

Traditional and Complementary Medicine Use Among Indigenous Cancer Patients in Australia, Canada, New Zealand, and the United States: A Systematic Review

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Abstract

Background: Cancer ‘patients’ are increasingly using traditional indigenous and complementary medicines (T&CM) alongside conventional medical treatments to both cure and cope with their cancer diagnoses. To date T&CM use among Indigenous cancer patients from Australia, Canada, New Zealand, and the United States has not been systematically reviewed. **Methods:** We systematically searched bibliographic databases to identify original research published between January 2000 and October 2017 regarding T&CM use by Indigenous cancer patients in Australia, Canada, New Zealand, and the United States. Data from records meeting eligibility criteria were extracted and appraised for quality by 2 independent reviewers. **Results:** Twenty-one journal articles from 18 studies across all 4 countries met our inclusion criteria. T&CM use ranged from 19% to 57.7% (differing across countries). T&CM was mostly used concurrently with conventional cancer treatments to meet their spiritual, emotional, social, and cultural needs; however, bush, traditional, and herbal medicines were used in a minority of cases as an alternative. **Conclusions:** Our findings highlight the importance of T&CM use to Indigenous cancer patients across these 4 countries; we identified multiple perceived spiritual, emotional and cultural benefits to its use. The patient’s perception of their health professional’s attitudes toward T&CM in some cases hindered or encouraged the patient’s disclosure. Additional research is required to further explore the use and disclosure of T&CM among Indigenous cancer patients to help inform and ensure effective, safe, coordinated care for Indigenous cancer patients that relies on shared open decision making and communication across patients, communities, and providers.

Keywords

traditional medicine, complementary therapies, cancer, neoplasms, cancer care facilities, Indigenous population, Oceanic Ancestry Group, American Native Continental Ancestry Group

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Introduction

It is well documented that Indigenous people in Australia, Canada, New Zealand, and the United States consistently experience substantial inequities in cancer outcomes in comparison with their non-Indigenous counterparts, in terms of increased incidence,¹⁻³ poorer prospects of treatment,²⁻⁴ and higher mortality rates.^{1-3,5} Current evidence suggests that these disparities are attributable to a range of factors, including, but not limited to, later stage at diagnosis, lower treatment compliance, lower cancer screening rates, and social deprivation.^{3,6}

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Cancer ‘patients’ are increasingly using traditional and complementary medicine (T&CM) in addition to conventional medical treatments, such as chemotherapy or radiation therapy, to both cure and cope with their cancer diagnosis.^{7,8} A recent systematic review⁷ reported a combined prevalence of 40% for current complementary medicine (CM) use in 152 studies, from across 18 countries, which included more than 65 000 cancer patients. Horneber et al⁷ also reported that CM use had increased over time from approximately 25% in the 1970s to more than 32% in the 1990s and to 49% post-2000. Cancer patients’ disclosure of their use of T&CM to health care providers is important to assess any potential treatment interactions.⁹⁻¹²

Indigenous people tend to view health from a holistic perspective that incorporates physical, cultural and spiritual wellbeing and this underpins their care-seeking behaviors.^{6,13} The use of traditional medicine (TM) (eg, singing/chanting, bush medicine, traditional healers, and external remedies) is part of Indigenous culture, continuing traditions and lore.¹³ TM is often used to enhance overall wellbeing through reconnection to land, spiritual, and ancestral roots.^{6,13} Traditional healers provide spiritual and social support that is equally as important as the botanically based herbal remedies.¹³ To date there has been no comprehensive review of T&CM among Indigenous cancer patients and this manuscript aims to address this gap.

Methods

Eligibility Criteria

TM and CM¹⁴ include a broad range of practices, technologies, products, knowledge systems, and approaches to preventing and/or treating illness and/or promoting well-being, which are not historically associated with the conventional medical profession or medical curriculum.¹⁵ While TM refers to health care indigenous to the local culture of users (including examples such as herbal medicines and practices provided by traditional healers who are usually unregulated and operate outside the publicly funded health care system), CM refers to health care, both self-administered or practitioner-led, which is often exotic to the culture of users (examples include massage, chiropractic, and Western herbal medicine).¹⁴ As these definitions suggest there may well be temporal and geographical fluidity whereby the definition of a particular health care practice can be considered TM or CM depending on the context of use and users.¹⁶ However, despite these possible variations of context both TM and CM in the vast majority of cases are largely defined by their continuing provision and use beyond the routine focus of conventional medical practice.¹⁴

Indigenous populations eligible for inclusion in this review were from Australia (Aboriginal and Torres Strait Islander), Canada (Aboriginal, First Nations, Inuit, or Métis),

New Zealand (Māori), or the United States (American Indian, Native American, Alaskan Native, American Samoan, Eskimo, and Native Hawaiian). These countries were included because of their shared history of colonization and disproportionately worse health in Indigenous populations.^{1,3} In this review, we respectfully refer to Indigenous people in these 4 countries as “Indigenous” while acknowledging that they comprise many diverse groups with distinct languages, beliefs, and cultural practices.

Search Strategy

The search originally aimed to identify peer reviewed literature reporting new empirical data from qualitative or quantitative studies examining T&CM use for 1 of 5 chronic diseases (cancer, cardiovascular disease, kidney disease, diabetes type 2, or respiratory disease) in adult (18 years and older) Indigenous populations from Australia, Canada, New Zealand, and the United States. As approximately half of all records were unique to cancer at the end of our search, this review focuses on cancer only; however, the flowchart (Figure 1) and search terms (Table 1) depict the screening of studies for all 5 diseases. We required full records of original research that were published in a peer-reviewed journal from 2000 onward, excluding (a) books or book chapters, commentaries, literature reviews, editorials, poster abstracts, and dissertations; (b) published languages other than English; and (c) efficacy studies (as we are interested in T&CM use).

