PICS with undergraduate courses in the health area, publications made between 2010 and 2020 and texts made available in full. The following were considered as exclusion criteria: articles related to the teaching of techniques inherent to the profession, such as massage, manipulations and body practices that do not have a theoretical rationale based on PICS, health degrees in PICS (such as chiropractic, acupuncture and naturology), articles from opinion, literature reviews and experience reports. The evaluation of titles and abstracts was conducted by two researchers separately, following rigorously the criteria for inclusion and exclusion defined in the study protocol. In cases of disagreement, researchers sought to find agreement in a consensus meeting.

The articles included were evaluated according to the criteria of the STROBE initiative (Strengthening the Reporting of Observational Studies in Epidemiology).¹⁴ Each of the 22 criteria received a score from 0 (does not meet) to 1 (meets) and after evaluating the criteria, each article received a score from 0 to 22 from each reviewer, where the final score was established by calculating the average of the scores of the authors. According to the final score, articles were classified in ascending order and the global score was converted into a percentage to assess the quality of the articles, classifying them into 3 categories, according to Mataratzis¹⁵: A – when the study meets more than 80% of the criteria established in the STROBE; B – when 50%-80% of the STROBE criteria are achieved; and C – when less than 50% of the criteria are achieved.

Results

In an initial search using the chosen descriptors and after joining the two independent researches, a total of 347 articles were found in the two databases and 4 articles taken from other sources. When duplicates were eliminated, 225 articles remained and then after the analysis of the titles, 94 articles were eliminated that didn't fit the theme of this research, leaving 131 articles selected for abstract analysis, step in which opinion articles, case report, experience

report, narrative review and unavailable articles in full were excluded from the research. 65 were read in full articles of which 43 were excluded because they don't fit in the inclusion criteria. At the end, were considered 22 items, as shown in Figure 1, which were within the eligibility criteria for this research. As for the assessment of methodological quality using the STROBE criteria¹⁴, 20% (n=3) of the studies were classified as quality A, 40% (n=9) of the studies were classified as quality B, and 40 % (n=9) of the studies were classified as quality C (Table 1). All 22 articles bring a total of 4677 participants included in the surveys and 223 institutions studied, as shown in Table 2.

Table 1 Qualitative study according to the STROBE criteria (strengthening the reporting of observational studies in epidemiology)

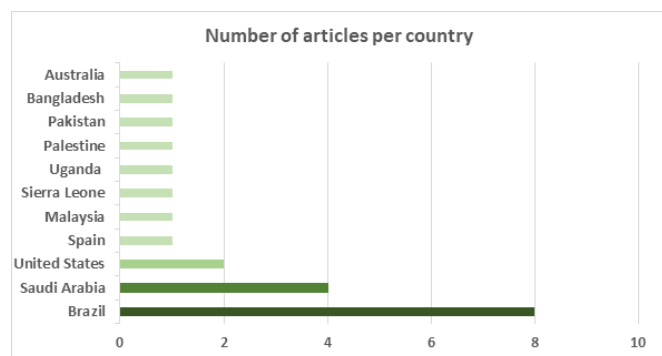
Reference	Points	%	Classification
Booth LaForce et al. ²⁶	6	27,27	C
Cowen & Cyr ¹⁸	8	36,36	C
Fernández Cervilla et al. ³⁴	8	36,36	C
Silva et al. ²⁹	8	36,36	C
Salles et al ¹³	8	36,36	C
Nascimento et al ⁹	9	40,91	C
Christensen & Barros ¹⁰	9	40,91	C
Ahmed et al. ²⁵	10	45,45	C
Mwaka et al.	10	45,45	C
Hamouda et al. ³⁵	11	50	B
Lopes et al. ³⁶	12	54,54	B
Feitosa et al. ²²	12	54,54	B
Hasan et al. ³⁰	12	54,54	B
Armson et al. ¹⁷	12	54,54	B
Albuquerque et al. ²⁰	14	63,64	B
Albadr et al. ¹⁶	15	68,18	B
Saha et al. ³⁷	15	68,18	B
Mansour et al. ³³	15	68,18	B
James et al ²¹	18	81,82	A
Ashraf et al. ¹⁹	19	86,36	A
Samara et al. ²⁴	20	90,91	A

Table 2 Selected articles published in the last 10 years: references, study designs, country of publication and number of participants.

