



A Systematic Review of Traditional, Complementary and Alternative Medicine Use Amongst Ethnic Minority Populations: A Focus Upon Prevalence, Drivers, Integrative Use, Health Outcomes, Referrals and Use of Information Sources

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Abstract

Ethnic minority populations have been identified as high users of traditional, complementary and alternative medicine (TCAM). This paper reports the systematic review of TCAM use amongst ethnic minorities. A comprehensive literature search was conducted in Ovid, PubMed and CINAHL. Included studies were original, peer-reviewed, English language articles with the primary focus on TCAM use amongst ethnic minority populations. A total of 17 articles met the inclusion criteria and were included in the systematic review. A considerable level of TCAM use was observed amongst ethnic minority populations usually attributed to its perceived safe and natural properties. Ethnic minority populations predominantly used TCAM concurrently with conventional medicine and primary TCAM referral sources were family and friends. A substantial level of TCAM integration with conventional medicine is common practice amongst these populations and the lack of disclosure about TCAM use raises an important area for further research inquiry.

Keywords Complementary and alternative medicine · Ethnic minorities · CAM use · Complementary therapies

Introduction

Globally, there is an exponential increase in the use of traditional, complementary and alternative medicine (TCAM)—practices and products which can be indigenous (traditional medicine) and/or exotic (complementary and alternative medicine) to the user and are not traditionally associated with conventional medical practice or curriculum including traditional herbal medicines, naturopathy, yoga, chiropractic, acupuncture and massage amongst others [1]. TCAM

is used for both physical and emotional conditions [1, 2] and for the management of common illnesses including pain (musculoskeletal), depression and anxiety [1, 3]. TCAM has been identified as popular amongst those looking to manage their quality of life and treat symptoms relating to chronic illnesses such as liver disease, lung disease, cardiovascular disease and cancer [1, 4]. For both chronic and acute illness, TCAM may offer symptom relief, a reduction in side effects and interim hope and comfort [1, 5].

Substantial TCAM use is evident across most socioeconomic groups in most cultures and amongst ethnic minority populations—groups of individuals with racial, national, cultural and/or religious origins dissimilar from the dominant population of the country where they reside—and constitutes a significant health care resource [6, 7]. Many TCAM are practices grounded in the traditions, cultures and beliefs of ethnic minority communities, originating in their country of heritage [8–10]. During the migration process, migrants tend to transport TCAM practices to their host countries, increasing their likelihood of employing TCAM approaches before or at least alongside their use of conventional medicine in their new adoptive country [9]. As such, ethnicity

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and culture play a significant role in influencing the rates, types and patterns of TCAM use [10, 11]. Ethnic minorities face a number of cultural, communication, behavioral and economic barriers to accessing health services often with adverse effects on their quality of life and overall health and well-being [9, 10]. These challenges are further exacerbated by cultural values and beliefs about healthcare help-seeking amongst these communities [12, 13], thereby making ethnic minorities an important target group for research enquiry and health care policy.

While there has been some early work on the utilisation of TCAM specific to ethnic minorities [9] there has been no comprehensive review on contemporary literature regarding TCAM use amongst ethnic minority populations. Given the wider challenges faced by ethnic minorities regarding accessing health care services [9, 10] and the potential direct and indirect risks associated with TCAM use alongside conventional medical care [14] it is imperative to understand the behaviours, communication and decision-making around TCAM use. This is essential to help inform the broader delivery of culturally sensitive health care to meet the needs of ethnic minority populations. In direct response to this significant research gap, this review aims to identify the prevalence, frequency and specific TCAM use as well as motivations for TCAM use in ethnic minority populations based on recently published research evidence from 2006 to 2017.

Methods

This systematic review was conducted in accordance with the preferred reporting items for systematic reviews and meta-analysis (the PRISMA statement) [15].

Study Design

A systematic review was undertaken to explore and synthesise findings from previous original research regarding the use of TCAM amongst ethnic minority groups. For the purpose of this review an ethnic minority is defined as a community/population of racial, national, cultural and/or religious background that differs from the dominant population of their resident country. Some disparate attributes of ethnic minorities may be demonstrated in their ethical values, distinct customs and beliefs, languages spoken, lifestyle choices, health choices, dress sense and food preferences which are adopted by ethnic group members. For heuristic reasons, we did not consider individuals that were indigenous or had historical ties to the country/territory they lived in as ethnic minorities. A paper was deemed to be reporting on use of TCAM in an ethnic minority population if the focus of the sample fitted the definition above or was

defined as TCAM and/or an ethnic minority by the researchers/authors. This review involved a comprehensive database search, article screening and selection, appraisal of evidence, data extraction, summary and synthesis of findings.

Search Strategy

A comprehensive search was conducted from October 2016 to June 2017 to identify peer-reviewed literature published in English using the following databases: Ovid (Medline), PubMed and Cumulative Index to Nursing and Allied Health Literature (CINAHL). The Cochrane library was excluded in this review as the focus was not on efficacy. Keywords and Boolean operators used during the search include: ('complementary medicine' OR 'alternative medicine' OR 'traditional medicine' OR 'complementary therapies' OR 'medicine, traditional') AND ('culturally and linguistically diverse' OR 'ethnic minority*' OR 'minority groups' OR 'vulnerable populations' OR 'non-English speaking background' OR 'migrants'). These terms were used as keywords and also matched to medical subject headings (MeSH). Reference lists of relevant articles were searched to identify further papers.