We searched AMED, AltHealthWatch, CINAHL, EMBASE, PsychINFO, and PubMed for records published between January 2000 and October 2017 (the year 2000 was chosen because of changes in complementary medicine and service systems that might limit the applicability of studies prior to this date). Keywords included using free-text terms representing (a) Indigenous populations from and residing in Australia, Canada, New Zealand, and the United States; (b) common chronic conditions among Indigenous populations (ie, cancer, diabetes, heart disease, kidney disease, respiratory disease); and (c) terms used previously for CM,⁹ which included TM terms (Table 1). In addition, we searched the reference lists of articles that had previously conducted systematic literature reviews on similar topics to ours.

Review Process

The systematic review process was guided by the Cochrane Collaboration¹⁷ and the Centre for Reviews and Dissemination¹⁸ and the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines¹⁹ as outlined in Figure 1.

After removing duplicates, AG and SL independently examined titles and abstracts using Covidence systematic

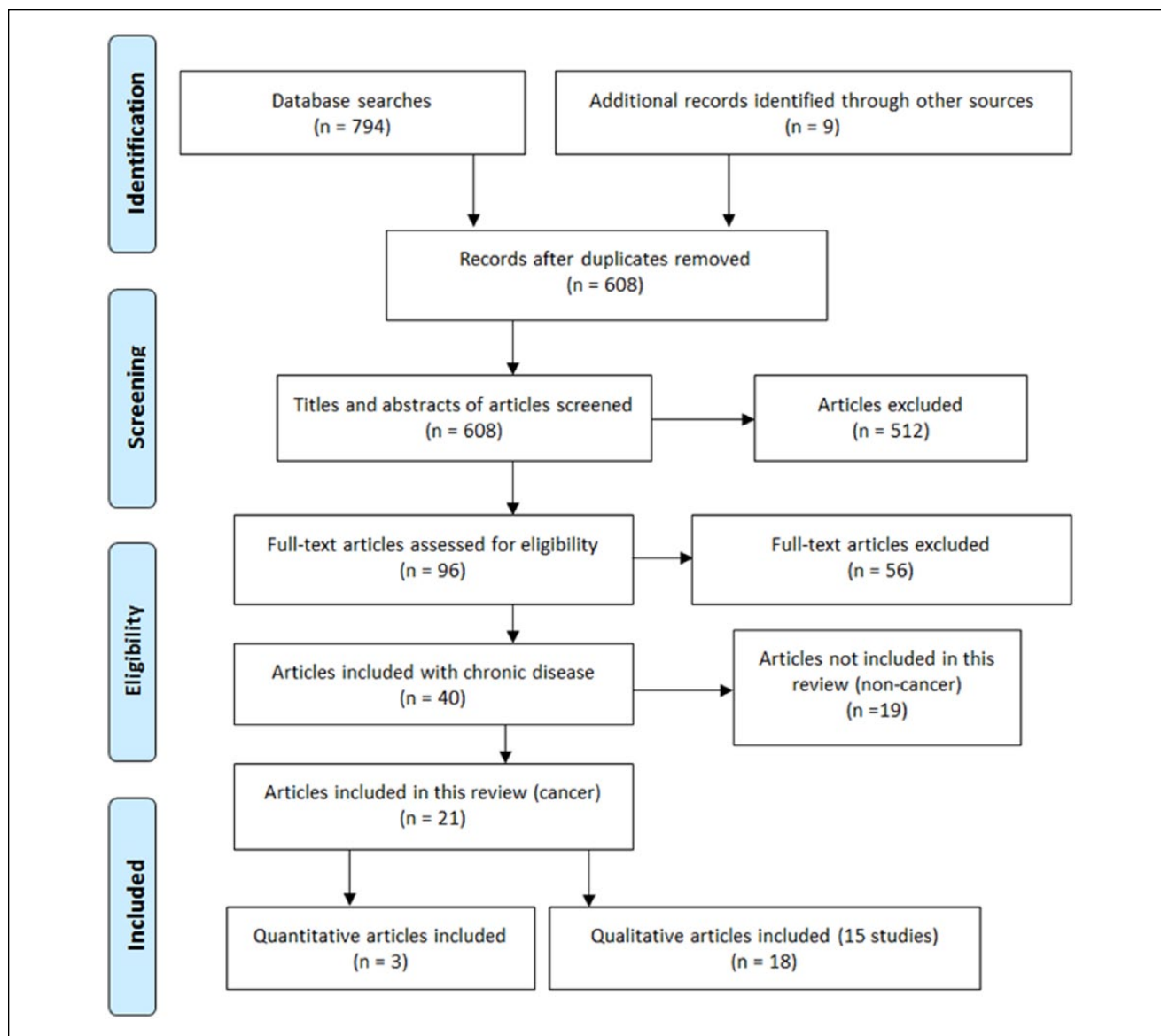


Figure 1. Study selection and PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flow diagram.