Authors	Study design	Country	No of participants
Ahmed et al. ²⁵	Cross observational	Saudi Arabia	70
Ashraf et al. ¹⁹	Descriptive, transversal, performed by sampling	Pakistan	937
Albadr et al. ¹⁶	Observational, descriptive and transversal	Saudi Arabia	399
James et al. ²¹	Descriptive cross-section with questionnaire application	Sierra Leone	90
Booth LaForce et al. ²⁶	Descriptive, transversal	United States	-
Cowen et al. ¹⁸	Systematic approach to content analysis	United States	130 institutions
Albuquerque et al. ²⁰	Observational and exploratory, with a descriptive and analytical cross-sectional design	Brazil	272
Lopes et al. ³⁶	Descriptive-exploratory research with a qualitative approach	Brazil	12
Fernández Cervilla et al. ³⁴	Descriptive Obsevational	Spain	94
Silva et al. ²⁹	Integrative review	Brazil	-
Hamouda et al. ³⁵	Descriptive Obsevational	Saudi Arabia	1000
Nascimento et al. ⁹	descriptive	Brazil	6 institutions
Saha et al. ³⁷	Cross-sectional study with questionnaire application	Bangladesh	250
Feitosa et al. ²²	Transversal and analytical	Brazil	248
Mansour et al. ³³	Study: Transversal has pre- and post-drawing	Saudi Arabia	65
Christensen e Barros ¹⁰	Systematic review	Brazil	-
Badke et al. ²⁷	Qualitative research, conducted through semi-structured interviews	Brazil	8
Salles et al. ¹³	Descriptive, exploratory with a quantitative approach	Brazil	87 institutions
Mwaka et al.	Qualitative with in-depth interview approaches	Uganda	21
Hasan et al. ³⁰	Transverse	Malaysia	500
Samara et al. ²⁴	Transverse	Palestine	251
Armson et al. ¹⁷	Descriptive Obsevational	Australia	460
	Total number of participants		4677
	Total number of institutions		223

Study location and encompassed health areas

Among the 22 articles analyzed for this RSL, we found a wide variety of countries with published works discussing the topic in question: Saudi Arabia (4), Pakistan (1), Sierra Leone (1), United States of America (USA) (2), Brazil (8), Spain (1), Bangladesh (1), Uganda (1), Malaysia (1), Australia (1) and Palestine (1), as shown in Table 2 and Figure 2.

**Figure 2** Number of articles per country.

The variety of countries with articles that address the teaching of PICS in undergraduate health courses corroborates WHO data that state that some countries have strengthened training programs that include practical knowledge in Complementary and Integrative Traditional Medicine (MTCI), especially in Africa and Asia, in the

curricular components of medical careers. To support member states to achieve quality capacity building, WHO has published a series of guidelines and benchmarks on capacity building.⁷ From the 15 health areas proposed for this study, Medicine (9), Nursing (5), Pharmacy (4) and Physiotherapy (1) were the courses that predominated in the searches, followed by articles (3) that contained more than one course in its research, encompassing other health courses. No papers were found that globally described the situation of teaching CAM/PICS in all undergraduate health courses.

Only articles addressing the teaching of CAM/PICS or one of its modalities within some health courses or articles related to a country, region, state, or university. There was no report in the studied literature that brought any data about the predominance of studies in medicine, nursing, pharmacy and physiotherapy courses.

CAM/PICS modalities offered

A survey conducted in two universities located in Saudi Arabia showed that, of the CAM modalities, bloodletting is the best-known modality and homeopathy the least known among medical students, according to their personal experiences.¹⁶ In Sierra Leone, the most popular modalities among students are herbs, followed by spirituality/prayer and massage, with Ayurveda being the least known. In Australia, a survey conducted with physiotherapy students showed that the techniques best known to them are massage therapy, yoga, meditation, and acupuncture.¹⁷ In Brazil, homeopathy is a modality that is present in almost all institutions that offer PICS and inserted in almost all health courses in them.⁹

Homeopathy is not a widely used practice in the Persian Gulf region and, therefore, students are unfamiliarity of this practice in research carried out in Saudi Arabia, in two universities.¹⁷ Surveys conducted in Sierra Leone, Australia, and Brazil show a variety of practices prevalent in each of the regions, this disparity observed from country to country in relation to practices by students is a result of cultural differences within each nation, a factor that interferes in the predominance of these modalities in different locations.²³