Inclusion and Exclusion Criteria

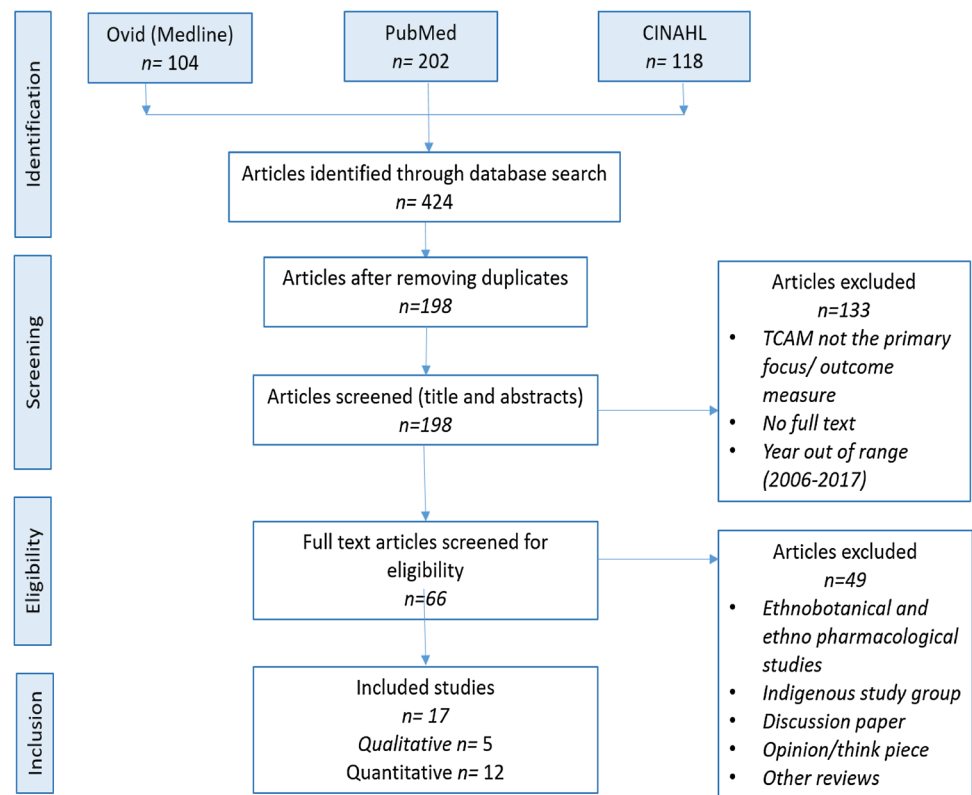
In order to determine the relevance of each article for the review, screening was conducted in accordance to specific inclusion and exclusion criteria. Essentially, articles for inclusion had to reflect TCAM as their primary research focus as either addressed in the aim, objective, and methodology or listed as a primary outcome measure and not merely a finding amongst others. Table 1 below highlights the inclusion and exclusion criteria employed in the review. Article screening and selection process are shown in Fig. 1.

Data Extraction and Synthesis

Data were extracted by the first author (JA) and reviewed and verified by a second author (JA). Discussion was used to reach consensus in case of any discrepancies. All articles were imported into EndNote X7 and duplicates were removed. Initial selection of articles occurred by screening titles and abstracts and some articles were excluded for the following reasons: TCAM was not the primary focus of the paper, outcomes were irrelevant to the study objectives, full text unavailability and articles that were not original research. Full texts of the remaining articles were screened for eligibility and the final selection of articles advanced to the critical appraisal phase.

Table 1 Inclusion and exclusion criteria for articles included in the review

Inclusion	Exclusion
Full text English language research papers i.e. articles reporting on new empirical findings from primary data	Ethnobotanical, ethno-pharmacological studies
TCAM use as the primary outcome measure or primary research focus	Secondary research (including: other critical, narrative, systematic or literature reviews) and editorials, anecdotal/think/opinion pieces, commentaries and case reports
Peer-reviewed, full and complete articles to enable methodological appraisal	Studies primarily or exclusively investigating efficacy of TCAM use—clinical trials
Articles that report on studies where participants belong to an ethnic minority group, not including indigenous population	
A paper was included if the focus of the sample fitted our definition of TCAM and/or an ethnic minority or was defined as such by the researchers/authors themselves	
Published on/between 2006 and 2017	

Fig. 1 Flowchart of study review and selection process

Critical Appraisal of Articles

Quality appraisal tools for qualitative [16] and quantitative [17] studies were used in this review accompanied with guidelines to ensure appropriate application of the tools. These guidelines were modified by inserting the word ‘TCAM’ where necessary to correspond with our study (Table 2)—this follows a similar modification process undertaken in a previous study [18].

Qualitative studies identified as meeting the inclusion criteria of our review were appraised using guidelines by Higginbotham et al. [16] that assessed the following 10

categories of interest: study purpose, rationale, conceptual framework, ethical implications, sampling strategy, data collection, data organisation, data analysis, reliability and validity, and conclusion (Table 3).

Quantitative studies that met the inclusion criteria were critically appraised using the McMaster University critical appraisal tool—a tool suited to appraising the methodological quality of any type of quantitative study [17]. In line with this tool, the categories examined for each quantitative paper were: study purpose, literature review, study design, study sample, outcome measures, intervention, data analysis, result, dropouts or exclusions, clinical

Table 2 Guidelines for quality appraisal

Category	Description
Qualitative guidelines [16]	
Study purpose	Is the study purpose relating to TCAM clearly stated? With a research question presented?
Rationale	Is this rationale appropriate for a qualitative approach and is it explained?
Conceptual framework	Is there a conceptual framework clearly outlined for the study?
Ethical implications	Dealing with ethnic minorities, have they given informed consent (with interpretation where necessary), the opportunity to withdraw, anonymity, feedback on study results
Sampling strategy	Sampling strategy in relation to TCAM use, sample size and characteristics described
Data collection	Information on data collection procedures, relating TCAM use amongst minorities with appropriate methods. How were the data collection procedures developed?
Data management	How is the data kept retrievable and organised, software, drives, etc
Data analysis	Are methods used for analysis appropriate and procedures outlined?
Reliability and validity	Threats to reliability and validity should be addressed in data collection, analysis and results
Conclusion	Address TCAM related aim/objective, summary of findings and political outcome in the conclusion
McMasters quantitative guidelines [17]	
Introduction	
Purpose	Is the aim and/or objective clearly stated and applicable to TCAM use amongst minorities
Literature review	Describe the justification of the need for this study, identifying gaps and the need for further research
Methodology	
Research design	Is the design described in detail and is it appropriate in addressing TCAM use amongst ethnic minorities
Sample size and characteristics	Sampling (who; characteristics; how many; how was sampling done?)
Outcome measure	Specify the frequency of outcome measurements are they (1) valid (2) reliable?
Intervention	Is sufficient detail provided to replicate the intervention in practice?
Data analysis method	Were results analysed according to the aim/objective?
Results and conclusion	
Results and statistical significance	Were results reported in terms of statistical significance?
Number of dropouts/exclusions	Were there any dropouts or exclusions in the study?
Clinical importance	Were the results clinically meaningful?
Appropriate conclusion	Were conclusions appropriate based on the aim and or objective?
Limitations	Did the authors address any limitations or potential biases?

importance, conclusion and limitations (Table 4). Categories in the appraisal tool that were only relevant for clinical trials (e.g. contamination and co-intervention) were removed.