Reasons for exclusion: nonindigenous population; indigenous population outside Australia, Canada, New Zealand, and the United States; no traditional and complementary medicine (T&CM) use reported; relevant diseases not mentioned in their chronic form (cancer, cardiovascular disease, kidney disease, diabetes type 2, or respiratory disease); nonhuman records, for example, animals or plants; not an empirical article reporting original research in an IMRaD (Introduction, Methods, Results, and Discussion)-style manuscript; not peer-reviewed; no participants aged 18 years or older; pre-2000; non-English; no indigenous breakdown of results.

review software.²⁰ Articles not meeting eligibility criteria were excluded. All retrieved full-text articles were independently assessed by AG and SL and the reasons for excluding articles were documented and discrepancies were resolved by consensus. Extraction of data in qualitative studies was conducted via the Joanna Briggs Institute's method of qualitative research synthesis (meta-aggregation) as it avoids reinterpreting data and attempts to accurately and reliably present the findings of included studies consistent with the intent of the original authors.²¹ AG and SL independently

piloted this approach²¹ to achieve consensus on interpretation and data extraction. AG and SL then proceeded with double independent extraction of findings, categories and synthesised findings from qualitative studies. Extraction discrepancies were documented and discrepancies were resolved by consensus.

Quality Appraisal of Studies. The methodological quality of each publication was assessed by AG and SL using separate tools for quantitative and qualitative studies. Quality

Table 1. Free-Text Terms for All Databases and Controlled Vocabulary for CINAHL.

Search Terms	
Indigenous population terms	[Title/Abstract search: Indigenous OR Aborigin* OR Torres Strait Islander* OR Māori* OR American Samoa* OR First Nation* OR Canadian Indian* OR Native American* OR American Indian* OR Inuit* OR Métis OR Eskimo* OR Alaska* Native* OR Aleut OR Native Hawaiian* CINAHL headings: Indigenous peoples OR American Samoa]
Chronic disease terms	[Title/Abstract search: cancer* OR neoplasm* OR heart disease* OR cardiovascular disease* OR kidney disease* OR renal disease* OR diabetes OR respiratory disease* OR lung disease* CINAHL headings: Neoplasms; Diabetes Mellitus; Cardiovascular Diseases; Kidney Diseases; Respiratory Tract Diseases]
CM and TM terms	[Title/Abstract search: complementary medicine* OR complementary therap* OR alternative medicine* OR alternative therap* OR natural medicine* OR natural therap* OR holistic medicine* OR holistic therap* OR Integrative medicine OR traditional medicine* OR bush medicine* OR traditional medicine practice* OR ethnomedicine* OR traditional healer* OR traditional practitioner* OR traditional health practice* OR native American medicine* OR Native American healing practice* OR spiritual treatment* OR medicine man OR medicine men OR native medicine* OR aboriginal healer* CINAHL headings: Alternative Health Personnel; Alternative Therapies]

Abbreviations: CINAHL, Cumulative Index to Nursing and Allied Health Literature; CM, complementary medicine; TM, traditional medicine.

assessment for the quantitative studies was conducted using the Newcastle-Ottawa Scale (NOS) modified for prevalence studies²² and a 6-item critical appraisal tool was used for the qualitative studies developed by Kuper et al.²³

The NOS scale authors report that the scale has face/content validity and interrater reliability.²⁴ The modified NOS produce a rating out of 5. It assesses the representativeness of the sample, the sample size adequacy, nonresponse, measurement of variables and the quality of the descriptive statistics reporting. Consistent with Cochrane guidance,¹⁷ we made minor adaptations to the NOS to fit the specifics of our review question. Specifically, we altered the first NOS item to score studies on variability in remoteness, socioeconomic status, gender, and age. In addition, we modified the fourth NOS item to represent our topic of interest, T&CM, by keeping the validated measurement tool and adding the need for a T&CM definition.

The Kuper et al²³ quality assessment tool for qualitative studies produces a rating out of 6. The 6 questions cover: sampling, data collection, data analysis, transferability, ethical issues, and reflexivity and the overall clarity of the study. AG and SL piloted the measures, introducing half marks for items that had 2-part questions and agreed upon a scoring system based on our research question. Furthermore, studies with no ethnic breakdown reported, received a reduced score, as we were unable to distinguish Indigenous from non-Indigenous participants.

Ethics. Ethical approval was not required for this systematic literature review.

Results

Of the 794 records retrieved, 195 duplicates were removed and 599 records were screened by title and abstract. An

additional 9 records were identified through checking the reference lists. Of the 608 abstracts considered for inclusion, 96 full-text articles were assessed for eligibility, and 40 records were subsequently considered eligible for inclusion. Of these records, 21 were cancer-related, and as such other chronic conditions were excluded (see Figure 1).

Characteristics of the Included Articles

The 21 articles represented 18 individual studies: 3 were conducted in Australia,²⁵⁻²⁹ 4 in Canada,³⁰⁻³³ 3 in New Zealand,³⁴⁻³⁶ and 8 in the United States.³⁷⁻⁴⁵ Most were qualitative,^{26-33,35-42,44,45} (n = 15, 83%), including 2 case studies,^{32,38} and all 3 quantitative studies were cross-sectional.^{25,34,43} All quantitative studies assessed TM as a subset of CM, where the qualitative studies differed in their focus, with 10 (75%) exclusively examining TM and/or TM healers; 2 from Australia, 4 from the United States, 3 from Canada, and 1 from New Zealand.

Most studies included participants from urban/accessible areas (n = 6; 33%), or rural areas (n = 8; 44%) and were conducted in a range of clinical and community settings. Most studies contained solely Indigenous participants (n = 13; 72%) and females (83.9%). Sample sizes varied extensively, with single clinical case studies, 126 in the largest qualitative study and 248 in the largest quantitative study; with both samples 100% Indigenous. For those studies that reported cancer type (n = 15; 83%), most included participants with breast cancer (40.5%), followed by digestive organ cancers (14.2%) and lung cancer (12.7%).