Effects of including CAM/PICS in undergraduate health courses

CAM/PICS are offered within undergraduate health courses mostly electively or optionally.^{16,18,19} When asked about the incorporation of CAM/PICS in the body of compulsory education in these courses, most students expressed a positive opinion about the topic.^{16,17,20–22} A high rate of health students, in several studies, recognized that they didn't have adequate knowledge about CAM/PICS.^{16,23,24} Based on Ahmed et al.,²⁵ more than half of the medical students who participated in the study and who had contact with CAM/PICS within its curriculum, find the application of the practices in their care valid and demonstrated to find them beneficial? In the US, a college incorporated a scholarship program to encourage the inclusion of CAM in the nursing curriculum. The program had a highly positive acceptance among students which increased their level of knowledge and interest in CAM after contacting their graduation.²⁶

A study among 250 undergraduate pharmacy students of Bangladesh revealed that most of students uses at least one sort of CAM. Among the students, 59% used homeopathy followed by Ayurveda (30%), meditation (29%), massage (13%), Unani (9%), yoga (6%) and acupuncture (2%). 84.45% of them recognized the importance of knowledge about CAM for them as future health professionals and for conventional medicine.³⁷ On the other hand, 30% of the students questioned in that study don't encourage the use of CAM that doesn't have scientific evidence and due to the lack of scientific knowledge about herbal medicine, as they did not know about safe doses or possible side effects or drug interactions, caused using these plants.²⁷ This need to include studies on scientific evidence of CAM/PICS in education is a growing trend in health schools¹⁷ and is part of the WHO guidelines for strengthening the MTCI.⁹ In Brazil, at the request of the Ministry of Health, several maps of evidence/clinical effectiveness of the CAM/PICS were produced, prepared by the Brazilian Academic Consortium of Integrative Health²⁸ (CABSIn) in partnership with the Network of Traditional and Complementary Medicines of the Americas (NETWORK MTCI-PAHO).

The lack of scientific evidence, from the perspective of traditional biomedical rationality, is an obstacle to the use by health professionals, such as nurses, within the scope of work.^{26,27,36} Thus, making the investment in research in this area a big step towards increasing the application of PICS and interaction with hegemonic conventional medicine in patient care, with herbal medicine being used by about 80% of the world population according to the WHO.²⁷

In a survey carried out in Brazil with dentistry, medicine and nursing students, more than 3/4 of the students had no knowledge about the Brazilian Politics about PICS (PNPIC).²² The teaching of CAM/PICS is offered both in public and private medical schools, as well as in other countries, through optional subjects (elective or optional).^{9,20} Brazil is below other countries when it comes to offering PICS within the curricula of medical training schools.⁹ There are some ways to present the PICS and introduce it in health courses, such as lectures and theoretical courses, which quickly reach many students and introduce

them to the topic; optional/non-mandatory courses, which are the most adopted form by universities, found in research carried out in medical schools in the USA and Brazil; and mandatory subjects included in the curriculum. The latter was cited by students as the most desired way of inserting PICS into their curricula, but the one that appears least in research involving universities that offer PICS/CAM.^{18,20,25,26,28,29}

A study carried out in the USA, when analyzing the teaching of CAM in medical colleges in the country, at the undergraduate level, only 11% of the courses sought to bring an interprofessional education into their curriculum.¹⁸ It's reiterated that the lack of disciplines with PICS approach contributes to a gap in the training of health professionals, in a way that distances itself from a comprehensive and ethical perspective. Therefore, it's necessary to recognize the need to confront the hegemonic biomedical model so that scientific plurality is valued, and the diversity of practices is made possible in a qualified manner.¹³ This non-mandatory and informative characteristic of most interventions observed in the studies, regarding the insertion of PICS in health education, results in a transitory and superficiality of insertion of the fundamental concepts associated with these practices, which implies the interruption or frequent suspension of these teachings in the training of health professionals. This systematic review reveals a certain similarity in the ways which this field of practice and knowledge has been peripherally inserted in health courses around the world, although cultural differences interfere in the content of these practices.

The students' opinions who demonstrate positivism with the incorporation of CAM into their matrix are justified by Armson et al.¹⁷ for several factors among which "the patient's expectations, health beliefs and values must be integrated in the patient care process", "the body is essentially self-healing and the task of a health professional is to assist in the healing process"; "Complementary and alternative therapies include ideas and methods that conventional medicine can benefit from" and "the patient's symptoms should be considered as a manifestation of general imbalance or dysfunction affecting the entire body."