After articles were critically appraised, extraction, summary and synthesis of data occurred using the NVivo 11 software, a data organisation and management software. Data extraction and summary was carried out using a systematic review technique. Findings were summarised and categorized in a tabular form including; study location, methodology, demographics, aims/objectives and outcomes relevant to the review (Table 4). Using an inductive approach, an investigator (JA) identified recurrent concepts and ideas from research outcomes by reading through each article repeatedly and coding them to different nodes in NVivo. These codes were then categorised into key themes (Table 5).

Results

A total of 17 articles met the study inclusion criteria for analysis. A summary of the literature search process is shown below in Fig. 1.

Quality Appraisal

Results from quality appraisal of all studies are shown in Tables 3 and 4. Appraisal of qualitative studies ($n=6$) using the Higginbotham et al. guidelines [16], revealed that the majority ($n=5$) were adequately designed and clearly addressed the study purpose, rationale, ethical considerations, data collection methods and data analysis procedures [19–22]. However, a number of these studies failed to identify conceptual frameworks, which were applied [22, 23], procedures used in data management [20–23] and threats

Table 3 Quality appraisal of qualitative research: Higginbotham et al. [16]

Study	Purpose of the study	Rationale	Conceptual framework	Ethical considerations	Sampling strategy	Data collection	Data management procedure	Data analysis method	Reliability and validity	Conclusion	Score (out of 10)
George [19]	X	X	X	X	X	X	X	X	X	X	10
Thomas [23]	X	X	-	X	-	X	-	-	-	X	5
Rao [20]	X	X	X	X	X	X	-	X	-	X	8
González-Vázquez [21]	X	X	X	X	X	X	-	X	X	X	9
Yearwood [22]	X	X	-	X	X	X	-	X	X	X	8

Weighting (X) = criteria met within the study, (-) = criteria not met within the study

Table 4 Quality appraisal of quantitative research: McMasters critical appraisal tool: Law et al. [17]

Study	Purpose	Lit-erature review	Research design	Sample (size and description)	Outcome measures (valid and reliable)	Intervention	Data analysis	Results and statistical significance	Dropouts/ exclusions	Clinical importance	Conclusion	Limitations	Score (out of 12)
Hwang [6]	X	X	X	X	X	X	X	X	X	X	X	X	12
Thorburn [24]	X	X	X	X	-	X	X	X	-	X	X	X	10
Meghani [25]	X	X	X	X	X	X	X	X	-	X	-	X	10
Elewonibi [9]	X	X	X	X	X	X	X	X	X	X	X	X	12
Tanaka [10]	X	X	X	X	X	X	X	X	-	X	X	X	11
Arcury [26]	X	X	X	X	X	-	X	X	-	X	X	X	10
Othman [28]	X	X	X	X	X	X	X	X	X	-	X	-	10
Gardiner [27]	X	X	X	X	X	X	X	X	X	-	X	-	10
Assion [5]	X	X	X	X	X	X	X	X	X	X	X	X	12
Avogo [11]	X	X	X	X	X	X	X	X	X	X	X	X	12
Arcury [29]	X	X	X	X	X	-	X	X	-	X	X	X	10
Roth [8]	X	X	X	X	X	X	X	X	-	X	X	X	11

Weighting (X) = criteria met within the study, (-) = criteria not met within the study

Table 5 Description of included studies on TCAM use amongst ethnic minorities

Author	Study region	Method	Sample characteristics (sample size, study group)	Study Aim/Objective	TCAM modality	Conditions treated/managed with TCAM	Theme represented*									
							1	2	3	4	5	6				
Qualitative																
Thomas [23]	London	Focus group discussions	n=70 Migrants from South Africa, Zimbabwe or Zambia	To gain insight into people's understandings and experiences of health care services in the UK and in their home country, and their access to, and use of, biomedical, alternative, and traditional sources of treatment	Herbal medicines Aloe vera Marianina Love potions	HIV, Immunity boosts, HIV related conditions (tuberculosis, herpes zoster and Kaposi's Sarcoma), fertility, enhanced sex drive and performance	✓	✓	✓	✗	✓	✓	✓	✓	✓	
Rao [20]	United states	In-depth interviews	n=21 Asian Indians	To examine the choice of medicine and the hierarchy of resort to the different health alternatives	Homemade remedies Chiropractic therapy Acupressure Acupuncture Non-drug therapies (Meditation, reiki and prayer) Yoga Ayurveda Homeopathy Naturopathy	Minor—(cold, cough, fever and sore throat and headaches) Major- chronic illnesses like depression, hypertension, diabetes, chronic back pain or arthritis and asthma	✓	✗	✓	✓	✓	✓	✓	✓	✓	
George [19]	United States	In-depth interviews	n=28 Low-income African-American (AA) adults	To identify causal models of asthma and the context of conventional prescription versus complementary and alternative medicine (CAM) use	Biologically based therapies (Chest rubs using camphorated, black salve, tar, yellow salve, or mustard. Commercial tea w/honey, lemon, and/or alcohol. Steam inhalation) Alternative medical systems (Bathing rituals and rain avoidance) Mind-body interventions (prayer and unstructured relaxation therapies) Manipulative and body-based treatments (Percussion and Tai Bo)	Asthma	✓	✓	✓	✓	✓	✓	✓	✓	✓	
González-Vázquez [21]	United States	In-depth semi-structured interviews and focus group discussions	n=32 Mexican Oaxacan Mixtec migrants	What are the transnational practices utilized by Mixtec Oaxacan migrants to access traditional medicine?	Medicine plants, homemade folk remedies, ointments, spiritual Cleansings and traditional healers	Waist pain Crooked spinal cord	✓	✗	✓	✓	✗	✓	✓	✓	✓	
Yearwood [22]	United States	Focus group discussions	n=12 English-speaking Caribbean people	To obtain data about the child health care decision making and practices of immigrant English-speaking women from the Caribbean region and (b) describe their experiences with the U.S. health care system and providers of care	Herbal products (grape water, mint, rosemary tea, Ginger root, powder, tablet and capsule etc.)	Congestion, gas, colds, fever reduction, sore throat, colic respiratory problems, premenstrual syndrome, diarrhea, diabetes	✗	✗	✓	✓	✗	✓	✗	✓	✓	
Quantitative																
Hwang [6]	South Korea	Self-administered survey	n=292 Ethnic minorities from the Gyeonggi province majority from China, Vietnam, and Philippines	To explore the prevalence of CAM use among ethnic minorities in South Korea	Multivitamins Ginseng Acupuncture Traditional Korean herbal medicine Herbal plants Therapeutic massage Moxibustion therapy	Acute diseases e.g. cold, fatigue, stomach pain, and joint pain Depression	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 5 (continued)