Of the quantitative studies, only the Australian study exclusively sampled an Indigenous population (from Queensland, a state of Australia), whereas the others sampled small (n = 26) and moderately sized (n = 129) Indigenous subgroups. Seven of 15 qualitative studies investigated TM

Table 2. Characteristics of Included Quantitative Studies.

Authors (Year)	Setting	Study Design	Indigenous Sample Size (Indigenous % of Total Sample)	Sex for Indigenous Sample Only	Data Collection Method	T&CM Use for Indigenous Sample Only	Discussions Regarding T&CM Use With HP	Quality Assessment Score/5
<i>Australia—Aboriginal and Torres Strait Islander</i>								
Adams et al (2015) ²⁵	62.9% urban, 37.1% outer regional outpatient clinics large public hospitals	Quantitative cross-sectional	248 (100%)	57% female	Structured questionnaire delivered face-to-face	47 of 248 (18.7%) used T&CM	NR	4.5
<i>New Zealand—Maori</i>								
Chrystal et al (2003) ³⁴	Outpatient clinics at a regional cancer treatment center unit	Quantitative cross-sectional	26 (13%)	NIB	Self-administered postal questionnaire	15 of 26 (57.7%) used T&CM	NIB	0.5
<i>USA—Alaskan Native, Native American, and Native Hawaiian</i>								
Maskarinec et al (2000) ⁴³	State of Hawaii	Quantitative cross-sectional	129 (12.9%)	NIB	Self-administered postal questionnaire	45 of 129 (29.8%) used T&CM	NR	3

Abbreviations: NIB, no Indigenous breakdown; NR, not reported; HP, health professional(s); T&CM, traditional and complementary medicine.

and/or CM use exclusively, with 2 of these 7 being case studies. Four qualitative articles intentionally reported on TM and/or CM as a subset of a broader focus, often indicated by mention of these practices only in the abstract. Seven qualitative studies referred to TM and/or CM in a section of the results not devoted to their use.

Using the modified Newcastle-Ottawa scoring guide,²⁴ the overall scores assigned to each quantitative study out of a possible score of 5 was 4.5, 3.5 and 0.5 (see Table 2). Using the quality assessment tool of Kuper et al²³ for qualitative studies, we assigned the 15 studies scores ranging from 1 to 5.5 (mean = 3.41) out of 6 possible points (see Table 3).

Quantitative Study Findings

Three quantitative studies were conducted, one each in Australia,²⁵ New Zealand,³⁴ and the United States.⁴³ Two studies focused exclusively on T&CM,^{34,43} and one reported T&CM use within a broader study not focused on T&CM use.²⁵ One study included broad terms to assess T&CM use (eg, “traditional Indigenous practitioner,” “complementary medicine practitioner,” and “relaxation/meditation class”)²⁵ while the other 2 assessed specific therapies.^{34,43} Across the 3 studies, T&CM use ranged from 19% to 57.7%—with Maori reporting the highest use and Indigenous Australians the lowest (note: we are only reporting on the Indigenous populations reported in these studies). Two studies did not provide reasons for T&CM use by Indigenous status.^{34,43} However, Adams and colleagues²⁵ found all users employed T&CM for support with their cancer; however, the specific areas of support were not identified. This Australian study also identified those patients with an education level of

high-school or above were more likely to consult a CM practitioner than those with education levels less than high school ($P = .015$).²⁵

Qualitative Study Findings

Fifteen qualitative studies were conducted: 2 Australian,²⁶⁻²⁹ 4 Canadian,³⁰⁻³³ 2 New Zealand,^{35,36} and 7 United States studies.^{37-42,44,45} Following meta-aggregation, thematic analysis revealed 4 broad themes: (a) perceived efficacy and benefits of T&CM, (b) integrating T&CM with conventional treatments, (c) T&CM use as connection to culture, and (d) impact of health professionals’ views of T&CM (Table 4).

Perceived Efficacy and Benefits of T&CM. The terms used to describe efficacy and benefits of T&CM are often ambiguous, such as *believing in it*,⁴⁰ *healing*,^{30,33,40,45} and *protection*.⁴¹ Three studies reported patients’ belief in T&CM as a cancer treatment,^{35,44,45} with 2 studies reporting patients’ belief that efficacy depends on the strength of their confidence in T&CM.^{28,29} The reported benefits of T&CM included: helping to cope; stress relief; cleansing and strengthening the body; increasing strength, energy, healing and recovery; and improving well-being.^{26-29,33,38,40,41,44,45}

... it’s a bush or root that you boil it up, but there is something in it that is good for insides, just as a cleanser. Makes all your body organs healthy and strong, it gets rid of all your internal stress²⁸

The exclusive use of TM during palliation was associated with “reconnection to land, ancestral and spiritual roots that enhanced the person’s overall well-being”; TM was used to

Table 3. Characteristics of Included Qualitative Studies.