These justifications fit the concept of PICS defined by the Ministry of Health⁶ which values the individual in their cultural complexity, their beliefs, natural mechanisms of care, the subject's leading role in their health and can be considered as revitalization strategies of health systems and change in the biologizing and medicalizing pattern of care and health promotion³⁰ and in other global health systems. Professionals who add knowledge of PICS in their training include their patients by embracing and seeing them integrally, biologically, philosophically, emotionally, and culturally.^{9,29,31–34}

Only 11% of medical schools in the US have CAM in their matrix,¹⁸ which is a fact that draws attention because the practice of CAM can be performed by various health professionals, bringing a multidisciplinary scenario to the clinic. Thus, if schools do not seek to implement this type of education in their health courses, this becomes another barrier for these integrative practices to be included in health systems, as these professionals need this knowledge to dialogue and discuss issues related to best therapy for their patients in an integral context.⁹ Although it's below other countries when it comes to offering CAM/PICS in undergraduate courses,⁹ which is justified by the lack of discussion within universities on the topic,²² Brazil is above most countries in the world offering PICS in the public health system, a factor explained by the creation of the PNPIC that implemented the PICS in the Health Public System (SUS).⁴ Among the challenges proposed by the Ministry of Health after an evaluation study of the 10 years of PNPIC implementation¹² is to evolve in the inclusion of PICS in the training of health professionals, as well as to raise awareness and train professionals who are already on the network.

The inclusion of CAM/PICS within the curricula of health courses at higher education institutions is a matter that attracts the attention of students, given the increased demand for PICS by the population and the need for these future professionals to exercise their profession in order to meet the needs of all in their different therapeutic options, joining the hegemonic health model centered on the disease.^{10,12,34,35} However, for this inclusion to occur, it is necessary that there are trained professionals to compose the faculty of these courses, which is not the reality in almost the whole world, and may be an important point for this new phase of medicine, of changes and growth, conquer their space, with adequate training of professionals.⁹

The WHO has long been making recommendations for the inclusion of CAM in universities, the population is increasingly seeking these alternative practices within medical centers and these professionals perceive the gap that the lack of such teaching within the classrooms influences the contact with the patient, the student's opinion is also considered and after being heard, it only reaffirms the need for this inclusion in the classroom. These reasons cause studies on the subject to be developed in several different places, which draws our attention to a global issue.^{2,15,16,17,22,30}

As limitations, this article did not include undergraduate courses in PICS such as Chinese Medicine, Music Therapy, Naturology and Chiropractic, which exist around the world, because they are already configured as PICS and, due to this nature, have the mandatory inclusion of theme in the curriculum. In addition, no studies were found that addressed all courses in the health area in a single search. Another important point is that only two of the selected studies conducted document analysis of health in undergraduate curricula, which demonstrates the need to show more accurately the presence or absence of CAM/PICS in the curriculum matrices. Otherwise, the quality of publications in this field needs to be improved. In the evaluation of the strobe criteria, 60% (N) of the selected articles presented percentages above 50% (N), which corresponded to a classification of A or B. The lack of publications like this was considered a limitation of the research, due to the impossibility of comparison with other works, which also opens the doors for other works that may complement and enrich the theme in question.

Conclusion

Among the 15 health areas covered in this research, teaching in CAM/PICS is concentrated in nursing, medicine and pharmacy courses. There is no other published work relating the teaching in CAM/PICS of all health courses in the world, this being an original work. The predominant modality within the universities that offer CAM/PICS was the optional course, which proved not to be effective, according to the reports of the students in not feeling confident in applying CAM at the end of their training. The lack of publication of scientific evidence, from the perspective of traditional biomedical rationality, on the use of CAM/PICS and its safety, increases the fear of students to use the practices. Thus, the current investment in the formation of networks of researchers in traditional, complementary and integrative medicine worldwide are essential for the dissemination of indicators and proof of the safety and effectiveness of these practices. There is a long way to go for the inclusion of CAM within health courses in a universal way, as the need for this implementation is increasing.

The WHO has long been making recommendations for the inclusion of CAM/PICS in universities, the population is increasingly seeking these alternative practices within medical centers and these professionals perceive the gap that the lack of such teaching within

the classrooms influences the contact with the patient, the student's opinion is also considered and after being heard, it only reaffirms the need for this inclusion in the classroom. These reasons cause studies on the subject to be developed in several different places, which draws our attention to a global issue, but even so these publications are few when it comes to work with a global vision. Thus, it is still necessary that new studies are carried out analyzing the world situation of the CAM/PICS, increasing the debate on and bringing visibility to the subject.

Acknowledgments

None.

Conflicts of interest

The author declares there is no conflict of interest.

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