Author	Study region	Method	Sample characteristics (sample size, study group)	Study Aim/Objective	TCAM modality	Conditions treated/managed with TCAM	Theme represented*						
							1	2	3	4	5	6	
Thorburn [24]	United States	Telephone survey 2001 Health Care Quality Survey (HCQS)	n=6008 African-American, Hispanic, and Asian households	To examine the relationship between discrimination in health care and CAM use	Herbal medicine Acupuncture Chiropractor	NR	✓	✓	✓	✓	✓	✓	✓
Meghani [25]	United States	National telephone survey by CBS New York Times	n=902 Non-Hispanic Whites, non-Hispanic Blacks, Hispanics, and others	To investigate differences in reported pain and pain treatment utilization (use of over-the-counter and prescription pain medications, seeing a pain specialist, and use of complementary and alternative medicine)	NR	Migraine Spinal pain Joint pain Abdominal Pelvic pain	✓	✓	✓	✓	✓	✓	✓
Elewonibi [9]	United States	2012 National Health Interview Survey	n=34,483 Oversampled black, Hispanic, and Asian populations	To examine the prevalence of and reason for CAM use in the U.S. population by citizenship status	2.8% used Alternative medicine systems (acupuncture) 62% used Biological-based therapies (herbal treatment and special diets) 11% used Mind-body therapies (Yoga, tai chi or qi gong) 2.9% used Manipulative and body based therapies (chiropractic care)	Conditions not specified used for General wellness Prevention Treatment	✓	✓	✓	✓	✓	✓	✓
Tanaka [10]	United States	2002, National Health Interview Survey (NHIS)	n=21,067 Asian and Pacific Islanders (Chinese, Asian Indians, Filipinos, other Asians and non-Hispanic whites)	To characterize the rates and patterns of herb use amongst the API population of the US	Herbs (Echinacea, ginseng, garlic, St. John's wort, Ginkgo biloba)	Head or chest cold Stomach or intestinal illness Back pain Other conditions not listed on the NHIS	✓	✓	✓	✓	✓	✓	✓

Table 5 (continued)

Author	Study region	Method	Sample characteristics (sample size, study group)	Study Aim/Objective	TCAM modality	Conditions treated/managed with TCAM	Theme represented*							
							1	2	3	4	5	6		
Arcury [26]	United States	2002 National Health Interview Survey (NHIS)	n=5837 Black, Hispanic Asian, and White adults	to measure CAM use amongst Black, Hispanic, Asian, and White elders (age >65 years) and to delineate the importance of ethnicity in determining CAM use	1.4% used Alternative medical system (acupuncture, homeopathic treatment and naturopathy) 15.6% used biologically based therapy (non-vitamin, non-mineral, natural products consists largely of herbs with a few animal-based products such as fish oil) 7.6% used Body-based and manipulative Methods (chiropractic care, massage) 11.7% used Mind-body medicine (deep breathing exercises, meditation, healing ritual, yoga, tai chi and progressive relaxation)	NR	✓	✓	✓	✓	✓	✓	✓	
Othman [28]	Malaysia	Self-administered questionnaire	n=384 Malays, Sabah natives, Chinese, Indian and other races	To focus on the use of Traditional and complementary medicine (TCM) amongst Malaysian community and how it contributed to the maintaining of health and disease treatment	Herbs (ginseng Tongkat Ali and Pennywort) Traditional products (oils and balms such as gamat oil and tiger balm) Vitamins	Treatment of disease Maintenance of health (condition not specified)	✗	✓	✓	✓	✓	✓	✓	✓
Gardiner [27]	United States	Secondary analysis of baseline data from the Re-Engineered Discharge (RED) clinical trial	n=623 Underserved, ethnically diverse population of patients	To identify socio-economic status (SES) factors, health behaviour factors, and clinical factors associated with the use of Stress management and relaxation techniques (SMART)	Mind-body technique Deep breathing Meditation Yoga	Illicit drug use depression	✓	✓	✓	✓	✓	✓	✓	✓

Table 5 (continued)

Author	Study region	Method	Sample characteristics (sample size, study group)	Study Aim/Objective	TCAM modality	Conditions treated/managed with TCAM	Theme represented*								
							1	2	3	4	5	6			
Assion [5]	Bochum, Germany	Structured interview (Survey)	n = 167 Psychiatric in-patients migrants (Poland, Turkey, Asia, Africa and South America) vs non-migrants (native Germans)	To contribute to the question to what extent unconventional methods are used by patients with a psychiatric disorder and to what extent migrants do	Acupuncture Alternative healing methods traditional or folk healing methods Herbal remedies homeopathy	Schizophrenia Depression Substance abuse Bipolar disorder Panic disorder	✓	✓	✗	✗	✓	✓	✓	✓	
Avogo [11]	United States	A cross-sectional survey on Disparities in the Health Care Quality Survey	n = 4695 African-American, Hispanic, and Asian	To address the need for comprehensive models that explain the use of CAM therapies. Specifically, the associations between health status, access to care, and patient satisfaction with conventional care and CAM therapies are examined	Herbal medications Acupuncture Chiropractic care	Chronic diseases	✓	✓	✓	✗	✓	✓	✓	✓	
Arcury [29]	North Carolina, United States		N = 200 Latino farmworkers and non-farmworkers	To describe the use of traditional healers amongst Latino farmworkers and compare the use of traditional healers by Latino migrant farmworkers to other Latino immigrants	Traditional healers	NR									