Authors (Year)	Setting	Indigenous Sample size (Indigenous % of total sample)	Age (Years)/Sex of Indigenous Sample Only	Data Collection Method	Methodology	Extent of Use of Indigenous Sample Only	Discussions Regarding T&CM Use With HP	Quality Assessment Score/6
<i>Australia—Aboriginal and Torres Strait Islander</i>								
Prior (2005) ²⁷ /Prior (2009) ²⁶	Women's health clinics, mobile cancer screening venues, gynecology clinics and in the general community	38 (100%) MS	NR/100% female	Face-to-face interviews, focus groups, and field notes	Interpretive ethnography	NR	Women in study feared disclosing TM preference due to potential ridicule	2 and 5.5 ^a
Shahid et al (2009) ²⁹ / Shahid et al (2010) ²⁸	Primary or tertiary care, Aboriginal Health Services or other local support agencies in urban, rural and remote	37 (100%) MS	30-39 (n = 5) 40-49 (n = 19) 50-59 (n = 9) 60+ (n = 4)/78% female	Face-to-face interviews; observations and field notes	Social constructionist framework	22 mentioned (59%)	NR	5 and 5 ^a
<i>Canada—Aboriginal</i>								
Barkwell (2005) ³¹	Hospital servicing a reserve community and the outskirts of the reserve	18 (58%) MS	NR/NR	Open-ended face-to-face interviews loosely based on Kleinman's explanatory model	Grounded theory	NR	NR	3.5
Clarke and Holstander (2010) ³²	NR	1 (100%)	NR/100% female	Observation (field notes)	Case study of Medicine Wheel teachings	1 (100%)	NR but HP aware	1
Mehl-Madrona (2008) ³³	NR	47 (100%)	Age range from 20 to 89/NR	Face-to-face interviews	Schatzman's 1991 grounded method	100% (eligibility criteria)	NR	3
Poudrier and MacLean (2008) ³⁰	Aboriginal organizations, universities and cancer centers in cities, rural, and First Nations communities	12 (100%)	42-75/100% female	Interviews and photography	Photovoice and feminist epistemology	NR	NR	4.5
<i>New Zealand—Maori</i>								
Dew et al (2015) ³⁵	Local community health services and hospitals	19 (55.9%)	Maori M = 59/NIB	Semistructured Interviews	NR	8 (42%), 4 no, but had considered	Yes, including conflict, % not reported	3.5
Walker et al (2008) ³⁶	Cancer Society Centre (feedback session), residential facilities for cancer patients and whanau	44 (100%) MS	Early-20s to mid-70s/NR	Face-to-face focus groups and interviews	Thematic data analysis incorporating feedback hui (member checking)	NR	NR	2.5

(continued)

Table 3. (continued)

Authors (Year)	Setting	Indigenous Sample size (Indigenous % of total sample)	Age (Years)/Sex of Indigenous Sample Only	Data Collection Method	Methodology	Extent of Use of Indigenous Sample Only	Discussions Regarding T&CM Use With HP	Quality Assessment Score/6
USA—Alaskan Native, Native American, and Native Hawaiian								
Arthur et al (2012) ³⁷	University Medical Centre (teaching hospital) in small city	1 (7%)	66/100% female	Semistructured face-to-face interviews	Grounded theory	1 (100%)	NIB	1.5
Bucher (2008) ³⁸	Tertiary care hospital	1 (100%)	65/100% female	Observation (field notes)	Case study	1 (100%)	NR but HP aware	1
Canales (2004) ³⁹	NR	6 (100%) 14 had no cancers	39 to 75, M = 53/100% female	Open-ended face-to-face interviews	Grounded theory	NR	NR	3
Haozous et al (2011) ⁴⁰	Regional cancer clinic servicing reservations	10 (100%)	M = 54 years (range 31-75 years)/90% female	Face-to-face interviews and semistructured questionnaire using Brief Pain Inventory—Short Form	Lincoln and Guba's criteria for methodological rigor in qualitative analysis (p. 405)	NR	NR	5.5
Hohl et al (2016) ⁴¹	Urban tribal clinics	82 (100%) MS	NR but eligibility >21 years/69% female	Open-ended question interviews via phone or face-to-face	NR	33%	Mixed, some reported and some did not—mixed responses when reported, both positive and negative	4
Itty et al (2014) ⁴²	Community clinics and community centers	126 (100%) MS	NR/70.6% female	Focus groups	Constructivist grounded theory	NR	Mixed reporting, many barriers identified to communication	4
Sruthers and Eschiti (2004) ⁴⁴ /Sruthers and Eschiti (2005) ⁴⁵	Participant homes, offices and 1 at their reservation	4 (100%)	49 to 61/75% female	Face-to-face interviews	Qualitative phenomenological methodology	4 (100%)	One participant disclosed after doctors noted unusual improvement—felt they needed to educate the HPs	3.5 and 3.5 ^a

Abbreviations: NIB, no Indigenous breakdown; NR, not reported; MS, mixed sample of cancer patients/survivors and caregivers; HP, health professional(s); T&CM, traditional and complementary medicine.

^aRepresents the quality assessment score for the 2 articles included in this column in the order that they appear.

Table 4. Findings Summary of Main Themes Identified via Meta-Aggregation.

Themes	Key Findings	Example Quotes
Perceived efficacy and benefits of T&CM	Ambiguous terms to describe T&CM efficacy Belief in T&CM Holistic benefits of T&CM T&CM used to reduce side-effects and assist in palliation Lack of evidence about efficacy or risks of T&CM can reduce use	"13 (93%) of the CAM users expressed belief in CAM and/or valued CAM." (Arthur et al)^{37(p235)} "I firmly believe that 75% of why I'm going to make it is going to be because of Indian medicine. Somehow or another it's working. I don't have the kind of faith in your medicine that I have in Indian medicine. I still give some credit to Western medicine and so, I have to give you guys [Western doctors] 25%." (Struthers and Eschiti)^{44(p18)} "All of the women interviewed shared the importance of balancing mind, body, and spirit in their efforts toward taking care of self and achieving a state of health and well-being." (Canales)^{39(p422)} "A connection to spirituality and holistic health worldview: Healing is mental, emotional and spiritual as well. For some participants the application of bush medicine was not only seen as relieving stress but was also seen as an enabler in maintaining their connections and beliefs on culture, ancestors and spirituality. The practice of bush medicines confirmed and supported participant's cultural beliefs and attitudes that conformed to Aboriginal understandings and epistemologies of health and wellbeing as holistic." (Shahid et al)^{28(p4)} "Linda developed pneumonia while undergoing chemotherapy and was hospitalized for 3 weeks. She lost 20 pounds. Family members contacted the medicine man, and Linda was given another herb to help stimulate her appetite." (Bucher)^{38(p113)} "He asked about alternative medicines. One relative who was in America had told him about a plant that could be used that was better than <i>chemo and radiation</i> and so he asked for information that could <i>prove that</i>, but he got no further information. Proof was particularly important as he had another relation who had died from cancer many years before after rejecting radiation and using an alternative approach in Mexico, so he concluded that "<i>I'm afraid I've got no trust in them.</i>" (Dew et al)^{35(p146)}
Integrating T&CM with conventional treatments	Integrated T&CM with conventional treatment T&CM used for curative properties, coping or preventing recurrence Rejection of conventional treatment and opt for TM only Seeking TM after failure of conventional treatment	"CM users did not express a current or continued dissatisfaction with their conventional cancer treatment. Instead, they expressed satisfaction with the combination of conventional treatment and CAM use, because they did not want to limit themselves to conventional medicine alone." (Arthur et al)^{37(p236)} <i>You have to use both [traditional and conventional]. But in terms of taking care of myself, obviously I've swung right back over toward [traditional] . . . but obviously a modern lab makes my Dim [dinomethyl], makes my Q-Co-10 [herbal remedy]. I'll do whatever, but I grow my own burdock [for tea].</i> (Canales)^{39(p418)} "Adverse reaction from biomedicine: <i>Radiation and chemo nearly killed me. I know a couple of people who chose the bush medicine once they read up about chemotherapy and the two per cent of people that chemo cured, they took their chances with the bush medicine, and they are still going. It's either the quality of life or being sick from the chemo, that's what they weighed up.</i> (Shahid et al)^{28(p6)} "There are some Aboriginal people who use traditional medicine as an alternative to Western medicine. Both cancer patients and the family members felt some people get scared about the intensive procedures of common cancer treatments and their side-effects, influencing them to choose other options instead." (Shahid et al)^{28(p6)}

(continued)

Table 4. (continued)

Themes	Key Findings	Example Quotes
T&CM use as connection to culture	Indigenous holistic concept of health ways of healing T&CM use to counter spiritual forces/payback Family and community encouraged use Fits with cultural values and beliefs Opposed to conventional medicine Connection to family (bridges isolation gap) Didn't want to be far away from home/family	"They participated and took initiative in their treatment because of the belief that wellbeing is holistic. A holistic view of wellbeing meant that the conventional treatment plan was only part of their solution." (Arthur et al)^{37(p236)} "Making connections with community and family provided important coping for a population that is economically, socially, and physically isolated . . . <i>There's traditional medicine, I believe in it, too. Because all your relatives come together. I really like the environment when everybody comes as one, and it makes you feel real good. It makes you feel just uplifted.</i> While participants referenced different spiritual foundations to their prayer, the common theme in these interviews was the power of spirituality to bring people together." (Haozous et al)^{40(p408)} "Generally the women in this study had a good knowledge of environmental and biological causes of cancer but they also believed in the spiritual forces of 'bad spirits' aroused as 'payback' to inflict the victim with a serious disease like cancer. Such beliefs added to the difficulty of the patients who may be reluctant to talk about their disease for fear of bringing shame to their family. But an important aspect of this view that cancer was a result of 'payback' were the beliefs that traditional medicine and Aboriginal healers were essential to the health care of the sick person, either with or maybe instead of, conventional medical treatment." (Prior)^{27(p9)} "She respects the fact that her family has decided to follow Christian ways; however, she wants her passing to be marked in traditional ways. This means that certain ceremonies must take place for her to have a peaceful transition to the spirit world." (Clarke and Holtslander)^{32(p34)} "Shelley, who identified as a Métis woman and had recently re-connected to her family's cultural values and traditional practices, took a photo of her family sweat lodge explaining that it was a salient part of her recovery from breast cancer. For her, it was a source of connection to traditional values and family and a source of strength. The sweat lodge was also seen as a safe place for healing—a place free of racism." (Poudrier and Mac-Lean)^{30(p311)} <i>The sweat lodge ceremony is a big part of my life and that's where I did most of my healing . . . Anything and everything in there is safe. Everything in there is equal because when that door is closed its black. So nobody, there's no color. There's no racism in there. There is nothing in there. It's really like a positive experience.</i> (Poudrier and Mac-Lean)^{30(p312)}
Impact of health professionals' views of T&CM	Lack of knowledge of T&CM by health providers Health professionals dismissive of TM Health professionals' lack of respect for TM hinders communication Patients unlikely to disclosure T&CM usage due to negative responses of health professionals	"Service providers need to acknowledge and understand the existence of Aboriginal knowledge (epistemology) and accept that traditional healing can be an important addition to an Aboriginal person's healing complementing Western medical treatment regimes." (Shahid et al)^{28(p1)} "She <i>didn't trust the Western medical system</i> because in her view it belittled Maori medicine and people were still dying under western medical treatment." (Dew et al)^{35(p146)}

(continued)