Table 5 (continued)

Author	Study region	Method	Sample characteristics (sample size, study group)	Study Aim/Objective	TCAM modality	Conditions treated/managed with TCAM					
						1	2	3	4	5	6
Roth [8]	Canada	Computer-assisted and personal telephone interviews. Data from cycle 2.1 of the Canadian Community Health Survey	$n = 2325$ Chinese Canadians	To examine the relationship between Chinese Canadian ethnicity and the use of complementary and alternative medicine (CAM) and explore some of the factors that contribute to CAM use amongst this visible minority group	Acupuncture Massage therapy Herbalists	✓	✓	✓	✓	✓	✓

1 = Ethnicity and TCAM usage, 2 = Disclosure/Non-disclosure, 3 = Factors associated with TCAM preference, 4 = TCAM and Conventional medicine integration, 5 = Perceived health outcome from TCAM usage, 6 = TCAM referral and information sources

NR not recorded, CAM complementary and alternative medicine, TCAM traditional, complementary and alternative medicine

to reliability and validity [20, 23]. For quantitative studies using the McMasters critical appraisal tool [17], poorly reported components include dropouts/exclusions [8, 10, 24–26], clinical importance [26–28], intervention descriptions [26, 29] and limitations [27, 28].

Most articles included in the review did not address measures employed to control for bias. The lack of detail on data management procedures by all qualitative studies in this review with the exception of George et al. [19] may be indicative of outcome reporting bias. Without proper data management there is no guarantee that results reported followed the study protocol or whether selective omission occurred in reporting [30]. Some quantitative studies failed to report on dropouts and exclusions, which in turn may affect selection bias especially in the advent of unequal loss of participants (attrition bias) [31, 32]. However, well-reported study elements across all included quantitative studies include study purpose, literature review, research design, initial sample size and description, validity and reliability with the exception of Thorburn et al. [24], data analysis procedures, results and conclusion. Overall, the critical appraisal indicated that the included articles constitute rich sources of data, as such all articles were included for the review.

Overview of Studies

The review identified 12 papers reporting relevant data using quantitative methods and five reporting relevant data drawn from qualitative research. The most frequently utilised data collection methods were face–face, self-administered, telephone and/or computer assisted surveys ($n = 12$), followed by focus group discussions ($n = 3$) and in-depth interviews ($n = 3$) (Table 5). Studies were predominantly conducted in the US ($n = 12$), other study regions were Vietnam, UK, South Korea, Malaysia, Germany and Canada ($n = 1$ each). The reported sample sizes ranged from a small focus group study of $n = 12$ conducted amongst Caribbean ethnic minorities living in the United States [22] to a National Health Interview Survey sample of $n = 34,483$ which oversampled black, Hispanic, and Asian populations [25]. Amongst the wide range of TCAM modalities reported in the literature reviewed, the most frequently cited were: herbal medicine, acupuncture and chiropractic respectively. In this review, TCAM was used in the treatment and management of both acute illnesses (cold, fever, coughs and stomach pains) and more chronic conditions (cancer, hypertension, diabetes, asthma). Most participants integrated TCAM and conventional medicine for health and wellbeing (Table 5).

Key Themes from Data Synthesis

Six themes resulted from our data synthesis including: relationship between ethnicity and TCAM use; prevalence and

modalities used; drivers of TCAM use; TCAM and conventional medicine integration; perceived health outcomes from TCAM use; and TCAM referral and information sources (Tables 5, 6).

Relationship Between Ethnicity and TCAM Use

Belonging to an ethnic minority group was an indicator of increased TCAM-use and some studies found a higher likelihood of TCAM use amongst ethnic minorities compared to their non-ethnic minority counterparts e.g. non-Hispanic Whites and non-migrants [6, 10, 21, 23]. However, this finding was not consistent throughout the reviewed literature as there were some studies, all conducted in the US ($n=3$), that reported no significant relationship between ethnicity and TCAM use and found US-born citizens and non-Hispanic whites to have higher TCAM usage than Asians, Hispanics and Blacks [9, 10, 25].

Prevalence and Modalities Used

Many of the included studies reported on the prevalence and type of TCAM used by different ethnic minority populations. Of the 17 papers reviewed, 14 reported prevalence rates of TCAM use amongst their study populations ranging from 14.9 to 100% of study samples/participants. The highest prevalence rate (100%) reported in the literature reviewed was from a study examining low-income African-American (AA) adults in the US George et al. [19]. A prevalence rate of 79.4% was reported from a study [28] which explored TCAM use in East Malaysia amongst Malay, Sabah natives, Chinese and Indian populations. The lowest prevalence rate (14%) of TCAM use by an ethnic minority population was from a study that explored the relationship between Chinese Canadian ethnicity and the use of TCAM [8]. Although the prevalence rate was low at 14%, this study reported a greater likelihood of TCAM use amongst Chinese Canadians than non-Chinese Canadians. The reviewed literature reported some modalities as particularly popular amongst certain ethnic population groups in particular settings. For example, one study identified Ayurveda and homeopathy as most popular when compared to other TCAM modalities amongst Indians and other Asians in the US [20], while another paper reported acupuncture as the preferred TCAM modality choice amongst Mongolians living in South Korea [6] and a third paper recorded preference for use of herbs amongst the Chinese community in the US [10].

Drivers of TCAM Use

Many of the studies identified ethnic minority populations as more accustomed to non-biomedical approaches to health-care (TCAM) than non-ethnic minority populations, due to a

perception of TCAM as safer, more effective and as 'natural' in approach [6, 19–21, 23]. The perceived safe and natural properties of TCAM alongside the experience of symptom relief have been identified as motivators for TCAM use amongst low income African American adults [19].

Level of confidentiality and stigmatisation were other drivers of TCAM use as seen in immigrant women from the Caribbean living in the US who expressed privacy concerns and recounted experiences of stigmatization by conventional medical doctors, which they believed occurred as a result of their accents and ethnic minority status [22]. Some experiences which served as motivations for TCAM use reported by these women were; insufficient patient-doctor consultation time with conventional medical doctors, feeling rushed and the perception of their conventional medical doctors as not focussed or interested in the health or treatment of their children [22].

Another study conducted in the US that analysed data from the Health Care Quality Survey (HCQS) which oversampled African-American, Hispanic, and Asian households also described experiences of stigmatisation and discrimination [24]. The authors reported a significant association between herbal medicine use and discrimination (measured in terms of disrespectful and unjust treatment by a conventional medical doctor) in healthcare as experienced by ethnic minorities [24].

Not all studies included in the review reported a preference for TCAM over conventional medicine by ethnic minorities. One study examined TCAM prevalence and reasons for use by comparing data from oversampled Black, Hispanic and Asian populations and found barriers to accessing TCAM services included a lack of insurance coverage for TCAM services and having a low income which is further accentuated by the high cost of some TCAM services [9]. Overall across most studies in the review, there was a correlation between gender, SES and TCAM use as more ethnic minority females were found to utilize TCAM than males [25, 26, 33] and an ability to afford private insurance coverage increased the likelihood of TCAM use in some studies [10, 20].

TCAM and Conventional Medicine Integration

Generally, a small proportion of ethnic minority populations exclusively utilise TCAM for their health care needs with most using TCAM and conventional medicine concurrently—a phenomenon known as medical pluralism which is common even in countries with well-established health care systems [9, 25].

TCAM was reported as used by ethnic minority populations alongside and concurrent to conventional medicine in a number of the reviewed studies. A study of African American participants found a 93% preference for equal integration

Table 6 Description of Key themes from studies on TCAM use amongst ethnic minorities

Themes	Ethnicity and TCAM usage (1)	Prevalence (2)	Drivers of TCAM use (3)	TCAM-Conventional medicine integration (4)	Perceived health outcome from TCAM usage (5)	TCAM referral and information sources (6)
Thomas [23]	Ethnicity, particularly amongst those of Asian and Latino heritage, is a primary factor that differentiates the level and type of TCAM use amongst older adults	45%	Faith in non-biomedical treatments	NR	Generally effective with improved health status and only one who felt increasing unwell	Traditional healers Local markets
Rao [20]	Ayurveda and homeopathy were first options for Asian Indian migrants before other alternatives	NR	Perception that allopathic medication are bad and harmful TCAM 'Non-drugs' like reiki, meditation and yoga were believed to be more effective and considered to be more 'discreet' in treating mental illnesses Dissatisfaction with conventional therapy	If chiropractic therapy or Chinese herbal medicine were considered, they were used in combination with allopathic or Indian medical alternatives	Effective but sometimes ineffective	Family and friends Ayurvedic or homeopathic clinics
George [19]	NR	100%	TCAM was considered natural, safe, effective, and potentially curative Lack of Conventional medicine patient-provider trust	Most subjects (93%) preferred a TCAM-Integrated approach	Symptom relief and for some, promised a cure	Family and friends
González-Vázquez [21]	TCAM seeking behavior was found to strengthen ethnic identity and community ties in their host country	NR	Trust that TCAM providers would take their concerns more seriously than doctors of Western medicine Unsure about the availability of other services in their host country Cultural affinity and affordability Lack of knowledge about rights to access health services in the host country	NR	Perceived healing after 8 days of recommendations from traditional healers (prayer, holy water, natural remedies etc.)	Migrant communities, small stores and shops in the US Family members Self-grown medicinal plants Hueseros (bone-setters) and sobadores (massage-based healers)

Table 6 (continued)

Themes	Ethnicity and TCAM usage (1)	Prevalence (2)	Drivers of TCAM use (3)	TCAM-Conventional medicine integration (4)	Perceived health outcome from TCAM usage (5)	TCAM referral and information sources (6)
Yearwood [22]	NR	NR	Seeing Conventional medicine /Doctors as the last resort Participants felt stigmatized by Conventional medicine providers for belonging to a minority group	NR	NR	Mother, grandmother, or Aunties
Hwang [6]	TCAM use and preferred modalities varied based on ethnicity. High TCAM use rates were found in respondents from the following countries: Pakistan, Mongolia, Philippines, and Cambodia Acupuncture was the most frequently used amongst minorities from Mongolia	62%	Belief in the effectiveness of TCAM TCAM seen as less harmful than Conventional medicine Perception that Conventional medicine has its Limitations Preference for CAM-Conventional medicine integration	TCAM was used as a secondary treatment while receiving conventional care TCAM users were more open-minded toward TCAM- Conventional medicine integration (45.3%) for health promotion and self-health management	Secondary treatment effects Pain reduction Health promotion Psychological stability Improved physical function	TKM clinics Traditional pharmacies specializing in medicinal herbs
Thorburn [24]	NR	33.6%	Discrimination in Conventional medicine settings	NR	NR	Self-prescribed TCAM provider Traditional healer
Meghani [25]	No association between race/ethnicity and TCAM use	47.2%	Majority (81%) perceived TCAM therapies as effective	NR	Effective in pain relief	NR
Elewonibi [9]	No relationship, U.S.-born citizens had higher TCAM utilization compared to naturalized citizens and non-citizens	64.2%	No preference for TCAM among minorities More barriers to TCAM access (e.g. no insurance, lower income and high cost of TCAM services)	NR	NR	NR

Table 6 (continued)