Table 4. (continued)

Themes	Key Findings	Example Quotes
		“The women in this study recalled their apprehension about declaring preferences for traditional approaches to treatment because they feared being ridiculed by the hospital staff. The culturally appropriate mantra of cancer control misses the point unless there is a deeper engagement of Aboriginal people in their own health care, so that real choices are possible and the significance of culture is understood and respected.” (Prior)^{26(p285)} “Though most respondents who discussed the use of traditional medicine with their care providers were met with support, some participants were either reluctant to share this information with care providers or felt disregarded, such as this survivor who reported: <i>I tried to (discuss traditional medicine with providers). It was kind of one of those things where they didn't want to hear it. They didn't want to discuss it . . . They didn't take the things I said seriously. They treated me like I was a complete idiot, and that was really, really difficult.</i>” (Hohl et al)^{41(p2441)} “The data suggest that when conventional providers respect native beliefs and traditions, are knowledgeable about natural practices, and recognize the influence of traditional world views on Native women's health and health care decisions, Native women are more open to, and trusting of, the conventional health care system.” (Canales)^{39(p433)}

Abbreviation: T&CM, traditional and complementary medicine.

reduce side effects of chemotherapy, including weight and appetite loss.³⁸ For many patients, TM was described as a highly valued Indigenous way of healing that was attributed to health improvements.^{28,30,40,44} TM was said to work best when patients are diagnosed early, believe in the value of TM, and have a strong desire to fight cancer.⁴⁴ Some participants had safety concerns about TM—citing the paucity of evidence relating to efficacy, the lack of prescription information and previous experiences of allergic reactions or interactions with other medications.^{28,35}

Integrating T&CM With Conventional Treatments. Most participants used T&CM alongside conventional cancer treatments,^{28,35-39,42,44} while a minority replaced conventional treatments with TM.²⁸ Some participants used TM for curing their cancer,^{28,30,44} some for healing and coping, and others to prevent recurrence,³⁹ while some used it only as a last resort.^{28,35} One participant speaks of fully integrating the 2:

In between having my surgery, convalescing, and coming back home, they had done ceremonies to heal me.⁴⁴

One participant explains why some people rely solely on TM:

I know a couple of people who chose the bush medicine once they read up about chemotherapy . . . they took their chances with the bush medicine, and they are still going. It's either the

quality of life or being sick from the chemo, that's what they weighed up.²⁸

Integrating TM and conventional medicine was common for some participants and this flowed naturally into their cancer treatment.^{28,39,44} Some participants used T&CM on recommendation from community members or after seeing others benefit.²⁸ Some decided against using conventional treatments in order to stay with family and community or due to their care responsibilities.²⁸

T&CM Use as Connection to Culture. Evidence that Indigenous cancer patients employ alternative health paradigms when using TM is consistent with Indigenous holistic conceptions of health.^{28,36,37,39,42,44} TM was associated with spirituality in all Indigenous cultures and the practice of TM with holistic healing.^{28,36,37,39,42,44} Prior and colleagues argued that TM usage is an active choice that fits with Indigenous cultural values²⁶ and offers Indigenous patients a safe place for healing that is free of racism.³⁰ Some participants expressed distrust and opposition to conventional treatment:

I said, “No, I'm not going that way. I'm going to stay with the rongoa”. The Māori herbal way.³⁵

The role of TM in maintaining family and community connections was an important coping mechanism for

participants; particularly given the common shame and stigma associated with a cancer diagnosis.^{28,40,42} The communal nature of many TM therapies encourage connection between patients, family, and community.^{26,28,30,35,38,40,42,44} Many participants desired to use TM,^{28,35,42,44} however, reported barriers facing urban participants included distance from traditional healers who are predominantly in remote and rural areas,^{28,35,42,44} uncertainty about accessing TM,^{28,35} lack of connection to Indigenous culture, and a preference for conventional medicines.

Indigenous Australians spoke of cancer being caused by spiritual forces associated with “payback,”²⁸ and TM was seen as essential in countering such forces.²⁸ For some, TM ensured a peaceful passage into the afterlife.^{32,38} Shahid and colleagues²⁸ stated that many Aboriginal Australians were brought up on missions with strong Christian beliefs that associated TM with paganism:

We didn’t use traditional medicine or anything like that. Because we are not traditional Aboriginal, and our family was Christian based, and so . . . We put our trust on God.²⁸

Impact of Health Professionals’ Views of T&CM. When conventional healthcare providers respected and had knowledge of TM, Indigenous patients’ satisfaction reportedly increased,^{28,39,41} and they had confidence and trust in conventional medical services.^{28,39} Participants who used CM and/or TM were reportedly more actively engaged in their treatment plans.^{26,37}

Most studies found that health professionals had little understanding of traditional beliefs and values of Indigenous cultures,^{26-30,36,39,41,44} which negatively affected communication and patients satisfaction.^{29,36} Some authors argue that culture and spirituality is central to healing and argue that TM could improve cancer outcomes.^{28,44} Health professionals need to counter “white man’s authority”²⁷ in health care and better “negotiate a balance between the different cultural paradigms.”²⁶ TM use had variable support from health professionals and there was a perceived lack of respect for TM, which arguably hinders patient-provider communication, reducing the likelihood of patients disclosing their T&CM use. Some participants felt belittled in their choice to use TM,^{35,39,41} as one participant describes:

I tried to (discuss traditional medicine with providers). They didn’t take the things I said seriously.⁴¹

While a minority of health professionals were openly accepting of TM, some participants reported some of their health care providers were personally interested in TM, but reluctant to openly discuss it, as it is generally disapproved of in conventional healthcare settings.⁴¹

Discussion

This systematic review reports on the use of T&CM by Indigenous cancer patients in Australia, Canada, New Zealand, and the United States. We identified 21 journal articles²⁵⁻⁴⁵ from 18 studies that inform understandings of usage of T&CM across all 4 countries.