Themes	Ethnicity and TCAM usage (1)	Prevalence (2)	Drivers of TCAM use (3)	TCAM-Conventional medicine integration (4)	Perceived health outcome from TCAM usage (5)	TCAM referral and information sources (6)
Tanaka [10]	Chinese respondents were significantly more likely to use herbs compared to Asian Indians Echinacea commonly used by Non-Hispanic Whites Ginseng commonly used by the Chinese Garlic, commonly used by Asian Indians	26.17%	Age, higher herb use amongst older participants (≥ 60 years) Gender higher use amongst women SES, Higher use amongst those with private insurance Having existing comorbidities or functional limitations Belief that Conventional medicine alone ‘would not help,’ Belief that TCAM- Conventional medicine integration is best	NR	NR	NR
Arcury [26]	Ethnicity is a predictor of TCAM use amongst older adults when controlling for personal and life-course characteristics Asian and Hispanic elders had greater odds of using a biologically based therapy than did White elders	27.7%	Gender, higher use amongst women Higher education levels associated with higher CAM use Having a higher number of health conditions (three or four, five or more) meant higher cam use	NR	NR	NR
Othman [28]	NR	79.43%	Disease treatment Maintenance of health	Majority of the participants reported using TCM as an additive to their conventional medicines	High percentage of respondents (85.57%) claimed that there was an improvement of their health condition after using TCM respondents agreed that TCM in whichever ways has increased their health status	Traditional practitioners Purchase from markets Family and friends Home-made Purchased from the Internet

Table 6 (continued)

Themes	Ethnicity and TCAM usage (1)	Prevalence (2)	Drivers of TCAM use (3)	TCAM-Conventional medicine integration (4)	Perceived health outcome from TCAM usage (5)	TCAM referral and information sources (6)
Gardiner et al. [27]	Non-Hispanic white patients were more likely than other race/ethnic groups to use Stress Management and Relaxation Techniques (SMART)	26.6%	Higher education level associated with higher TCAM use Higher health literacy associated with higher TCAM use Having a combination of illicit substance use and depressive symptoms	NR	NR	NR
Assion [5]	The relevance of folk medical beliefs was to some extent higher in the migrant sample. Nearly one-third of the patients in the migrant group had experience with at least one of these methods (31%)	42%	NR	NR	47% had a positive attitude towards TCAM efficacy Psychiatric in-patients tend to believe unconventional medicine to be effective	Relatives Friends Medical professionals Other patients
Avogo [11]	On ethnic differences, TCAM use was highest amongst non-Hispanic Whites, (36.0%), followed by Asians (31.6%), Hispanics (30.0%), and Blacks (25.1%)	34.4%	Cost constraints in accessing conventional care Dissatisfaction with quality of conventional care Not having health insurance Higher education levels associated with higher TCAM use Those with higher incomes were more likely to report use of TCAM therapies	NR	TCAM appeared to be more effective in treating their conditions	Traditional healers Chiropractors Herbalists Acupuncturists
Arcury [29]	NR	64% Farmworkers 41% non-farmworkers	More males than females	NR	NR	NR

Table 6 (continued)

Themes	Ethnicity and TCAM usage (1)	Prevalence (2)	Drivers of TCAM use (3)	TCAM-Conventional medicine integration (4)	Perceived health outcome from TCAM usage (5)	TCAM referral and information sources (6)
Roth [8]	The use of TCAM varies according to ethnicity, with Chinese Canadians being more likely to use TCAM than non-Chinese Canadians Chinese Canadians who feel strongly connected to their local community are much more likely to use alternative medicine	14.9%	The likelihood of using TCAM also increases as respondents' level of education increases Higher income results in a greater likelihood of using TCAM Gender is an important predictor of TCAM use. Chinese men are likely to use TCAM than women	NR	NR	NR

TCAM traditional, complementary and alternative medicine, NR not recorded

of TCAM with conventional medicine used in the treatment of asthma [19], while other research exploring Chinese, Indian, Vietnamese, Malaysian and Filipino ethnic minorities living in South Korea and Malaysia, identified TCAM use as constituting a supplement to conventional care [6, 28].

TCAM disclosure to conventional medicine providers by ethnic minorities was low as reported in four of the 16 papers which examined this issue. TCAM disclosure prevalence rates were reported as 52.2% amongst Chinese, Vietnamese and Filipino ethnic minorities in South Korea [33], 33.4% amongst African American, Asian and Hispanic ethnic minorities in the US [24] and 31.5% amongst Sabah, Chinese and Indian ethnic minorities in Malaysia [28]. Additionally, a study examining HIV positive migrants from Southern Africa living in the UK found that 45% of participants reported using some form of non-conventional medicine and only a few people disclosed their use despite continuing use with conventional medicine, whilst 75% expressed a desire to use non-conventional medicine either as an alternative or in combination with antiretroviral therapy if only they had better access to them [23]. Two reasons for participants' refusal to disclose their respective TCAM usage were; failure of their conventional medical doctors to ask about any TCAM usage [23] and the fear of condemnation by their medical providers for using TCAM [22, 23]. In addition, migrants from South Africa, Zimbabwe and Zambia in London, England [23], reported a reluctance to disclose their combined TCAM and conventional medicine use due to a fear that their conventional medical doctors may request they cease TCAM use and they were unwilling to lose the self-perceived health benefits of such use.

Perceived Health Outcome from TCAM Use

Overall, most studies (n = 9) identified high levels of satisfaction amongst ethnic minorities with regards to their TCAM use. Study participants were reported as frequently mentioning associated positive outcomes to TCAM use including: improvement in health status through symptom relief; pain reduction; psychological stability; and increased health promotion and improved physical function [6, 19, 21, 23]. However, perceived effectiveness differed as some Asian Indian participants in a US-based study experienced TCAM use as sometimes effective and ineffective at others [20].

TCAM Referral and Information Sources

The majority of articles reviewed (n = 10) showed that TCAM users within ethnic minority communities access TCAM information from multiple sources, often concurrently, with the most common sources being family and/or friends [5, 19–22, 28]. The second most popular source

of TCAM information was from traditional healers [11, 23, 24, 28, 29, 33]. Other sources of TCAM information cited by ethnic minorities in the review included local markets, TCAM clinics and practitioners, traditional pharmacies, community health workers and the internet. In studies reporting on TCAM information sources, no one information source was exclusively utilised with participants obtaining TCAM supplies and information from multiple sources [5, 11, 19, 20, 22–24, 28, 33].

Discussion

This paper reports findings from the first systematic review to explore TCAM use in ethnic minority populations as sourced from contemporary international literature. Analyses of the reviewed literature show that a high level of TCAM use exists amongst people in ethnic minority populations with an evident influence of other socio-demographic factors such as gender and socioeconomic status influencing choice around TCAM use. International studies which have identified independent predictors of TCAM use beyond ethnic minority populations portray similar results in line with our review findings, profiling the average CAM user as female, middle-aged, educated and with higher levels of income than non-CAM users [33–37].

The relationship between TCAM use and ethnicity is of significance to both researchers and those providing care given that only marginal empirical work has explored the predictors and patterns of ethnic minorities' use of TCAM while national studies have advanced our understanding of TCAM use across more general populations [38, 39]. Our review identifies a positive correlation between ethnicity, type of TCAM used and the decision to use TCAM. These findings are consistent with other studies which have concluded that certain racial/ethnic groups may lean more towards some TCAM modalities than others [38–40]. Most studies investigating TCAM use in the UK and US have distinguished between ethnic minority-racial subgroups with some multivariable studies reporting a reduced likelihood of non-white study participants using TCAM compared to white study participants [40–42], an increased likelihood of black participants using mind–body therapies and an increased overall TCAM use amongst Asians compared to whites or blacks [43]. Most of these aforementioned studies conducted in the UK and US are limited by the absence of a clear definition of TCAM, the use of surveys administered only in English, the adoption of widely defined categories of ethnicity which limits the heterogeneity of this group and the evaluation of a narrow range of TCAM modalities [33]. Additionally, the findings from most TCAM studies around ethnic minority use are frequently from nationally representative data which fail to oversample ethnic minorities

leading to challenges in extrapolating results [33]. A further assessment of ethnic-specific TCAM use through conducting more culturally sensitive research may prove beneficial in helping healthcare providers and researchers to examine TCAM modalities that are prioritized by a particular group and thereby helping inform and develop potentially more targeted policies and services in this area.

Previous literature has found that cultural values, beliefs and practices are aspects of ethnicity that usually influence TCAM use [38, 43]. An inability of ethnic minorities to access healthcare also increases the likelihood of TCAM use [44], this is further exacerbated by other factors contributing to ethnic/racial disparities in healthcare including limited health insurance coverage and income levels [37, 40]. Our review identified a high rate of non-disclosure of TCAM use amongst ethnic minorities to conventional medical doctors which was comparable to reports from previous studies showing that a significant proportion of TCAM users (beyond ethnic minority populations) are reluctant to disclose usage to their conventional medical doctors [45–48]. Although previous literature did not specifically target ethnic minority TCAM users, the potential reasons for TCAM non-disclosure found in the general population appear consistent with our findings regarding ethnic minority patients including concerns around physician disapproval, discouragement, negativity and a lack of TCAM questioning by the doctor during consultation [45, 49]. Although inconclusive, this significant finding with regards to discrimination in some conventional health care settings, may in part help explain the increased likelihood of TCAM use and reports of non-disclosure amongst ethnic minority populations [44]. A better understanding of the reasons affecting ethnic minority patients' (non) disclosure of their TCAM use [48] may well help inform improved communication between conventional medical doctors and their patients from ethnic minority communities (whether using or not using TCAM) and the provision of optimal services for those communities. Future research is warranted to explore reasons for non-disclosure and discriminatory experiences of medically underserved ethnic minorities in conventional health care settings.

Similar to other studies investigating ethnic minorities and TCAM users, our review found that having a positive perception about the efficacy of TCAM use increased the adoption and acceptance of TCAM approaches [33, 50]. Most ethnic minority participants reported in the reviewed literature had a high satisfaction with the effectiveness of TCAM. It is interesting that TCAM was considered harmless by most ethnic minorities in the reviewed literature and in some studies participants were unperturbed about the lack of positive outcomes as they were satisfied with knowing that there would be no harm to their wellbeing from using TCAM (33). Despite the general acceptance towards the use of TCAM as found in this review, the efficacy of different

TCAM modalities still remains questioned with a number of studies labelling TCAM as an unproven therapy with unsubstantiated effectiveness [51, 52]. Some TCAM modalities have begun to attract emerging research evidence (albeit often only preliminary) with some positive results for acupuncture (for short/long term pain relief) [53, 54], relaxation techniques (for management of panic disorders, anxiety and insomnia) [55] and some herbal remedies (musculoskeletal conditions and other chronic conditions) [56, 57], although efficacy varies across TCAM modalities. Another potential benefit of TCAM may be its relative cost-effectiveness, with some studies in the US and Canada reporting that certain TCAM modalities used for selected conditions may provide savings for the wider healthcare system [55, 56]. Despite the still controversial location and role of TCAM in wider health care systems, prevalence rates in both ethnic and non-ethnic minority populations appear to be on the rise [56]. Further evaluation into the perceived effectiveness of TCAM in combination with or comparison to conventional medicine for the management and treatment of diverse health conditions is direly needed to better inform health service delivery to ethnic minority populations. Research is warranted to investigate the motivations and significance of concurrent use of TCAM and conventional medicine and non-disclosure of TCAM use to conventional medical doctors. There is a need for service providers and policy makers to acknowledge the substantial use of TCAM in their efforts to help develop effectiveness, safety and coordination of care for ethnic minority patients and populations.

This review is not without its limitations. Inclusion was restricted to only studies published in the English language, considering the target group (ethnic minorities) in review, there may be other research conducted and published in other languages that are relevant to this review but were excluded. Also, the review scope was limited to 2006–2017, thereby excluding some earlier research in this field. However, this time limit was chosen in order to encapsulate and identify the most recent and relevant research of pertinence to contemporary health care and health systems. Despite these limitations, this remains the first systematic review on this topic providing important insights for those providing and managing health care services for ethnic minority populations.

Conclusion

There appears to be substantial TCAM use amongst ethnic minority communities. While much of this use is concurrent to conventional health care there is often a lack of disclosure about TCAM use by ethnic minority patients to their conventional medical doctor(s). It is imperative that those developing health care services for ethnic minority

populations are mindful of all the health-seeking choices and behaviours undertaken in these communities with a view to helping facilitate safe, effective and coordinated care for such patients.

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Compliance with Ethical Standards

Conflict of interest No potential conflict of interest was reported by the authors.

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