Most of the articles in this review were qualitative, with 7 investigating T&CM use exclusively.^{28,32,33,37,38,44,45} Two^{32,38} of these were case studies; 4 articles reported TM and/or CM use as a component of a broader study (eg, a study on quality of life)^{29,35,39,40}; and the remainder made some reference to T&CM use within their results.^{26,27,30,31,36,41,42}

The number of quantitative studies was small. All explicitly focused on TM and/or CM use, but only 1 Australian study exclusively sampled an Indigenous population (Queensland, a state of Australia),²⁵ whereas the others sampled^{34,43} Indigenous people as a subgroup. The estimated extent of T&CM use in the quantitative articles varied from 19% in Indigenous Australians,²⁵ 58% in Maori in NZ³⁴ and 29.8% in Native Hawaiians.⁴³ The Australian study may have produced the lowest estimate because of the limitations of having only 5 options for reporting the type of T&CM used in a structured questionnaire, which would miss some types of T&CM. In contrast, the US study⁴³ and the NZ study³⁴ collected much more detailed T&CM information asking 21 and 19 questions, respectively. The estimate of T&CM in Native Hawaiians may be lower relative to the New Zealand study as the study collected data pre-2000, which yields lower estimates relative to studies conducted in the year 2000 or after.⁷ It is known that restricting CM use to certain categories or treatments reduces estimates,⁷ and makes comparisons difficult. Therefore, the use of consistent definitions and measurements are recommended using standardized and validated tools such as the International Complementary and Alternative Medicine Questionnaire (I-CAM-Q).⁴⁶ While standardization is critical improving overall understanding of the types and prevalence of T&CM use among Indigenous people, the validity of such tools to measure the diversity of TM is often questioned.⁴⁷ It has been previously reported that when evaluating CM use in ethnically diverse populations, ethnic-specific modalities should be recognized⁷; this should also include TM.

High heterogeneity was observed in the quantitative studies, which is consistent with the 2012 systematic review and meta-analysis of CM use in non-Indigenous cancer patients that reported estimates ranging between nine and 88%.⁷ These disparate estimates speak to the importance of consistency in survey methods. In light of this, we advocate following the recommendations of Horneber and colleagues’ review⁷ to improve the relevance, reliability, validity, and reporting of future surveys assessing CM use in

cancer patients. These recommendations relate to improvements in the conduct and reporting of future surveys of CM use in cancer patients, and specify 10 quality criteria, with recommendations on how these criteria should be fulfilled and reported.

It is evident from the current thematic analysis that Indigenous populations perceive T&CM as more than just a treatment for physical symptoms, and a cure for cancer. Indigenous people who use T&CM also do so as intrinsic to their wider belief system as a means of maintaining connections with family and community.¹³ Similarly, Iwasaki et al⁴⁸ found that Indigenous people in Canada used T&CM as a means to impart spirituality, which they see as *sacred* and *fundamental* to their lives; in particular to their ability to cope and heal from their diabetes.⁴⁸ It is important that health professionals recognize this and be respectful when engaging in conversations about T&CM use. This also speaks to the importance of creating safe spaces in health services to make patients feel comfortable discussing T&CM and disclosing its use. The importance of open and effective patient-clinician communication is paramount to assessing the potential risks and benefits associated with the use of T&CM in the cancer setting.^{49,50} Indeed, effective, safe, and coordinated care for Indigenous cancer patients relies on shared open decision making and communication across patients, communities, and health care providers. Therefore, it is important for health professionals and policymakers to ensure that the care afforded to Indigenous cancer patients is culturally relevant, safe, effective, and optimal wherever and as much as possible.

Future research in this area would benefit from addressing some of the questions not addressed in the current review. In particular, studies looking at predictors of T&CM use in Indigenous populations. For instance, does the use of T&CM have an impact on the time taken to seek Western medical treatments for cancer? What are Indigenous people's perceptions and beliefs regarding the ability for T&CM to prevent or cure cancer; does this impact or prompt T&CM use? Its questions like these that will help to form a clearer understanding about the potential motivations and predictors of T&CM use in Indigenous populations. Furthermore, there is a clear lack of research focused on determining the actual percentages of Indigenous people from Australia, Canada, New Zealand, and the United States that are using T&CM either alongside or instead of conventional cancer treatments. Without accurate quantitative data in this area, we are not able to show the significance of this phenomenon.

Conclusion

The current review identified wide variations in the estimates of T&CM use among Indigenous cancer patients, perhaps due to methodological variety across studies. This

review highlights the importance of understanding the cultural beliefs of Indigenous people with cancer about the effectiveness and safety of T&CM, and in providing clinical information known about the T&CM treatments to enable Indigenous people to make informed choices. These findings are also a reminder of the importance of reflexivity when working with Indigenous populations, to recognise and set aside health professionals' own backgrounds, positions, perspectives, paradigms, experiences, and biases, which have an impact on attitudes to T&CM use and patient-practitioner relations. The review results highlight a critical need for further research investigating T&CM use, decision-making and information seeking among Indigenous cancer patients, to help inform health practitioners and policy makers on how to create culturally relevant, safe, effective, and optimal care for Indigenous cancer patients wherever and as much as possible.

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